Fundamental Concepts in Economics

Lesson 1 to 22

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CONTENTS

FUNDAMENTAL CONCEPTS IN ECONOMICS

	Credit	Lecture	Tutorial	Practical
	4	3	1	0

Course Outcome

By the end of the course student will be able to:

- understand basic concepts of economics.

- understand the budget document.

- evaluate the performance of the Indian economy.

- identify and discuss national and global economic issues.

Unit - I

Definition of economics, nature of economic problem, Concepts and measurement of utility, law of diminishing marginal utility-its practical applications and importance Law of demand, elasticity of demand (price, income and cross)-Measurement, practical importance and applications. Law of supply, elasticity of supply and its practical applications.

Unit - II

Theory of Production: Stages of production function; Returns to factor proportions; Return to scale; Elasticity of substitution; Technical progress and production function; Cost and Revenue Analysis (traditional and modern theories of cost).

Unit - III

Equilibrium of the firm-marginal analysis: Optimum factor combination and product combination. Meaning of market, types-Perfect, Monopoly, Oligopoly, Monopolistic (Main features only).

Unit - IV

Concept of Gross Domestic Product, Gross National Product, National Income and Disposable Income. Aggregate demand and supply (Both open and closed economies) Basic concepts of inflation, deflation, stagflation, business cycles and Balance of Payment (with special reference to India's BOP). Reserve Bank of India (RBI); Its working, functions, performance and role in the economic development of India; RBI's monetary policy

Unit - V

Growth and Structure of Indian Economy Since 1950. Growth of Indian economy since 1950. Trends in the nature and magnitude of poverty, inequality and unemployment. Trends in agricultural and industrial production and productivity. India's developmental pattern-Successes and failures.; India's engagement with International Financial Institutions IMF, IBRD (World Bank), Asian Development Bank (ADB). International Development Association (IDA).

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NATURE AND SCOPE OF ECONOMICS

Structure

1.1.   Introduction

This unit aims to explain the nature and scope of economics. It covers the meaning of economics, various definitions, and the nature of economic problems within an economy. Interestingly, the number of economics definitions seems to match the number of economists worldwide. Let's begin by exploring the basic concepts and key definitions of economics.

1.2.   Learning Objectives

- To learn about economics
- To study the nature and scope of economics

1.3.   Meaning of Economics

According to Lionel Robbins, "Economics is a science which studies human behaviour as a relationship between ends and scarce resources which have alternative uses." Here ends refer to wants which are considered to be unlimited. The allocation and utilization of limited resources for producing goods and services should aim to achieve maximum satisfaction. This principle is relevant to both individual decisions and the overall functioning of society.

Adam Smith says, "Economics enquires into the nature and causes of wealth of nations." According to Ricardo, economics studies "how the produce of the earth is distributed", which deals with the distribution of income and wealth. There has been a lot of controversy among economists about the true scope of economic theory and its subject matter. Therefore, the subject matter of economics or economic theory has been variously defined. A great confusion has been created about the true nature and scope of economics because of these

numerous and conflicting definitions of economics. According to J.M. Keynes, "Political economy is said to have strangled itself with definitions." In the words of Jacob Viner, "Economics is what economists do." To understand what economics entails, it is essential to explore its scope and subject matter by examining the fundamental economic issues it addresses. Let's begin by identifying the key factors that lead to the emergence of economic problems.

Self-Check Exercise-1

Q1. Define Economics.

### 1.4. The Economic Problem: Scarcity and choice.

The starting point of economics is human wants, needs, and desires. An economy exists because of two basic facts: human wants for goods and services are unlimited, and productive resources with which to produce goods and services are scarce. With our wants being virtually unlimited and resources scarce, we cannot satisfy all our wants and desires by producing everything we want.

Given this situation, a society must determine how to utilize its limited resources to achieve the greatest possible satisfaction for its members. The fundamental issue of scarcity is the root cause of numerous economic challenges that have been a primary focus for economists over time.

Nature of Economic Problems

The following are the main questions which economists have asked from time to time. It is worth remembering that all these economic problems and fundamental questions arise because of the basic problem of scarcity confronting an economy.

1. What goods are produced and in what quantities by the productive resources which the economy possesses?

2. How are the different goods produced? That is what production methods are employed for producing various goods and services.
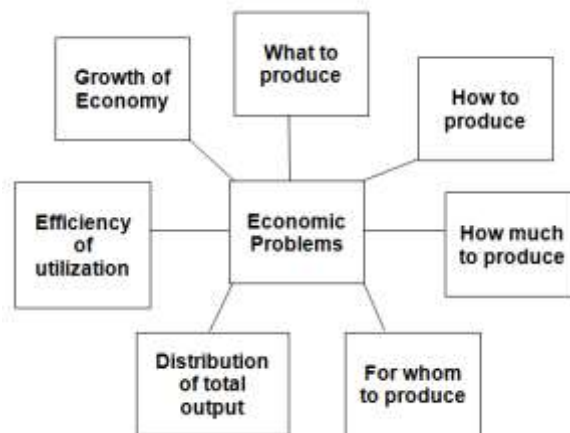
3. How is the total output of goods and services of a society distributed among its people?

4. Are the use of productive resources economically efficient?

5.   Whether all available productive resources of a society are being fully utilized, or are some of them lying unemployed and unutilized?

6.   Is the economy's productive capacity increasing, declining, or remaining static over time?

Economic theory occasionally concerns the sixth question listed above. All of them arise from the fundamental problem of scarcity. All economies, whether capitalist, socialist, or mixed, must make decisions about these economic problems. Therefore, economic theory studies how these decisions are made in various societies.

1.4.1   The Problem of Choice

The nature of the basic economic problems discussed above can be better understood and distinguished from each other using an important tool of modern economics: the production possibility curve (PPC).

1.4.1.1 Production Possibility Curve (PPC) is a graphical representation of alternative production possibilities facing an economy. As the total productive resources of the economy are limited, the economy has to choose between different goods. The productive resources can be used for the production of various alternative goods. It has, therefore, to be decided which goods are to be produced more and which ones less.

Let us assume that there is a given number of productive resources that remain fixed. Although resources are fixed in quantity, they can be shifted from the production of one good to another. Further, assume that the given resources are being used fully with utmost technical efficiency. In other words, we assume that resources are neither unemployed and underemployed nor inefficiently utilised. That means the economy is working on the level of full employment and achieving maximum possible production. We also presume that technology does not undergo any changes. In short, we assume fixed resources, full employment, complete technical efficacy and a given technology. Let's try to understand with the help of PPC.
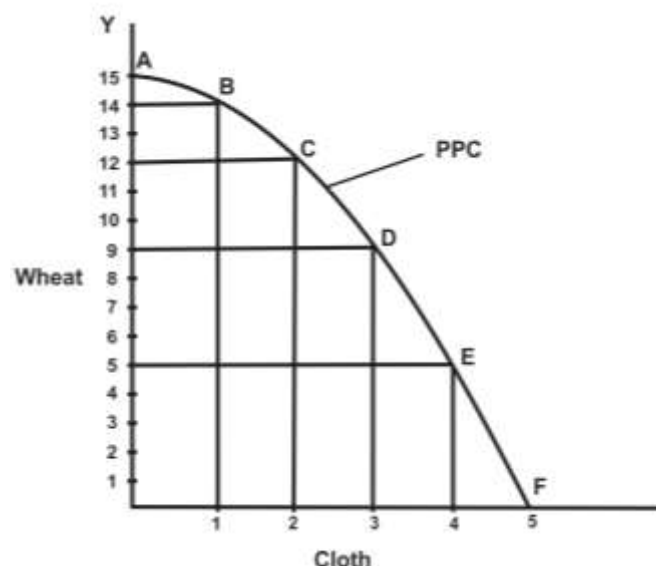
Fig. 1.1 Production Possibility Curve

Table 1.1

Alternative Production Possibility Curve

Production Possibilities	Cloth (in thousand meters)	Wheat (in thousand quintals)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

From the above diagram and table, it is shown that if all the factors of production given are employed for wheat production, it is supposed that 15 thousand quintals of wheat are produced. On the other hand, if all the resources are devoted to producing cloth, 5 thousand meters of fabric are made. These are two extreme possibilities with the PPC (i.e., A and F). In between these two possibilities, there will be many other production possibilities, such as B, C, D and E.

The curve AF in Figure 1.1 obtained from the data in Table 1.1 is plotted. This AF curve is called the production possibility curve, which represents the various combinations of two goods or two classes of goods which the economy can produce with the given number of resources. This production possibility curve, shown in the above diagram, illustrates that in a fully employed economy, an increase in the amount of cloth necessitates a decrease in the amount of wheat. As we move from A towards F on the curve, we sacrifice some units of wheat to have more cloth. On the other hand, if we move up from F towards A, we will be giving up some amount of cloth for the sake of more wheat.

Self-Check Exercise-2

      Q1.   Why does an economy exist?

      Q2.   What is the Production Possibility Curve (PPC)?

      Q3.   Briefly describe the fundamental economic questions arising from scarcity.

1.5   Positive Economics and Normative Economics

Understanding the distinction between positive and normative economics is essential. Positive economics focuses on describing and explaining actual economic situations through theories and laws based on observed phenomena. In contrast, normative economics deals with value judgments, addressing what ought to be or what should happen in the economy. For example, in positive microeconomics, we are broadly concerned with explaining the determination of relative prices and the allocation of resources between different commodities. Positive macroeconomics primarily focuses on understanding how national income, employment levels, overall consumption, investment, and general price levels are determined. In these instances of positive economics, issues such as the ideal prices, appropriate saving rate, optimal resource allocation, and desired income distribution are not addressed. Such questions, focusing on what should be or ought to be, are the concern of normative economics.

The Problem of Underemployment and Under-utilization of Resources

However, during those periods when the economy is not fully utilizing its resources (or not using them efficiently) then there will be unemployment or inefficiency in the use of resources. Which is shown in Figure 1.2 below.
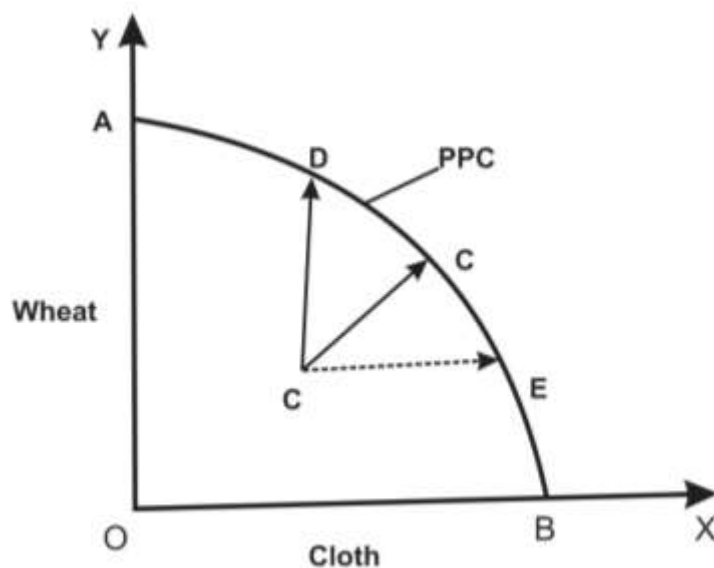
Fig. 1.2 Underemployment and Under-Utilization of Resources

In case of underemployment and under-utilization of resources, the output combination of two products will lie below the economy's Production Possibility Frontier, such as at a point like U in Figure. 1.2. Normative economics focuses on what ought to be and is therefore referred to as prescriptive economics. It addresses questions such as the appropriate price for a product, the fair wage rate, and the equitable distribution of income. Unlike positive economics, normative economics involves value judgments, reflecting people's beliefs about what is good or bad. These judgments are shaped by ethical, political, philosophical, and religious views rather than scientific reasoning or established laws. As a result, normative economics is primarily concerned with welfare-related propositions. Since what is good or what is bad ultimately depends on the welfare of the individual and society.

Self-Check Exercise-3

Q1.   Define Positive Economics.

Q2.   Define Normative Economics.

Q3.   Where would output lie in a case of underemployment and under-utilization of resources on a Production Possibility Frontier (PPF)?

1.6.   Summary

In this unit, we explored the fundamental economic problems faced by an economy. The primary reasons behind these issues are the unlimited nature of human wants and the scarcity of resources to satisfy them. Due to this limitation, it becomes challenging to meet all desires simultaneously. We also examined key economic questions, such as what to produce and how to produce. Whom to produce, etc. These questions and economic problems arise due to the

scarcity of resources and the unlimited human wants. However, to understand these economic problems, we have used the modern economic tool, the Production Possibility Curve. Moreover, we have learned about positive economics and normative economics.

1.7. Glossary

- **Economics:** The term economics is derived from the Greek word 'OiKonomos', meaning the management of the household. The principle of home management. The word economics has something to do with economizing on using means to attain ends since means are scarce and limited.

- **Ends:** Ends refer to wants which are considered to be unlimited.

- **Goods:** Material means of satisfying human wants, desires, and needs.

- **Means:** The instruments or resources used in attaining the perceived objectives.

- **Normative Economics:** This branch of economics focuses on what ought to be or what should happen, involving value judgments based on individual or societal beliefs.

- **Positive Economics:** Positive economics deals with explaining actual economic situations, using theories and laws to describe observed economic phenomena.

- **Production Possibility Curve (PPC):** The PPC illustrates the maximum possible output of two goods that can be produced with available resources and existing technology.

- **Scarcity:** Scarcity refers to a basic economic problem-the gap between limited resources and unlimited wants.

- **Desire, want and Demand:** Desire refers to the wish a person has. Want is a strong feeling of possessing some things. Demand refers to the desire to have a commodity backed by the willingness and ability to purchase that commodity of given price during a period of time.

1.8 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 1.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 1.4.

Answer to Q2. Refer to Section 1.4.1.1.

Answer to Q3. Refer to Section 1.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 1.5.

Answer to Q2. Refer to Section 1.5.

Answer to Q3. Refer to Section 1.5.

1.9 References/Suggested Readings

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1.10. Terminal Questions

Q.1   Define Economics: What are the central economic problems of an economy?

Q.2   What do you mean by PPF? Explain the problem of choice with the help of PPF.

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THEORY OF CONSUMER BEHAVIOUR

Structure

2.1   Introduction:

Every consumer has a limited income, while the range of goods and services available for consumption is vast. Regardless of whether a person's income is large or small, it is never enough to buy everything they desire. Therefore, individuals must make rational choices regarding what to purchase and what quantities. A consumer's spending is considered rational when it is allocated in a way that maximises overall satisfaction. The theory of consumer demand explains the economic principles guiding how consumers should distribute their limited income across various goods and services to achieve maximum satisfaction. In this context, you will explore the principles that a rational consumer should apply to optimise total satisfaction with their spending decisions.

2.2   Objectives

The objective of this lesson is to relate how individual consumers take decisions of consumption in a situation where market prices are given to them and they can't influence the market prices by altering their consumption. This unit will enable you to:

- Explain the meaning of utility.

- State the ordinal and cardinal utility.

- Explain in detail the marginal utility theory of demand.

2.3   The Concept of Utility

Jeremy Bentham introduced the concept of utility to social thought in 1789, while William Stanley Jevons brought it into economic theory in 1871. Utility refers to the capacity of a commodity or service to satisfy human wants. People demand specific goods or services because they expect satisfaction from consuming them. In essence, utility represents the usefulness or value derived from using a product or service. This concept is subjective, as the utility of a good varies from person to person and is rooted in individual psychological experiences. It reflects a person's satisfaction, pleasure, or well-being from consuming or owning a commodity or service. Notably, a product may be harmful or hazardous to health but still holds utility for individuals who desire it; thus, utility lacks ethical judgment.

Several approaches explain consumer demand theory. Among them, two prominent methods are Utility Analysis and Indifference Curve Analysis. Utility Analysis, developed by British economist Alfred Marshall, is often called the Marshallian Utility Analysis. In contrast, Indifference Curve Analysis, proposed by British economist J.R. Hicks, serves as an alternative approach. The Marshallian approach assumes that utility is quantifiable, allowing the satisfaction derived from consumption to be measured. Conversely, the indifference curve approach challenges this assumption, arguing that measuring utility in numerical terms is unnecessary to understand consumer behavior.

2.3.1   Cardinal and Ordinal Utility

To achieve the goal of maximizing utility, a consumer must be able to compare the satisfaction derived from different combinations of goods that can be purchased with their income. There are two primary approaches to comparing utilities: the Cardinalist Approach and the Ordinalist Approach. The Cardinalist Approach assumes that utility can be measured. According to this view, a consumer can assign specific numerical values, known as utils, to the satisfaction gained from consuming various quantities or combinations of goods. While some economists advocate measuring utility in monetary terms, others prefer subjective units like utils. In contrast, the Ordinalist Approach argues that utility cannot be measured in absolute terms but can be ranked in order of preference. This approach suggests that consumers do not need to quantify the exact level of satisfaction from different commodities; instead, they only need to rank consumption bundles based on preference. While cardinal utility provides a measurable index of satisfaction, ordinal utility simply ranks alternatives without assigning specific numerical values.

Self-Check Exercise-1

Q1.   Define the concept of

1)   Utility

2)   Cardinal Utility

3)   Ordinal Utility

Q2.   What is the difference between cardinal and ordinal utility?

2.4   Cardinal Utility Theory

No one is willing to pay for something that holds no utility for them. For instance, I buy a book because it provides me with utility, whereas a vegetarian avoids purchasing meat as it lacks utility for them. Price represents a sacrifice made by the consumer, and no one is willing to make such a sacrifice without receiving some benefit in return.

According to Marshallian Utility Analysis, the utility of a commodity for a consumer can be indirectly measured by the maximum amount of money they are willing to pay for a unit of that good rather than forgo it. For example, suppose you are prepared to pay only Rs. 10 for an orange and not more. In that case, that orange's utility is equivalent to Rs.10. On the other hand, if your friend is willing to pay one rupee for the same orange rather than go without it, the utility of the orange to your friend is one rupee. Thus, the utility of a good for any consumer can be indirectly gauged by the maximum amount they are willing to pay to obtain it.

2.4.1   Assumptions of the Marshallian utility theory

The Marshallian Utility Analysis is based on the concept of cardinal utility and relies on several key assumptions:

1. **Rational Consumer:** The consumer is rational and seeks to maximise utility within the limits of their income.
2. **Cardinal Utility:** Utility is considered measurable and additive, allowing for quantitative comparisons.
3. **Monetary Measurement:** Utility can be measured in terms of money.
4. **Constant Marginal Utility of Money:** This assumption is essential when using money as a measure of utility, implying that the utility derived from each unit of money remains constant.
5. **Diminishing Marginal Utility:** As a consumer acquires more units of a commodity, the additional satisfaction from each subsequent unit decreases.
6. **Complete Knowledge of Commodities:** The consumer is fully aware of the availability and technical characteristics of goods.
7. **Perfect Knowledge of Choices:** The consumer understands all available options for consumption.
8. **Price Awareness:** The consumer knows the exact prices of various goods, and their perceived utility is unaffected by price fluctuations.
9. **Absence of Close Substitutes:** No close substitutes are available for the commodities being considered.

The Law of Diminishing Marginal Utility (LDMU)

Cardinal utility analysis outlines two fundamental laws of consumption:

1. Law of Diminishing Marginal Utility

2. Law of Equi-Marginal Utility

2.4.2 The Law of Diminishing Marginal Utility

The Law of Diminishing Marginal Utility was first introduced by Hermann Heinrich Gossen in 1854 and later popularized by Alfred Marshall, who gave it its present name. The law states that as an individual consumes additional units of a commodity, the satisfaction (marginal utility) derived from each extra unit gradually decreases. In other words, while total utility increases with consumption, it does so at a decreasing rate

This principle reflects human psychology: as consumption of a commodity continues within a limited time frame, marginal utility reduces, eventually reaching zero and possibly becoming negative if consumption persists. According to Marshall, "the additional benefit a person gains from an increase in the quantity of a good diminishes as they acquire more of it."

The following table illustrates the concept of diminishing marginal utility through the consumption of oranges:

Table 2.1: Law of Diminishing Marginal Utility

No of Oranges consumed	Total Utility (In utils)	Marginal Utility (in utils)
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	- 2
8	24	- 4

Marginal Utility (MU) refers to the additional satisfaction gained from consuming one more unit of a commodity. Total Utility (TU) is the cumulative satisfaction derived from all consumed units. It is the sum of the marginal utilities of each unit. As shown in the table, while total utility increases with consumption, the marginal utility decreases and eventually becomes negative after consuming the seventh orange, indicating dissatisfaction from overconsumption.
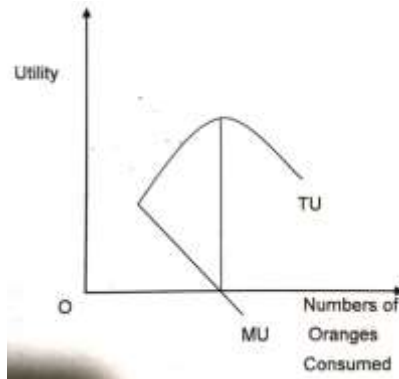
Fig. 2.1 : Law of Diminishing Marginal Utility

The graph illustrating the Law of Diminishing Marginal Utility shows:

- **Total Utility (TU)** increases but at a decreasing rate, peaking when marginal utility reaches zero.

- **Marginal Utility (MU)** declines as consumption rises and becomes negative beyond the point where total utility is maximized.

The law plays a vital role in demand theory. It explains why the demand curve slopes downward—consumers are willing to buy more of a good only at lower prices, as the utility gained from additional units diminishes.

2.4.3 Law of Equi-Marginal Utility and Consumer's Equilibrium

In economic theory, it is assumed that consumers act rationally, aiming to maximize their satisfaction within their income constraints. While consumers desire many goods and services, their income is always limited, making it impossible to purchase everything they want. Regardless of the amount, income is never sufficient to fulfil all wants. Given limited income and numerous desires, a consumer must make rational choices among various goods and services. To achieve maximum satisfaction, they distribute their income in a way that provides the greatest possible benefit. When a consumer selects a combination of goods and services that maximizes satisfaction based on their income, preferences, and market prices, they are said to be in equilibrium. This state of equilibrium implies that any change in consumption would lead to a decrease in total satisfaction rather than an improvement. The Law of Equi-Marginal Utility states that a consumer reaches equilibrium, or maximum total satisfaction when the marginal utilities of different commodities they consume are equal.

At any given time, multiple goods compete for a consumer's limited income. Each good offers a different level of utility per rupee spent. The consumer selects the best available options to ensure maximum satisfaction. When income is allocated in such a way that the last unit of money spent on each good yields the same level of utility, equilibrium is achieved.

To illustrate this, consider a consumer with a daily income of ₹15, who wishes to buy goods X, Y, and Z, each priced at ₹1 per unit. The table below presents the marginal utility schedules for these goods.

Table 2.2 Law of Equi-Marginal Utility

Unit of Goods	Marginal Utility Schedule of X (MUx)	Marginal Utility Schedule of Y (MUy)	Marginal Utility Schedule of Z (MUz)
1	18 (1)	10 (5)	9
2	16 (2)	9 (6)	7
3	14 (3)	8 (9)	5
4	12 (4)	7 (10)	3
5	8 (8)	6 (12)	
6	5 (13)	5 (14)	
7	3	3	

The marginal utilities of different units of goods X, Y, and Z present the consumer with various options for spending their income. To maximize total satisfaction, the consumer seeks the highest utility for each rupee spent. For the first rupee, the available utilities are 18 units from X, 10 units from Y, and 9 units from Z. Naturally, the consumer will allocate the first rupee to good X, which offers the greatest utility. Examining the marginal utility schedules reveals that the first four rupees are best spent on X, yielding utilities of 18, 16, 14, and 12 units. After these choices, the next most rewarding option is the first unit of Y, which provides 10 units of utility for the fifth rupee. Subsequent spending decisions follow the same logic: the consumer spends the sixth rupee on the second unit of Y and the seventh rupee on the first unit of Z, consistently choosing options that provide the greatest marginal utility. This step-by-step allocation continues until the consumer's last rupee yields equal utility across all goods. In this example, the final rupee spent on X, Y, or Z provides the same marginal utility of 5 units, indicating the point of equilibrium. At equilibrium, total utility is maximized. With an income of ₹15, the optimal combination is purchasing 6 units of X, 6 units of Y, and 3 units of Z, resulting in the following total utility:

Total utility from X=18+ 16+ 14+12+8+5=73

Total utility from Y=10+9+8+7+6+5=45

Total utility from Z=9+7+5=21

Total utility from X, Y and Z = 139.

If the consumer chooses another combination, such as 7 units of X, 5 units of Y, and 3 units of Z, total utility falls to 137 (70 + 40 + 21), which is less than the maximum achievable. Therefore, the key to equilibrium is spending each rupee where it yields the same marginal utility. In this case, the equilibrium condition is:

$MU_X = MU_Y = MU_Z$

MU_X, MU_y and MU_z are the marginal utilities of X, Y and Z commodities.

In the above example, all goods are priced at ₹1 per unit. However, in real markets, goods typically have different prices. This variation does not change the equilibrium condition. Instead, marginal utilities are divided by their respective prices to determine marginal utility per rupee. Representing prices as P_x, P_y, and P_z, the equilibrium condition can be expressed as:

$$\frac{MYx}{Px} = \frac{MUy}{Py} = \frac{MUz}{Pz}$$

This formula ensures that the consumer allocates their income efficiently to maximize total satisfaction.

2.4.4 Limitations of the Law of Equi-marginal Utility

The law of equi-marginal utility is vital for guiding consumers to allocate their limited income across various goods to maximize satisfaction. However, practical application of this principle faces several challenges:

1. Difficulty in Measuring Utility:

Utility is subjective and cannot be measured in exact quantities. It represents a consumer's preference rather than a measurable value, making calculations of marginal utility impractical.

2. Assumption of Independent Utilities is Unrealistic:

The law assumes that the utility of a good is independent of others. In reality, goods are often related as substitutes (e.g., tea and coffee) or complements (e.g., cars and petrol), where a change in the consumption of one affects the utility of the other.

3. Constant Marginal Utility of Money is Unrealistic:

The principle assumes that the utility derived from money remains constant regardless of income changes. In practice, as income increases, the marginal utility of money generally decreases, influencing consumption patterns.

4. Consumer Ignorance and Habits:

Consumers may lack knowledge of marginal utilities or be influenced by habits (e.g., smoking or drinking), leading them to make irrational spending decisions despite better alternatives.

5. Practical Complexity in Application:

Comparing utilities of different goods for every unit of money is complicated and not feasible in everyday decision-making.

Self-Check Exercise-2

Q1.   How does the Marshallian utility analysis measure the utility of a commodity?

Q2.   What are the assumptions of the Marshallian utility theory?

Q3.   Explain the Law of Diminishing Marginal Utility with the help of a numerical example.

2.5   Summary

Utility refers to the satisfaction derived from consuming a good or service, introduced by Jeremy Bentham in 1789 and later applied to economics by Jevons in 1871. It is subjective, varying from person to person, and can be measured in units (utils) or monetary terms under the cardinal utility theory, which assumes rational consumers with full product knowledge. The Law of Diminishing Marginal Utility, proposed by Gossen (1854) and popularized by Marshall, states that as consumption of a commodity increases, the additional satisfaction from each extra unit declines. The Law of Equi-Marginal Utility suggests that consumers maximize satisfaction by allocating their income so that the marginal utility per currency unit is equal across goods. However, practical application is difficult due to challenges in measuring utility, lack of consumer knowledge, and habitual behaviors leading to irrational choices.

2.6   Glossary

- **Utility:** The satisfaction or pleasure derived from consuming a good or service; it varies from person to person and is subjective.
- **Cardinal Utility Theory:** A theory assuming that utility can be measured in numbers (utils) or money, with consumers making rational choices based on measurable satisfaction.
- **Law of Diminishing Marginal Utility:** States that as consumption of a commodity increases, the additional satisfaction from each extra unit decreases.
- **Law of Equi-Marginal Utility:** A principle guiding consumers to allocate their income so that the marginal utility per unit of money is equal across all goods for maximum satisfaction.
- **Marginal Utility:** The additional satisfaction gained from consuming one more unit of a good or service.

2.7   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Sections 2.3 & 2.3.1.

Answer to Q2. Refer to Sections 2.3 & 2.4.

Self-Check Exercise-2

Answer to Q1. Refer to Section 2.4.

Answer to Q2. Refer to Section 2.4.1.

Answer to Q3. Refer to Section 2.4.2.

2.8.   References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

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4.   Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

2.9   Terminal Questions

Question 1   State and explain the cardinal utility theory of demand?

Question 2   Discuss Law of Diminishing Marginal Utility.

*****

DEMAND ANALYSIS

Structure

3.1   INTRODUCTION

Demand theory explains the relationship between the quantity of goods and services consumers are willing to buy and factors such as price, income, and preferences. It forms the foundation of the demand curve, which illustrates how consumer demand varies with the availability of goods. Generally, when the quantity of goods in the market increases, both demand and equilibrium prices tend to decrease. As a core concept in microeconomics and consumer behaviour, demand theory examines how changes in prices, income levels, and consumer utility affect purchasing decisions. In economics, demand refers to effective demand, which differs from mere desire. Effective demand requires three components: a desire for a commodity, the financial means to purchase it, and a willingness to spend money on it. For example, wanting a scooter becomes a demand only when a person has the money to buy it and is ready to spend it. This distinction emphasises that a desire alone is insufficient to constitute demand unless accompanied by both ability and willingness to purchase.

Demand is always linked to a specific price. Without mentioning the price, the concept of demand holds no significance, as the willingness and ability of consumers to purchase a good or service depend on its price. For instance, the statement, 'the weekly demand for potatoes in city X is 10,000 kilograms' has no meaning unless we specify the price at which this quantity is demanded.

Demand always refers to the quantity of a good or service desired over a specific period of time. Therefore, it is vital to specify the period for which the commodity is demanded. For instance, the statement that demand for potatoes in city X at Rs. 8 per kilogram is 10,000 kilograms again has no meaning unless we state the period for which the quantity is being demanded. A complete statement would therefore be as follows: 'The weekly demand for potatoes in city X at Rs. 8 per kilogram is 10,000 kilograms'Specifying both the time period and price is essential, as the demand for a commodity varies with changes in its price and over different time frames. Thus, we can define demand as follows:

"The demand for a commodity at a given price is the amount of it which will be bought per unit of time at that price".

3.1.1   The Meaning of Demand

In economics, demand refers to the quantity of a good or service that consumers are both willing and able to purchase at various prices over a specific period. Mere desire does not constitute demand unless it is backed by purchasing power and the willingness to spend. Demand encompasses a range of quantities associated with different prices rather than a single quantity at one price. For instance, wanting a car is not considered demand unless you have the financial means and are ready to buy it at a given price within a defined time frame. The concept of time is crucial; stating "the demand for cars is 10,000" is incomplete without mentioning both price and time. A correct example would be: "The annual demand for cars in India is 10,000 at a price of ₹80,000 per car." Thus, demand arises when a consumer has sufficient resources and is prepared to spend them on a commodity at a specific price during a certain period.

3.1.2   Definition of Demand

In everyday language, demand refers to a desire for something, but in economics, it goes beyond mere desire. Economic demand represents the quantity of goods and services a person is willing and able to purchase with the necessary financial means. According to Prof. Hidbon, demand is the range of quantities consumers are prepared to buy at different prices during a specific period, reflecting potential buyers' behavior in the market. Stonier and Hague define demand as a desire backed by both the willingness to buy and the purchasing power to pay. Therefore, desire alone is insufficient; effective demand requires three key elements: desire, the ability to pay, and willingness to purchase. For instance, while many people may want a Benz car, only those with the financial means and readiness to spend can be said to have an actual demand for it.

3.2 Learning Objectives

After going through this lesson, you will be able to:

- Explain the meaning and concept of demand.

- Elucidate on the Law of Demand.

- Identify Demand Functions.

- Explain why the demand curve slopes downward

- Differentiate between the extension and contraction of the demand curve and shifting of the demand curve

3.3 Demand Function

The relationship between the demand for a commodity and its various influencing factors can be represented mathematically through a demand function, expressed as:

Dx = f (Px, Py, M, T, A, U) where,

Dx = Quantity demanded for commodity X.

f = functional relation.

Px = The price of commodity X.

Py = The price of substitutes and complementary goods.

M = The money income of the consumer.

T = The taste of the consumer.

A = The advertisement effects.

U = Unknown variables or influences

The above-stated demand function is a complicated one. Again, factors like tastes and unknown influences are not quantifiable. Economists, therefore, adopt a very simple statement of demand function, assuming all other variables, except price, to be constant.

A simplified and commonly used form of the demand function is expressed as: Dx = f (Px,) indicating that the demand for commodity X depends on its price. Traditional demand theory primarily focuses on this specific relationship. It is important to understand that the demand function refers to the entire relationship between price and quantity demanded, not just the quantity at a specific price within a given time frame. In other words, saying "quantity demanded is a function of price" means that each price level corresponds to a particular

quantity demanded. Put differently, the demand for a commodity encompasses the complete demand schedule, which displays different quantities purchased at various prices during a specific period. Demand is dynamic and changes with varying market conditions. Therefore, it is essential to explore the factors influencing both household demand (demand by an individual or family) and market demand (aggregate demand by all consumers).

3.3.1 Household Demand

The demand for a commodity by a household depends on several key factors:

a) **Income:** An increase in family income generally raises the demand for superior and luxury goods while reducing the demand for inferior goods. Conversely, a decrease in income lowers the demand for higher-end goods.

b) **Price of the Commodity:** There is typically an inverse relationship between price and demand. As the price decreases, demand increases, and vice versa.

c) **Tastes and Preferences:** Consumer preferences, influenced by fashion and trends, affect demand. Popular products see higher demand, while out-of-fashion goods experience a decline.

d) **Price of Related Goods:**

    i. **Complementary Goods:** Demand decreases if the price of a complementary good rises (e.g., higher petrol prices reduce scooter demand).

    ii. **Substitute Goods:** If the price of one good rises, demand for its substitute increases (e.g., a rise in coffee prices boosts tea demand).

3.3.2 Market Demand

In addition to the factors affecting household demand, market demand is influenced by two more factors:

    i. **Size and Composition of Population**: A larger population increases demand for various goods. Population composition (age, gender ratios) also impacts demand. For example, more children lead to higher demand for toys and baby products.

    ii. **Distribution of Income:** Unequal income distribution raises demand for luxury goods among the wealthy, while mass consumption goods see lower demand. Conversely, a more equal income distribution increases demand for essential goods.

Self-Check Exercise-1

Q1. Define demand function.

Q2. What do you mean by market demand?

3.4 Law of Demand

The law of demand describes the relationship between a product's price and the quantity demanded. It states that, assuming other factors remain unchanged, a decrease in price leads to an increase in demand, while an increase in price causes demand to fall. This indicates an inverse relationship between price and demand under the assumption that factors like consumer

income, preferences, and prices of related goods stay constant. Economists refer to this assumption as ceteris paribus.

Assumptions of the Law of Demand

For the law of demand to hold, certain conditions must remain constant:

1. **Constant Income Level:** The buyer's income should not change. An increase in income, without a price drop, can boost demand and violate the law.

2. **Unchanged Consumer Preferences:** Shifts in consumer tastes or trends can affect demand regardless of price.

3. **Stable Prices of Related Goods:** Price changes in substitutes or complements can influence demand for the product.

4. **No Introduction of New Substitutes:** The arrival of alternative products can reduce demand even if the original product's price remains the same.

5. **No Expectations of Future Price Increases:** If consumers expect future price hikes, they may buy more now, disrupting the inverse relationship.

6. **Consistent Advertising Efforts:** Increased promotional activities can artificially raise demand, so advertising should remain stable.

3.4.2 Demand Schedule

The law of demand can be demonstrated using a demand schedule and a demand curve. A demand schedule lists the quantities of a good or service that consumers are willing to purchase at different price levels over a certain period, assuming all other factors affecting demand remain unchanged. The following table illustrates a demand schedule.

Table 3.1: Demand Schedule for Ice-cream

Price of Ice-cream	Quantity Demanded of Ice-cream
10	20
8	40
6	60
4	80
2	100

3.4.3 Demand Curve

The law of demand can also be represented by a demand curve, which illustrates the relationship between price and quantity demanded. It is a graphical representation showing various price-quantity combinations. The curve indicates the quantity of commodities consumers are willing to purchase at different prices over a specific period, assuming other factors remain constant. For example, an individual demand curve for ice cream, shown in Fig. 3.1, is derived from the data in Table 1.1.
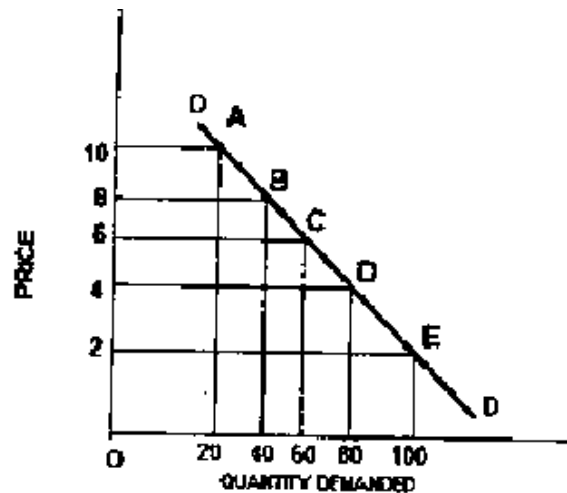
Fig. (3.1) Demand Curve

In Fig. 3.1, the curve DD' extends from point A to point G, passing through points B, C, D, and E. Each point on this demand curve represents a specific price-quantity combination. The combinations read in alphabetical order should decrease price of ice- cream and increasing number of cups of tea demanded per day. Price quantity combinations in reverse order of the alphabet illustrate the increasing price of tea per cup and decreasing number of ice-cream per day consumed by an individual. The demand curve illustrates the relationship between a commodity's price and the quantity a consumer is willing to purchase over a specific period— whether daily, weekly, monthly, seasonally, or annually. It reflects an inverse relationship between price and quantity demanded, causing the curve to slope downward to the right.

In economics, price is typically shown on the vertical axis and quantity demanded on the horizontal axis. The demand curve represents the quantities of a good or service that consumers are willing and able to buy at different prices. Each point on the curve indicates a unique price-quantity combination, consistent with the law of demand.

3.4.4 The Market Demand

As discussed earlier, an individual's demand for a product is primarily influenced by its price, assuming other factors remain constant. To understand overall market behavior, it is essential to consider the total demand from all individuals. Market demand refers to the total quantity of a commodity that all consumers in a market are willing to purchase at various prices over a specific period. To determine market demand, the quantities demanded by each individual at a given price are added to obtain the total quantity demanded at that price. This process is repeated for different prices to create the market demand schedule. Market demand is influenced by the same factors affecting individual demand, along with the number of buyers in the market. Graphically, the market demand curve is derived by horizontally adding the individual demand curves of all consumers. For simplicity, consider a market with just two consumers—Individual A and Individual B. Their individual demand schedules, along with the combined market demand schedule, are presented below.

21

Table 3.2: Market demand schedule

Individual A		Individual B		Market Demand	
Price	Quantity Demanded	Price	Quantity Demanded	Price	Quantity Demanded
8	2	8	2	8	4
6	4	6	4	6	8
4	8	4	6	4	14

3.4.5   Market Demand Curve

By illustrating the data from Table 3.2 in a diagram, we can derive the market demand curve, as depicted in Figure 3.2. This market demand curve, shown in Figure (c), is constructed by horizontally summing the individual demand curve D1D1 of Consumer A (Figure a) and the individual demand curve D2D2 of Consumer B (Figure b).
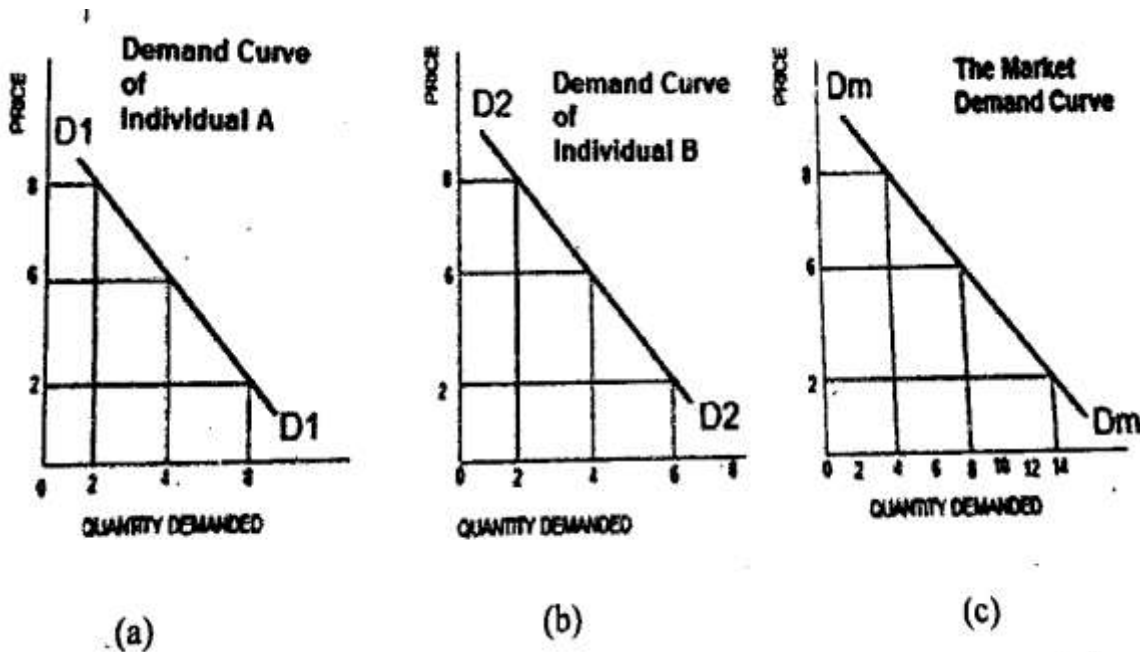
Fig 3.2

The above figure demonstrates that the market demand curve is derived by horizontally summing the individual demand curves of all buyers in the market. Similar to individual demand curves, the market demand curve slopes downward from left to right, reflecting the inverse relationship between price and quantity demanded. In the earlier example of the market demand schedule and curve, for simplicity, we assumed there were only two consumers—A and B—purchasing oranges. The market demand schedule and curve were obtained by adding the individual schedules and curves of these two consumers. However, in reality, numerous consumers purchase a commodity, making it challenging to calculate individual demand schedules or curves for each consumer and sum them to determine the overall market demand.

An alternative approach involves identifying an average or representative consumer. By determining the demand schedule of this representative consumer and multiplying the quantities demanded at various prices by the estimated total number of consumers, we can construct the market demand schedule. Based on this schedule, the corresponding market demand curve can be drawn.

3.4.6 Reason why a demand curve generally slopes downwards from left to right:

A demand curve typically slopes downward from left to right, indicating that consumers tend to buy more of a commodity when its price decreases and less when its price increases. But why do consumers behave this way? The downward slope of the demand curve and the operation of the law of demand can be explained by the following reasons:

1. **Diminishing Marginal Utility:** The concept of diminishing marginal utility helps explain why demand increases when prices fall. As a consumer purchases additional units of a product, the satisfaction (or utility) gained from each extra unit decreases. Consumers continue buying a product until the marginal utility of the commodity (MUc) equals the marginal utility of money (MUm). When the price of a commodity drops, the MUc becomes higher than the MUm, disrupting this balance. To restore equilibrium (MUc = MUm), the consumer purchases more units. As the quantity consumed rises, the utility per unit decreases until equilibrium is re-established, causing demand to increase with a price decline.

2. **Entry of New Consumers:** Market demand represents the total demand from various individuals. When a product is expensive, only wealthier consumers can afford it, leaving lower-income groups to either do without it or opt for cheaper alternatives. As prices decrease, more people can afford the product, expanding its consumer base. Further price reductions make the product accessible to an even wider group, thereby increasing overall demand.

3. **Income Effect:** Price changes influence a consumer's purchasing power. A decrease in price effectively increases real income, allowing consumers to buy more of the commodity. Conversely, a price increase reduces purchasing power, leading to lower demand. This relationship between price fluctuations and changes in purchasing power is known as the income effect.

4. **Substitution Effect:** When the price of a product falls, it becomes more attractive compared to its substitutes. Consumers may switch to the now cheaper product, increasing its demand. For example, if the price of tea drops, people may buy more tea instead of coffee. On the other hand, if tea prices rise, consumers may shift to coffee, reducing tea demand.

These factors collectively explain why the demand curve usually slopes downward: lower prices encourage higher demand, while higher prices discourage consumption.

3.4.7 Exceptions to the Law of Demand

While the demand curve generally slopes downward from left to right—reflecting that consumers purchase more of a good at lower prices and less at higher prices—there are certain situations

where this relationship does not hold true. These exceptions occur due to various economic and psychological factors, which are outlined below:

1. **Giffen Goods:** Named after Sir Robert Giffen, Giffen goods are inferior products that defy the typical law of demand. Lower-income consumers may buy more of such goods because they cannot afford better substitutes when they rise. For instance, if the price of a staple like coarse grains increases, people with limited budgets may still purchase more by cutting back on more expensive foods.

2. **Veblen Goods (Conspicuous Consumption):** Veblen goods are luxury items whose demand increases as prices rise, driven by the desire to showcase wealth and status. Products like designer handbags, luxury cars, or high-end watches become more appealing to certain consumers precisely because of their higher prices, which signals exclusivity and prestige.

3. **Price Expectations:** If consumers anticipate that prices will increase further in the future, they may purchase more of a commodity despite a current price hike. Conversely, if they expect prices to fall, they might delay purchases, even when prices are low. This behaviour can temporarily reverse the usual price-demand relationship.

4. **Essential Goods with No Substitutes**: Necessities like life-saving medications or basic utilities often exhibit price inelasticity. Even if prices rise, consumers continue buying these goods because they are essential and lack suitable alternatives.

5. **Ignorance Effect:** Sometimes, consumers may not be aware of a price change or its significance. If a price increase is small or goes unnoticed, purchasing patterns may remain unchanged, defying the expected drop in demand.

6. **Quality Perception Effect:** Consumers may associate higher prices with better quality. In such cases, a price increase might attract more buyers who believe the product's value has improved, contradicting the law of demand.

These exceptions highlight scenarios where the inverse relationship between price and quantity demanded does not apply, resulting in an upward-sloping or irregular demand curve.
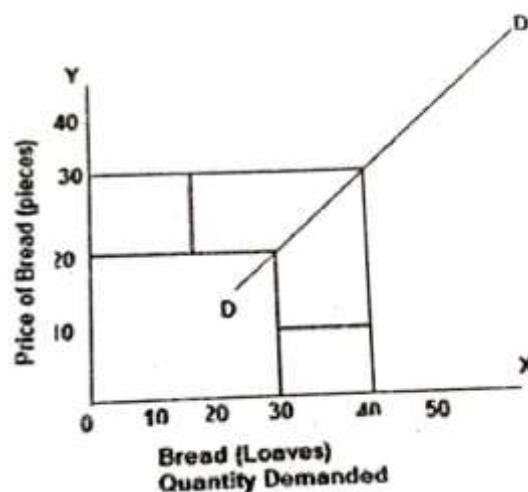

Diagram 3.3 Giffen Good

Self-Check Exercise-2

      Q 1.   Why does the demand curve slope downwards? Discuss.

      Q 2.   Explain Law of Demand, in detail?

      Q 3.   Suggest a possible exception to the "law of demand," in which people buy less of a good as its price increases.

3.5   Determinants of Demand

Several factors influence the demand for a product beyond its price. These non-price determinants are assumed constant when drawing a demand curve, but any change in them shifts the curve. The key determinants include:

1. **Income:** Generally, higher income leads to greater demand for most goods, known as normal goods. Conversely, demand decreases for inferior goods as income rises, as consumers opt for better alternatives.

2. **Prices of Related Goods:**

     o **Substitutes:** Goods that can replace each other (e.g., tea and coffee). An increase in the price of one raises the demand for the other.

     o **Complements:** Goods used together (e.g., cars and fuel). A price drop in one increases the demand for both.

3. **Tastes and Preferences:** Changes in consumer preferences, often influenced by trends or advertisements, can increase or decrease demand. Fashion products see higher demand, while outdated ones face a decline.

4. **Expectations:** Consumers who expect prices to rise buy more now. Conversely, they delay purchases if they anticipate price drops or income reductions. Future income expectations also affect current demand.

5. **Number of Buyers:** More buyers in the market lead to higher demand. Population growth typically boosts the demand for various goods and services.

6. **Income Distribution:** Equitable income distribution increases overall consumption, raising demand. In contrast, unequal distribution lowers demand, as the wealthy have a lower propensity to consume than the poor.

Self-Check Exercise-3

Q1.   What are the factors which determine the demand for a commodity?

3.6   Difference between Expansion and Contraction of Demand and Increase and Decrease in Demand

3.6.1   Expansion and Contraction of Demand:

Various factors influence demand for a commodity. However, when analyzing the law of demand, we focus solely on the effect of the commodity's price changes, assuming other factors (like income, tastes, and prices of related goods) remain constant.

- **Expansion of Demand:** Occurs when the quantity demanded increases solely due to a fall in the commodity's price. This change is shown as a movement downward along the

same demand curve. Example: If the price of oranges drops from ₹3.00 to ₹2.50 per dozen, and demand rises from 1 dozen to 2 dozen, this is an expansion of demand.

- Contraction of Demand: This happens when the quantity demanded decreases due to a rise in the commodity's price, represented by an upward movement along the same demand curve. Example: If the price of oranges rises from ₹1.50 to ₹2.00 per dozen, reducing demand from 4 dozen to fewer, it reflects a contraction of demand.

These changes, termed "change in quantity demanded," occur only due to price variations and are not influenced by other factors.
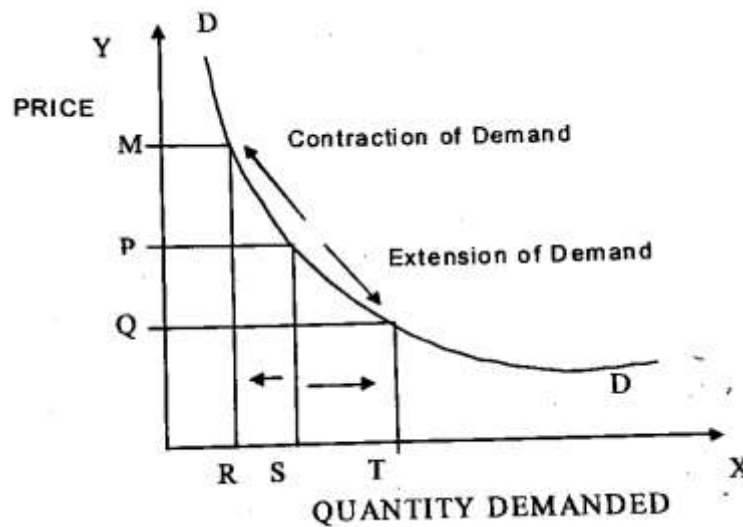
Fig. 3.4

We have drawn the demand curve DD, illustrating the quantities of commodity X demanded at various prices, while keeping other factors constant (such as income, consumer tastes, and prices of related goods). In the figure:

- At the price OP, the quantity demanded is OS.

- When the price decreases from OP to OQ, the quantity demanded increases from OS to OT. This increase, represented by ST, is known as an extension of demand.

- Conversely, when the price increases from OP to OM, the quantity demanded decreases from OS to OR. This reduction, shown by RS, is referred to as a contraction of demand.

Thus, demand extension and contraction occur solely due to changes in the commodity's price and are shown by movements along the same downward-sloping demand curve.

3.6.2 Increase and Decrease in Demand: Changes in demand caused by factors other than the commodity's price—such as variations in consumer income, tastes, fashion, or prices of related goods—are referred to as increases and decreases in demand.

- When a consumer's income rises (while the commodity's price remains unchanged), they demand more goods, leading to an increase in demand.

26

- Conversely, if a consumer's income falls, their demand decreases, resulting in a decrease in demand.

While extension and contraction of demand are shown as movements along the same demand curve, an increase or decrease in demand is represented by a shift:

- Increase in demand: Rightward shift of the demand curve.

- Decrease in demand: Leftward shift of the demand curve.

This concept is illustrated in diagram 3.5.
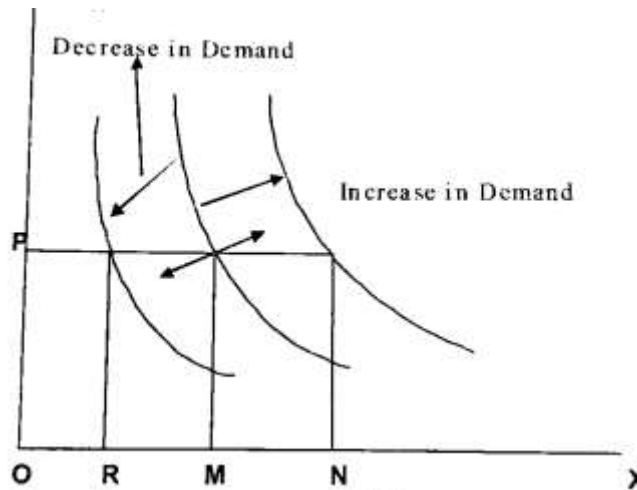
Diagram 3.5

Initially, the demand curve is represented as DD. At the price level OP, the quantity demanded for commodity X is OM. If the price remains constant but factors such as consumer income rise or the good becomes more desirable, the consumer's purchasing capacity increases. This causes the demand curve to shift rightward to D_1D_1, leading to a higher quantity demanded (ON) at the same price. Conversely, if income declines or the product becomes less popular, the demand curve shifts leftward to D_2D_2. In this case, at the same price OP, the quantity demanded reduces to OR instead of OM, indicating a decrease in demand. Thus, movements along the same demand curve reflect changes in demand due to price variations, whereas shifts in the demand curve result from changes in other influencing factors. Increases and decreases in demand result from changes in other factors (e.g., income, tastes, preferences, fashion, or prices of related goods) and are reflected by shifts in the demand curve—upward/rightward for an increase and downward/leftward for a decrease.

Self-Check Exercise-4

Q1. Explain the difference between a change in quantity demanded and a change in demand.

3.7 Summary

This lesson examined different aspects of demand. The law of demand establishes an inverse connection between the price of a commodity and its quantity demanded—when the price increases, demand decreases, and vice versa. This principle applies under specific conditions, such as stable consumer income, unchanged tastes and preferences, and constant prices of

related goods. The demand curve generally slopes downward from left to right due to factors like diminishing marginal utility, the income effect, and the substitution effect. However, there are exceptions to this law, including Giffen goods, luxury products bought for status, and goods anticipated to become scarce or more expensive. Key factors influencing demand include consumer income, prices of related goods, preferences, expectations about future prices, market size, and income distribution. Changes in price result in either an expansion (higher quantity demanded due to a price decrease) or contraction (lower quantity demanded due to a price increase). In contrast, shifts in demand occur when non-price factors, such as income or preferences, change, causing the entire demand curve to move.

3.8 Glossary

- **Demand:** The quantity of a good that consumers are both willing and able to buy at a particular price within a given time frame.

- **Law of Demand:** This principle states that, assuming other factors remain unchanged (ceteris paribus), a decrease in price leads to an increase in quantity demanded, while an increase in price leads to a decrease in quantity demanded, highlighting an inverse relationship.

- **Individual Demand:** The specific quantity of a product that a single consumer is prepared to buy at a given price, influenced by both financial capacity and willingness to purchase.

- **Demand Function:** A mathematical representation of how various factors, including price, influence the quantity demanded of a good. This function may be linear or non-linear.

- **Demand Curve:** A graphical depiction of the relationship between a product's price and the quantity demanded, generally sloping downward to reflect the inverse relationship.

- **Income Effect:** The impact of a change in consumer income on purchasing behavior, assuming stable prices for goods.

3.9 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 3.3.

Answer to Q2. Refer to Section 3.3.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 3.4.6.

Answer to Q2. Refer to Section 3.4.

Answer to Q3. Refer to Section 3.4.7

Self-Check Exercise-3

Answer to Q1. Refer to Section 3.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 3.6.

3.10 References/Suggested Readings

1. Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.
2. Koutsoyiannis. (1991). Modern microeconomics. Macmillan.
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3.10 Terminal Question

Question 1. Define the law of demand and show it through a demand schedule and a demand curve. What are the exceptions to the law of demand?

Question 2. Briefly state the reasons for the downward-sloping demand curve.

Question 3. State the difference between change in quantity demanded and change in demand.

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ELASTICITY OF DEMAND

Structure

4.1   Introduction

The demand for a product is shaped by multiple factors, such as its price, the prices of related goods, consumer income levels, preferences, advertising, government policies like taxes or subsidies, climatic conditions, and anticipated price changes. The law of demand states that, when other factors remain unchanged, a decrease in price leads to an increase in quantity demanded, whereas a price increase reduces demand. Additionally, variations in income or the cost of substitute and complementary goods influence demand. For example, warmer weather often leads to higher demand for ice cream. While these general trends indicate the direction of change in demand, they do not specify the magnitude of such changes.

For economic analysis and informed decision-making, it is crucial to determine how sensitive demand is to changes in various factors and to compare the responsiveness of demand to different influences. The concept of elasticity of demand serves as a tool to measure how the quantity demanded responds to changes in any determinant affecting demand. Although some factors, like price and income, are quantifiable and can be measured, others—such as certain consumer preferences—may not be easily quantified. Elasticity of demand evaluates how demand reacts to various factors. Price elasticity measures the change in quantity demanded due to price fluctuations. Cross elasticity assesses how the demand for one good responds to price changes in another related good. Income elasticity examines how variations in consumer income affect demand. Understanding these elasticity concepts helps analyze market behavior and predict how different factors influence consumer purchasing decisions.

4.2   Objectives

After going through this unit, you will be able to:

- Elucidate Elasticity of Demand
- Explain different types of elasticity of demand
- List Determinant factors of Elasticity of Demand

4.3   Elasticity of Demand

The law of demand explains the inverse relationship between price and quantity demanded but does not indicate its exact strength. To measure this responsiveness, elasticity of demand is used, which quantifies how demand changes with variations in price or income.

4.3.1   Meaning of Elasticity

The law of demand explains that a price decrease leads to higher demand and vice versa but does not indicate the speed of this response. Alfred Marshall introduced elasticity of demand to measure how demand reacts to price changes. It quantifies the sensitivity of consumers to price fluctuations, showing the degree of responsiveness in demand.

4.3.1.1 Price Elasticity of Demand

Price elasticity of demand quantifies the responsiveness of quantity demanded to price changes. It is determined by the percentage change in quantity demanded relative to the percentage change in price.

The formula for measuring price elasticity of demand is:

$$\text{Price Elasticity of Demand} = \frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in price}}$$

OR

$$E_p = \frac{\text{Change in Quantity demanded} / \text{Quantity demanded}}{\text{Change in Price} / \text{price}}$$

OR

$$E_p = \frac{(Q2 - Q1) / Q1}{(P2 - P1) / P1}$$

Where:

Q1 = Quantity demanded before the price change

Q2 = Quantity demanded after the price change

P1 = Price before the change

P2 = Price after the change

Price elasticity of demand is categorized into five types based on how sensitively quantity demanded reacts to price changes.

1) Perfectly elastic demand (infinitely elastic)

When a slight change in price results in an unlimited change in the quantity demanded, it is referred to as perfectly elastic demand. In this scenario, buyers are willing to purchase any quantity at a specific price, but even a minor increase in price causes the demand to drop to zero. The demand curve representing this situation is a horizontal straight line, indicating that the price remains constant regardless of the quantity demanded. (Here $e_p = \infty$)
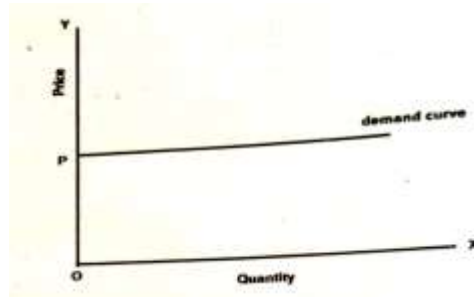
2) Perfectly inelastic demand

In this case, the quantity demanded remains unchanged despite price fluctuations. The demand curve is a vertical line, showing zero responsiveness to price changes, with a price elasticity of demand (Ep) equal to 0.
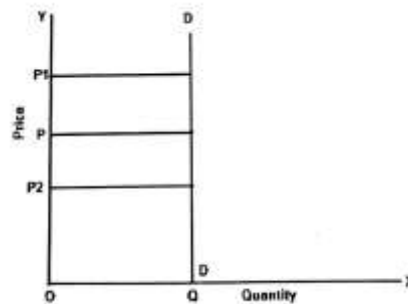
3) Relatively elastic demand

In this scenario, even a small price change leads to a large shift in quantity demanded. The demand curve appears flatter, reflecting high sensitivity to price variations, with a price elasticity of demand (Ep) greater than 1.
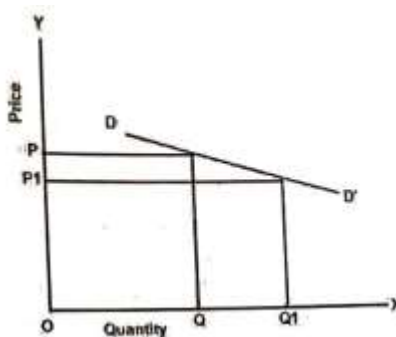
4) Relatively inelastic demand

32

In relatively inelastic demand, a substantial price change results in only a minor change in quantity demanded. The demand curve is steeper, indicating low sensitivity to price variations, with a price elasticity of demand (Ep) less than 1.
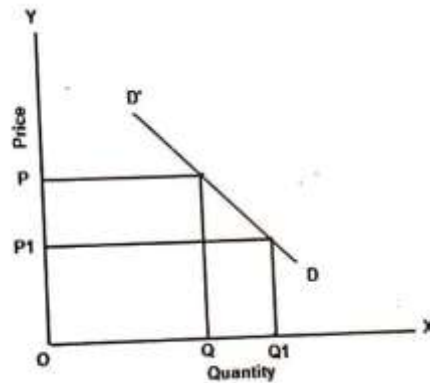
5)   Unit elasticity of demand (unitary elastic)

Unitary elastic demand occurs when the change in quantity demanded is proportional to the change in price, resulting in a price elasticity of demand (Ep) equal to 1.
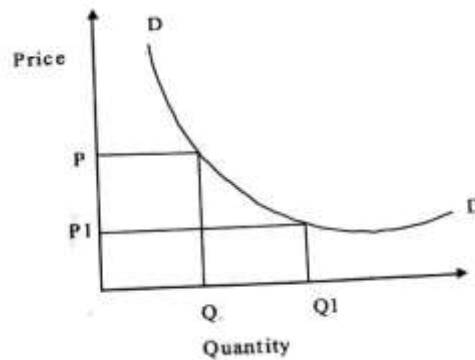
The above five types of elasticity can be summarized as follows

Sr. No.	Type	Numerical Expression	Description	Shape of Curve
1	Perfectly Elastic	∞	infinity	Horizontal
2	Perfectly inelastic	0	zero	Vertical
3	Unitary	1	one	Rectangular hyperbola
4	Relatively Elastic	>1	More than one	Flat

| 5 | Relatively inelastic | <1 | Less than one | Steep |

4.3.1.2 Income Elasticity of Demand

Income elasticity of demand measures how the quantity demanded of a good responds to changes in consumer income. It is expressed using the following formula:

$$Ey = \frac{\text{Proportionate Change in Quantity Demanded}}{\text{Proportionate Change in Income}}$$

Income elasticity of demand can be classified into three main types:

1. **Zero Income Elasticity:** In this case, changes in income do not affect the quantity demanded. Consumers purchase the same amount regardless of income fluctuations. Essential goods like salt and sugar often fall into this category. Here, **Ey = 0**.

2. **Negative Income Elasticity:** When an increase in income leads to a decrease in the quantity demanded, the elasticity is negative. This situation is common for inferior goods. In this case, **Ey < 0**.

3. **Positive Income Elasticity:** A rise in income results in an increase in the quantity demanded. Positive income elasticity can be further divided into three subtypes:

a) **Unit Income Elasticity (Ey = 1):** Quantity demanded changes in the same proportion as income.

b) **Income Elasticity Greater than Unity (Ey > 1):** A rise in income causes a more than proportionate increase in the quantity demanded.

c) **Income Elasticity Less than Unity (Ey < 1):** Quantity demanded increases with income but less than proportionately.

Types of Goods	Numerical Measure of Income Elasticity	Verbal description
(1) Inferior Goods	Negative	Quantity demanded decreases as income increases.
(2) Normal Goods	Positive	Quantity demanded increases an income increases.
(2.1) Necessity	Less than one	Quantity demanded increases less than proportion to increase in income.
(2.2) Luxury	Greater than one	Quantity demanded increases more than proportion to increase in income.

4.3.1.3 Cross Elasticity of Demand

Cross elasticity of demand measures the responsiveness of the quantity demanded of one commodity to a change in the price of another related commodity. These related goods can

be either substitutes or complements. For example, tea and coffee are substitute goods, while cars and petrol are complementary goods.

The formula for calculating cross elasticity of demand is:

$$\text{Cross Elasticity} = \frac{\text{Proportionate Change in Quantity Demanded of a Commodity}}{\text{Proportionate Change in the Price of Related Commodity}}$$

- **Positive Cross Elasticity:** Indicates that the goods are substitutes. For instance, an increase in the price of tea may lead to a rise in the demand for coffee as consumers switch preferences.

- **Negative Cross Elasticity:** Suggests that the goods are complements. For example, if the price of cars rises, the petrol demand will likely decline since both are used together.

Understanding cross-elasticity is valuable for managers, especially when determining the pricing strategy for products with close substitutes or complements.

Type of goods	Numerical measure of cross elasticity	Verbal description
Substitutes	Positive	Quantity demanded of a good increase if the price of substitutes increases.
Complementary	Negative	Quantity demanded of a good decrease if the price of complements increases.
Independent	Zero	Quantity demanded of a good remains unchanged to change in the price of other good.

Self-Check Exercise-1

    Q1.   Write short notes on

        1)   Elasticity of Demand

        2)   Price Elasticity

        3)   Cross Elasticity

    Q2.   Define income elasticity of demand.

4.4   Factors Determining Elasticity of Demand for Different Goods

The price elasticity of demand differs across goods. While some products exhibit highly elastic demand, others are less elastic or even inelastic. Several factors contribute to these variations. Although numerous influences exist, the key determinants are discussed below:

i.   Availability of Close Substitutes:

The presence of close substitutes significantly affects a product's elasticity. Goods with numerous alternatives, such as toothpaste, soaps, or shaving blades, tend to have higher elasticity. For instance, if the price of a particular toothpaste brand increases while other brands remain unchanged, consumers are likely to switch, making demand highly elastic. Conversely, products like salt with no close substitutes exhibit inelastic demand.

ii.   Nature of the Commodity:

Demand elasticity also depends on whether a product is considered a necessity or a luxury. Necessities, such as staple foods, have inelastic demand because consumers must purchase them regardless of price changes. Luxuries, however, can be foregone when prices rise, leading to more elastic demand.

iii. Price Level of the Commodity:

At extremely high or very low prices, demand elasticity is generally low. For example, a price drop in pencils (already inexpensive) may not significantly boost purchases, while a minor price change in luxury cars won't make them affordable to most consumers.

iv. Proportion of Income Spent on the Commodity:

Goods that require a small portion of a consumer's budget (e.g., salt, matchboxes) tend to have inelastic demand, as price changes have minimal budgetary impact. Conversely, when a product accounts for a significant share of income (e.g., groceries), a price increase prompts consumers to seek cheaper alternatives, making demand more elastic.

v. Entry of New Buyers into the Market:

High-priced goods are typically purchased by wealthier consumers. However, when prices fall, the product becomes affordable to more people, expanding the customer base and increasing elasticity.

vi. Possibility of Postponing Purchases:

If the purchase of a product can be delayed (e.g., furniture, electronics), its demand tends to be more elastic. In contrast, essentials like medicines and education, which cannot be postponed, exhibit inelastic demand.

vii. Time Period Considered:

Elasticity is generally higher over longer periods since consumers need time to adjust their consumption habits or find alternatives. In the short term, demand tends to be less elastic as immediate adjustments are harder to make.

Multiple factors often influence a good's demand elasticity simultaneously. For example, salt is a necessity, lacks substitutes, is inexpensive, and its consumption cannot be postponed—all contributing to its inelastic demand. Understanding the interplay of these factors is essential for accurately determining the elasticity of any product.

Self-Check Exercise-2

Q.1   What factors determine the Elasticity of Demand?

4.5   Summary

Elasticity of demand measures how the quantity demanded of a good responds to changes in price, income, or the price of related goods. Price elasticity indicates demand sensitivity to price changes, income elasticity reflects demand shifts due to income variations, and cross elasticity measures the effect of one product's price change on another's demand. While the law of demand shows an inverse relationship between price and demand, elasticity quantifies its strength. The degree of elasticity depends on factors such as substitutes, necessity or luxury status, and consumer spending on the product.

4.6   Glossary

- **Elasticity of Demand:** Measures how sensitive the quantity demanded is to changes in price.

- **Perfectly Elastic Demand:** A slight price change results in an infinite change in quantity demanded.

- **Perfectly Inelastic Demand:** Quantity demanded remains constant regardless of price changes.

- **Unit Elastic Demand:** The percentage change in demand is equal to the percentage change in price.

- **Cross-elasticity of Demand:** Measures how the demand for one product changes in response to the price change of another related product.

4.7   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Sections 4.3, 4.3.1.1 and 4.3.1.3.

Answer to Q2. Refer to Section 4.3.1.2.

Self-Check Exercise-1

Answer to Q1. Refer to Section 4.4.

4.8   References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced Economic Theory. S. Chand and Company.

2.   Baumol, W. J. (1996). Economics: Theory and Operations Analysis (3rd ed.). Prentice Hall Inc.

3.   Koutsoyiannis, A. (1991). Modern Microeconomics. Macmillan.

4.   Salvatore, D. (1991). Microeconomics. HarperCollins.

5.   Varian, H. (1992). Microeconomic Analysis. W.W. Norton & Company, Inc.

4.9   Terminal Questions

Question 1:   What do you understand by the elasticity of demand? What are the different types of elasticity? Explain in detail.

Question 2: Explain the concept of elasticity of demand and distinguish between price elasticity, income elasticity, and cross elasticity of demand with suitable examples.

*****

SUPPLY ANALYSIS

Structure

5.1 Introduction

In the previous chapter, we explored demand; now, we focus on supply. Supply represents the different quantities of a good or service that sellers are willing to offer at various prices over a specific period. It illustrates the relationship between price and the quantity sellers are prepared to make available in the market. Like demand, supply is not about a single quantity

at a fixed price but a range of quantities at different prices. It reflects the willingness of firms to sell over time rather than the actual sales made.

5.2 Learning Objectives

After going through this lesson, you should be in a position to

- Explain the meaning of supply.

- Identify supply function

- State the law of supply

- Explain the factors determining the supply

- State the reason why there is a direct relationship between price and quantity supplied

5.3 The Meaning of Supply

Supply refers to the quantity of a good that producers are willing to sell in the market at a specific price within a given time frame. Similar to demand, supply is always considered concerning a particular price and time period. The total stock of a product available with producers is not the same as supply, as they may not be willing to sell all of it at a given price. Supply includes only the portion of stock that sellers are ready to offer in the market. Unlike demand, which has an inverse relationship with price, supply follows a direct relationship—higher prices encourage greater supply, while lower prices lead to reduced supply.

5.3.1 Supply Function

Similar to demand, supply is influenced by multiple factors. The quantity of a product supplied depends on its own price, the prices of related goods, input costs, technological advancements, future expectations, and the number of sellers in the market. This relationship is represented by the supply function:

$Q_X^S = f (Px, Pr, Pi, T, E, N)$

Where.,

Q_X^S = Quantity supplied of commodity x

Px = Price of the commodity x

Pr = Prices of related products

Pi = Prices of inputs

T = State of technology

E = Expectations

N = Number of producers in the market

For basic price analysis, the supply function simplifies to: Qs = f (P)

This means that the quantity supplied (QSQ_SQS) is primarily determined by its own price, assuming other factors remain unchanged.

Self-Check Exercise-1

Q1.   What do you mean by supply?

Q2.   Define supply function.

5.4   Law of Supply

The law of supply explains the relationship between the price of a commodity and the quantity supplied. It states that when the price of a good increases, the quantity supplied also increases, and when the price decreases, the quantity supplied reduces, assuming all other factors remain constant. This demonstrates a direct relationship between price and quantity supplied.

5.4.1   Supply Curve

A supply curve is a graphical representation of the quantity of a good or service that sellers are willing to supply at different price levels. It slopes upward, indicating the positive relationship between price and quantity supplied. While the entire curve represents supply, a specific point on it indicates the quantity supplied at a given price.

The law of supply is often illustrated using a supply schedule and a supply curve. A supply schedule is a table that outlines different quantities of a good or service that sellers are willing to offer at varying prices within a specific period.

Table 5.1 Supply Schedule

Price	Quantity Supplied
5	40
10	60
15	80
20	100
25	120

A supply schedule illustrates that as the price increases, the quantity supplied also increases. By representing the data from the supply schedule on a graph, we can construct the supply curve, which visually depicts this relationship.
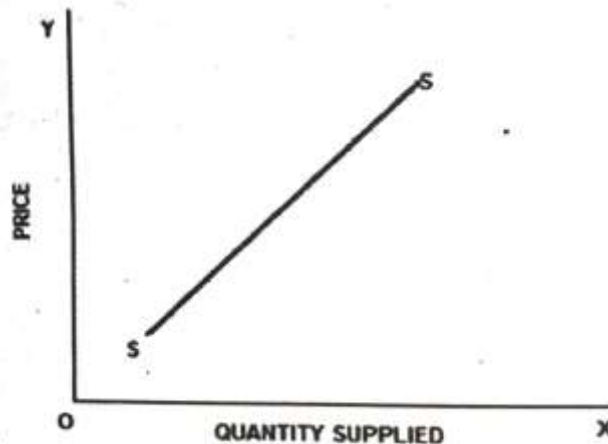
Fig. 5.1

5.4.2 Why there is a direct relationship between price and quantity supplied?

Higher prices act as an incentive for producers to supply more goods. Sellers aim to maximize profits, so when prices rise, they expect higher returns, motivating them to increase production. Additionally, higher prices may attract new suppliers to enter the market, further increasing the quantity supplied.

Self-Check Exercise-2

Q1.   Discuss the law of supply with the help of a diagram.

Q2.   Why is there a direct relationship between price and quantity supplied?

5.5   Factors Determining the Supply

The quantity of a good or service that sellers are willing to offer depends on both price and non-price factors. These factors include prices of related goods, input costs, technological advancements, expectations, and the number of sellers in the market. Let's examine each factor:

1. **Price of the Commodity:** Producers aim to maximize profits, so they tend to supply more of a product when its price increases and less when its price decreases. This direct relationship is known as the Law of Supply.

2. **Prices of Other Goods:** If the prices of alternative products rise while the price of the current product remains unchanged or increases at a slower rate, producers may shift production to the more profitable alternative, reducing the supply of the original product.

3. **Cost of Production:** The prices of inputs such as labor, raw materials, and capital directly affect production costs. Higher input costs reduce profitability, leading to a decrease in supply, whereas lower input costs encourage greater supply.

4. **Technological Advancements:** Improved production methods and technological innovations can lower production costs, increasing the efficiency of supply. As a result, more goods can be produced at a lower cost, boosting supply.

5. **Producers' Objectives:** While many producers prioritize profit maximization, some may focus on increasing sales volume or expanding market share, leading to a higher supply of certain goods even at lower profits.

41

6. **Number of Sellers:** The overall market supply is the sum of all individual producers' outputs. An increase in the number of sellers leads to a higher market supply, while a decrease in sellers reduces total supply.

Self-Check Exercise-3

Q1.   What are the factors that determine the quantity supplied of a good?

5.6   Changes in quantity Supplied

A change in quantity supplied occurs when the amount of a good or service offered for sale varies due to a change in its price, while other factors remain constant. Unlike a shift in supply, which is caused by changes in external factors, a change in quantity supplied results solely from price fluctuations.

Since there is a direct relationship between price and quantity supplied, an increase in price leads to an increase in the quantity supplied, while a decrease in price results in a lower quantity supplied. This adjustment is represented as a movement along the supply curve rather than a shift of the curve itself.
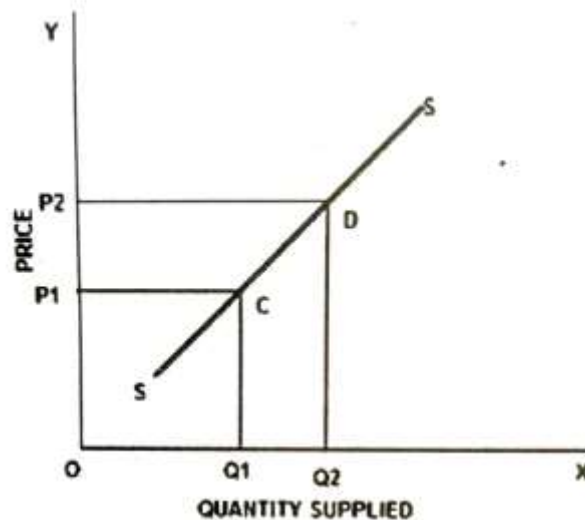
Fig 5.2

For example, at price P1, the quantity supplied is Q1. If the price increases to P2, the quantity supplied rises to Q2. This movement along the supply curve—from point C to point D illustrates the change in quantity supplied.

Self-Check Exercise-4

Q1.   Show the changes in quantity supplied of a good with the help of a diagram.

5.7   Changes in Supply

An increase in supply means that producers are willing to offer a greater quantity of a commodity at every price level, leading to a rightward shift in the supply curve. This shift

signifies that more of the good is available in the market at any given price. Several factors contribute to an increase in supply, including:

(a) A decrease in the price of alternative goods that could be produced,

(b) A rise in the price of goods that are jointly produced,

(c) Lower production costs due to reduced input prices,

(d) Technological improvements that enhance efficiency, and

(e) A greater number of producers entering the market.
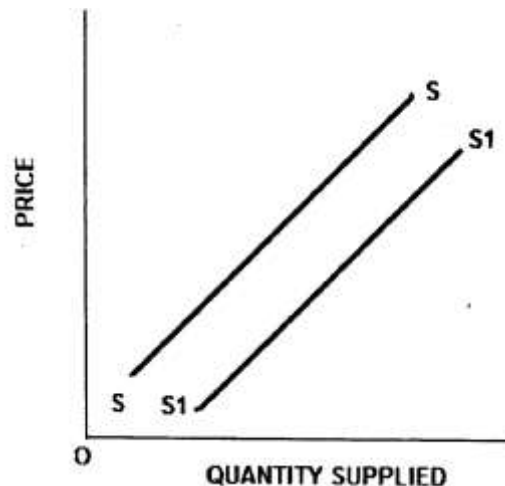
Fig. 5.3

This change is graphically represented by a rightward shift in the supply curve from SS to S_1S_1, indicating an overall rise in the quantity supplied at all price levels. Conversely, a decrease in supply occurs when the quantity supplied at every price level falls, causing a leftward shift in the supply curve. This reduction implies that producers are offering fewer goods at the same price. Factors contributing to a decrease in supply include:

(a) An increase in the price of alternative goods that could be produced,

(b) A decline in the price of jointly produced goods,

(c) Higher production costs due to rising input prices,

(d) A decline in the number of producers in the market, and

(e) Government-imposed taxes on production or sales.

This decline in supply is reflected in the supply curve shifting from SS to S_0S_0, showing a lower quantity supplied at all price levels.
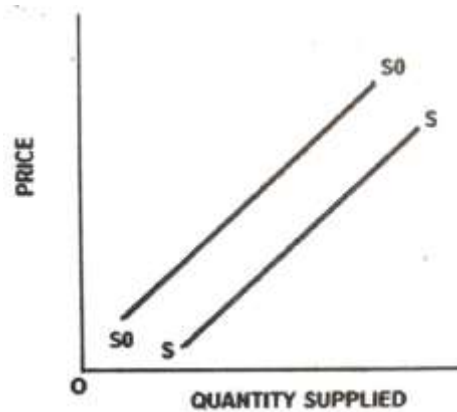
Fig. 5.4

Self-Check Exercise-5

Q1.   Distinguish between change in supply and change in quantity supplied.

5.8   Market Equilibrium

Market equilibrium occurs when the quantity of a good that buyers are willing to purchase matches the quantity that sellers are prepared to offer at a particular price. This balance ensures that there is neither excess supply nor shortage in the market. Consumers participate with the goal of acquiring goods to meet their needs, while producers aim to sell goods for profit. The interaction between supply and demand plays a key role in establishing the price at which transactions take place. Equilibrium is achieved when market forces stabilize, leading to the determination of the equilibrium price and quantity. At this point, buyers can purchase the exact amount they desire, and sellers can sell the exact amount they intend to supply at the prevailing price, leaving no motivation for either party to alter their decisions. In essence, equilibrium is a stable state that, once reached, tends to persist over time. Market demand and supply schedules can be combined to illustrate how these forces establish the equilibrium price and quantity of a commodity. The following table provides a hypothetical example of the demand and supply schedules for commodity X.

Table 5.2

Commodity X (Px in Rupees)	Quantity Supplied (Qxs)	Quantity Demanded (QXD)	Surplus (+) Shortage(-)	Pressure on Price
5	140	20	120	Downward
4	100	40	60	Downward
3	60	60	0	Equilibrium
2	40	80	-40	Upward

| 1 | 20 | 100 | -80 | Upward |

When the price of commodity X is set at Rs 1, buyers are prepared to purchase 100 units, while sellers are willing to supply only 20 units, resulting in a shortage of 80 units. Conversely, at a price of Rs 5, buyers demand just 20 units, but sellers offer 140 units, creating a surplus of 120 units. Considering a price of Rs 3, both buyers and sellers agree on a quantity of 60 units, indicating no surplus or shortage. This makes Rs 3 the equilibrium price, with the equilibrium quantity being 60 units.

At any price above the equilibrium level, the quantity supplied surpasses the quantity demanded. For instance, at Rs 4, sellers supply 100 units, but buyers demand only 40 units, causing a surplus. To clear this excess, sellers lower prices, which boosts demand and reduces supply until the price stabilizes at the equilibrium level of Rs 3. Conversely, prices below equilibrium lead to shortages. For example, at Rs 2, buyers demand 80 units, but sellers supply only 40 units. This shortage prompts buyers to offer higher prices, encouraging sellers to supply more until equilibrium is restored at Rs 3.

The equilibrium price is the only price that balances demand and supply, ensuring no further pressure for change. This price is known as the equilibrium price, and the quantity traded at this price is the equilibrium quantity. The market reaches equilibrium when the quantity demanded equals the quantity supplied. This relationship between demand, supply, and price can also be illustrated graphically by plotting both curves on a single graph.
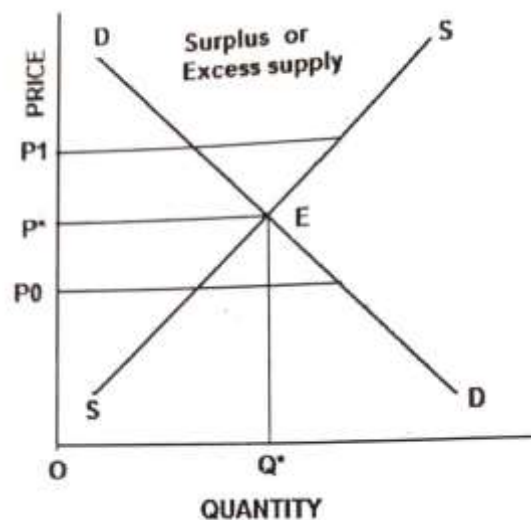
Figure 5.5

The equilibrium price (P^*) and equilibrium quantity (Q^*) are determined at the point where the market demand curve (DD) intersects the market supply curve (SS) at point E. At this equilibrium point, the quantity demanded matches the quantity supplied, leaving no excess demand or supply and, therefore, no pressure for price changes. Reaching equilibrium is a dynamic process involving continuous adjustments. If the market price is set above equilibrium, at a level like P_1, a surplus occurs as the quantity

45

supplied exceeds the quantity demanded. Sellers, aiming to clear excess stock, lower prices. As prices fall, demand rises while supply contracts, eventually restoring equilibrium at P*. Conversely, when the price is below equilibrium, such as at P, there is a shortage since demand surpasses supply. In response, consumers compete by offering higher prices, motivating producers to supply more until equilibrium is re-established at P*. Through this process of price and quantity adjustments, the market naturally moves towards equilibrium where demand equals supply. Unless there is a shift in either demand or supply, the equilibrium point remains stable. It is important to note that the market price observed at any given moment may not always reflect equilibrium. However, market forces continuously drive prices toward equilibrium unless external price controls intervene.

5.8.1 Changes in Market Equilibrium:

Changes in demand or supply lead to adjustments in market equilibrium. Various factors constantly influence demand and supply, thereby affecting the equilibrium price and quantity of a commodity. When demand increases or decreases while supply remains constant, the market equilibrium shifts. Similarly, a change in supply, with demand unchanged, also impacts the equilibrium price and quantity. In some cases, both demand and supply may change simultaneously, altering the market equilibrium.

To analyze how shifts in demand and supply affect equilibrium, the method of comparative statics is employed. This approach begins with an initial equilibrium position, introduces the desired changes, and identifies the new equilibrium. By comparing the new equilibrium with the original one, the resulting differences can be attributed to the changes introduced.

5.8.1.1 Adjustments to changes in demand

The market demand curve for a commodity shifts due to various factors, such as changes in consumer income, tastes and preferences, prices of related goods (substitutes and complements), the number of buyers, and income distribution. When the market supply curve remains constant, any increase or decrease in demand leads to a new market equilibrium.

Increase in Demand:

An increase in demand occurs when factors other than price, such as higher consumer income, lead to a rightward shift of the demand curve. This shift results in a higher equilibrium price and quantity. Initially, market equilibrium is established where the demand and supply curves intersect. However, as demand increases, excess demand arises at the original price, creating upward pressure on prices. This leads to a new equilibrium where both the price and quantity supplied are higher than before, reflecting the increased willingness of consumers to purchase the good at higher price levels.
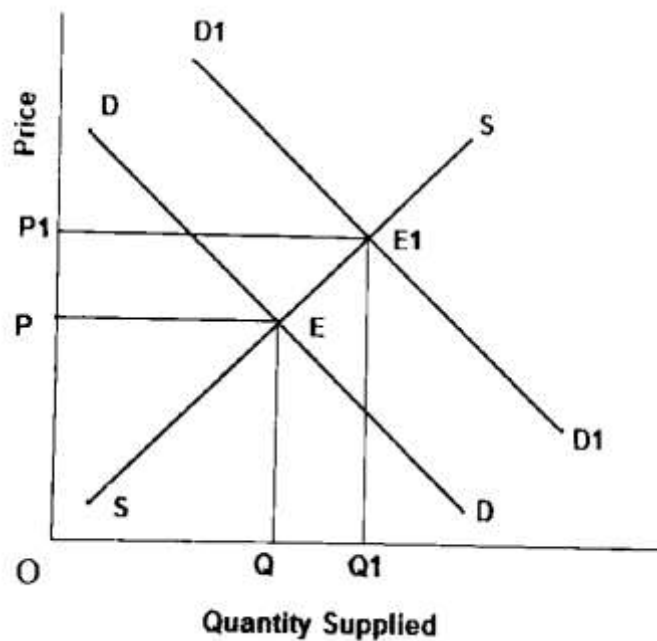
Figure 5.6

Decrease in Demand:

A decline in demand occurs when non-price factors, such as a fall in consumer income or a decrease in the price of substitute goods, cause the demand curve to shift leftward. This shift leads to a reduction in both the equilibrium price and quantity. Initially, market equilibrium is determined by the intersection of the demand and supply curves. However, with lower demand, the new equilibrium is established at a lower price and quantity, reflecting decreased consumer willingness to purchase the good at previous price levels. The surplus created by the demand drop exerts downward pressure on prices until the market reaches a new equilibrium.

These adjustments highlight how shifts in demand, with supply constant, influence market equilibrium.

47
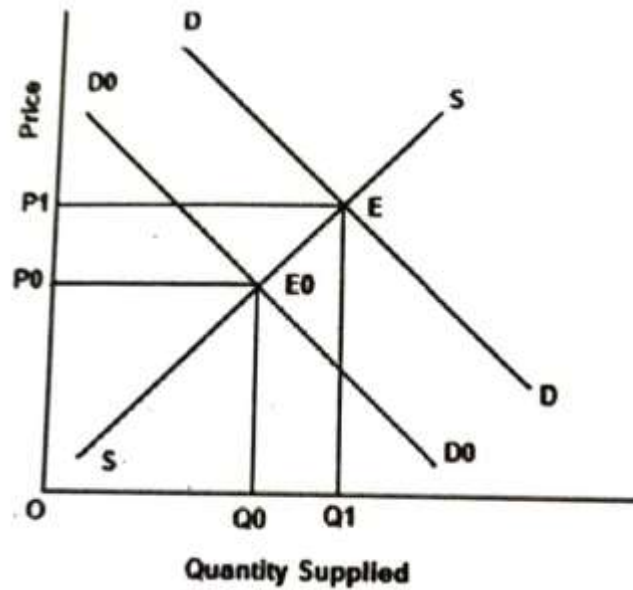
Figure 5.7

5.8.1.2 Adjustments to changes in supply

Let's examine how changes in supply affect the equilibrium price and quantity of a commodity, assuming demand remains constant. The market supply curve can shift due to factors such as variations in the prices of related goods, input costs, technological advancements, the number of producers, and future expectations. An increase in supply shifts the supply curve to the right, while a decrease shifts it to the left.

Impact of an Increase in Supply:

An increase in supply occurs when producers offer more of a commodity, often due to factors like lower input prices or technological improvements. With demand unchanged, this leads to a decrease in the equilibrium price and an increase in the equilibrium quantity, as illustrated in Figure 5.8.

48
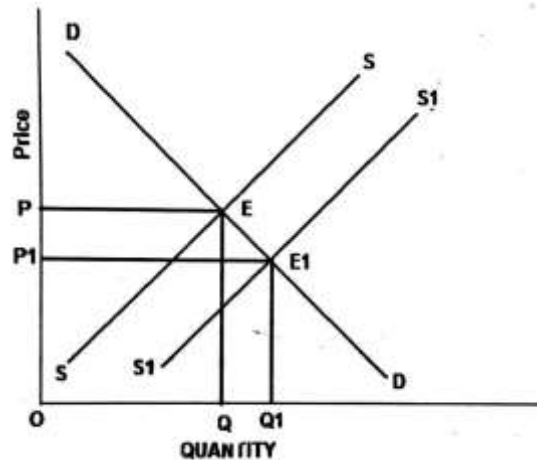
Figure 5.8

Initially, the market demand curve (DD) and the supply curve (SS) intersect at point E, establishing an equilibrium price of OP and an equilibrium quantity of OQ. Following an increase in supply, the supply curve shifts rightward to S1S1. This shift creates a temporary surplus at the original price OP. To clear this surplus, sellers reduce prices, causing the price to drop to OP1. The new equilibrium is established at the intersection of the demand curve (DD) and the new supply curve (S1S1). As the price declines, the quantity demanded rises, resulting in a new equilibrium quantity of OQ1.

Self-Check Exercise-6

Q1.   What causes changes in market equilibrium from the demand and supply side?

Q2.   Define market equilibrium.

5.9   Summary

Supply represents the quantity of a good that producers are willing to offer for sale in the market at a specific price within a given time frame. Various factors determine the level of supply, including the price of the product, the cost of production, technological advancements, the prices of related goods, market expectations, and the number of sellers.

The law of supply states that there is a direct relationship between the price of a product and the quantity supplied. When prices increase, producers are encouraged to supply more due to the potential for higher profits. Conversely, a decrease in price leads to a reduction in the quantity supplied. While price plays a crucial role in influencing supply, several non-price factors, such as input costs, technology, and producer expectations, also have a significant impact on market supply.

5.10   Glossary

- **Supply:** The quantity of a product that producers are willing and able to sell in the market at a particular price over a certain period.

- **Determinants of Supply:** Various factors influence supply, including the price of the product, production costs, prices of related goods, technological advancements, market expectations, and the number of producers.

49

- **Law of Supply:** This principle states that, assuming all other factors remain unchanged, an increase in the price of a good leads to a rise in the quantity supplied, whereas a decrease in price results in a lower quantity supplied. This highlights a direct relationship between price and supply.

- **Supply Schedule:** A tabular representation that outlines the different quantities of a good or service that sellers are willing to offer at various price levels within a specific timeframe.

- **Supply Curve:** A graphical depiction of the supply schedule, illustrating how the quantity of a product supplied changes in response to price variations.

5.11 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 5.3.

Answer to Q2. Refer to Section 5.3.1.

Self-Check Exercise-2

Answer to Q1. Refer to Section 5.4.

Answer to Q2. Refer to Section 5.4.2.

Self-Check Exercise-3

Answer to Q1. Refer to Section 5.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 5.6.

Self-Check Exercise-5

Answer to Q1. Refer to Sections 5.6 & 5.7.

Self-Check Exercise-6

Answer to Q1. Refer to Section 5.8.

Answer to Q2. Refer to Section 5.8.1.

5.12   References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Koutsoyiannis. (1991). A modern microeconomics. Macmillan.

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5.13   Terminal Questions

Question 1.   State the law of supply and show it through a supply schedule and a supply curve. Explain supply function?

Question 2.   What causes changes in Market Equilibrium from demand and supply side? Discuss in detail.

<center>*****</center>

ELASTICITY OF SUPPLY

Structure

6.1   Introduction

In the previous chapter, we explored the concept of demand elasticity. Now, we will discuss supply elasticity and how it is measured. The idea of supply elasticity is similar to that of demand elasticity. Although various factors affect the quantity supplied, our focus will be on the impact of the commodity's own price. In other words, we will examine the price elasticity of supply.

6.2   Learning Objectives

By the end of this unit, students will be able to

•   State elasticity of supply.

•   List degrees of elasticity of supply.

- Explain the different types of degrees of elasticity of supply.
- Explain the different methods of measuring elasticity.

6.3   Elasticity of Supply

Price elasticity of supply measures the degree to which the quantity of a good or service supplied responds to fluctuations in its price. It is determined by comparing the percentage change in quantity supplied to the percentage change in price. Mathematically, it is expressed as:

$$E_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

Self-Check Exercise-1

Q1.   What is the elasticity of supply?

6.4   Degrees of Supply Elasticity

When the supply curve slopes upward, the elasticity of supply can range from zero to infinity. Based on the elasticity coefficient, supply can be categorized into five types:

I.   Perfectly Inelastic Supply

II.   Inelastic Supply

III.   Unitary Elastic Supply

IV.   Elastic Supply

V.   Perfectly Elastic Supply

6.4.1   Perfectly Inelastic Supply

When the quantity supplied of a commodity remains unchanged despite price variations, the supply is considered perfectly inelastic. In this case, the elasticity of supply is zero ($E_s=0$), and the supply curve appears as a vertical line. This indicates that regardless of price fluctuations, the quantity supplied remains constant.
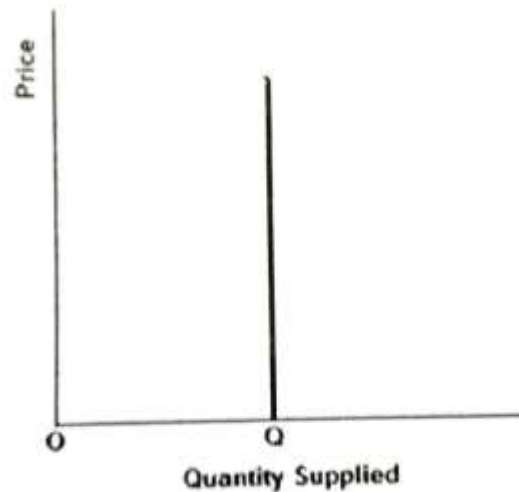
Quantity Supplied

6.4.2 Inelastic Supply

When the percentage change in quantity supplied is less than the percentage change in price, the supply is considered inelastic. The elasticity coefficient falls between zero and one (0<Es<1). If a linear supply curve intersects the horizontal axis, it indicates inelastic supply. The diagram shows that a price increase from P1 to P2 leads to a less than proportional change in quantity supplied from Q1 to Q2.
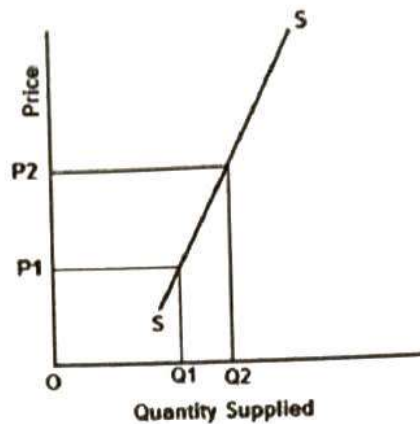
Quantity Supplied

6.4.3 Unitary Elastic Supply

When the percentage change in quantity supplied matches the percentage change in price, supply is referred to as unitary elastic. In this case, the elasticity coefficient is exactly one (Es=1). A linear supply curve passing through the origin represents unitary elasticity, regardless of its slope. The diagram illustrates that for any two points on such a curve, the percentage change in quantity supplied equals the percentage change in price.
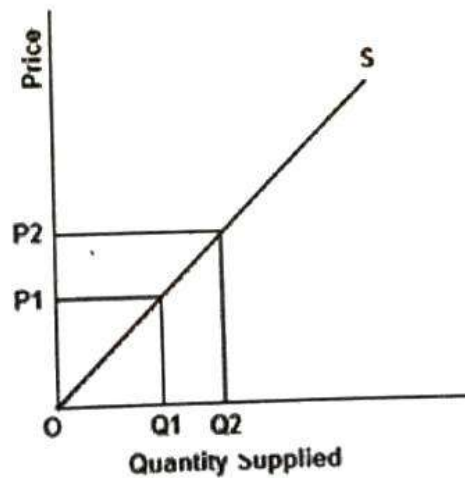
Quantity Supplied

6.4.4 Elastic Supply

When the percentage change in quantity supplied exceeds the percentage change in price, the supply is considered elastic. The elasticity coefficient is greater than one (Es>1). A linear supply curve represents elastic supply if it intersects the vertical (price) axis. The illustration shows that a price increase from P1 to P2 results in a more than proportional rise in quantity supplied from Q1 to Q2.
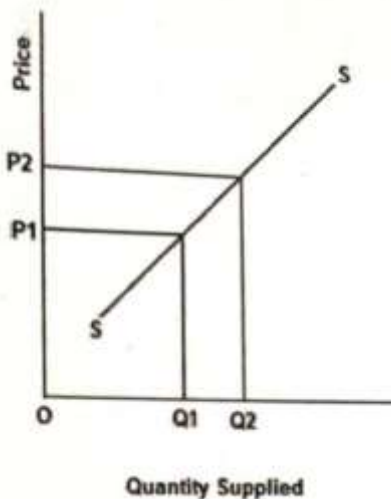
Quantity Supplied

6.4.5 Perfectly Elastic Supply

When an unlimited quantity is supplied at a specific price, the supply is considered perfectly elastic. In this case, the elasticity coefficient is infinite (Es=∞). A perfectly elastic supply is represented by a horizontal supply curve parallel to the quantity axis. This means that at price OP, suppliers are willing to provide any quantity, but if the price falls below OP, no supply will be available.

.
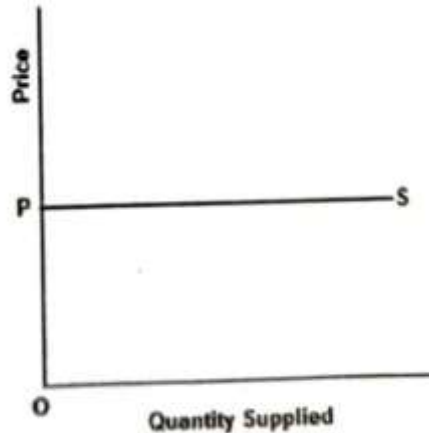
Self-Check Exercise-2

    Q1.   List and explain different degrees of elasticity of supply.

6.5   Measurement of Elasticity

    There are various methods for the measurement of elasticity of demand. Following are the important methods:

6.5.1. Proportional or Percentage Method: This method calculates the elasticity of demand by determining the ratio of the percentage change in quantity demanded to the percentage change in price. Commonly referred to as the formula method, it is expressed mathematically as follows:

$$ED = \frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in price}}$$

$$\text{OR} \qquad \frac{\dfrac{\text{Change in Demand}}{\text{Original Quantity demanded}}}{\dfrac{\text{Change in Price}}{\text{Original price}}}$$

6.5.2. Expenditure or Outlay Method: This approach, introduced by Marshall, measures elasticity by analyzing how total expenditure varies with changes in price and quantity demanded. It consists of three key scenarios:

- When price changes but total expenditure remains unchanged, demand is unitary elastic.

- When price changes and total expenditure moves in the opposite direction, demand is elastic (E>1).

- When price changes and total revenue moves in the same direction, demand is inelastic (E<1).

This relationship can be illustrated through a diagram.
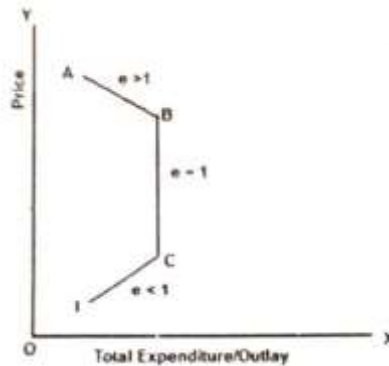
6.5.3 The Graphical Method of Measuring Elasticity (Point Elasticity): Actually, this method is only a graphical version of the 'Percentage change method' discussed above. The demand curve is only a graphical representation of demand schedule. Therefore, the results obtained through the two methods must necessarily be identical. A straight-line demand curve, such as TS in Diagram 6.2, is drawn to demonstrate how elasticity is measured using a demand curve.

In the diagram, when the price decreases from AR to BD, the quantity demanded rises from OA to OB. Here, the change in quantity demanded (ΔQ) corresponds to AB (or CD), while the price change (ΔP) CR. The initial quantity demanded (Q) is OA, and the initial price (P) is AR.

Using the percentage method, the elasticity of demand can be determined as follows:

$$e = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

In terms of the above diagram, we have

Quantity Demanded

$$e = \frac{AB}{CR} \times \frac{AR}{OA}$$

57
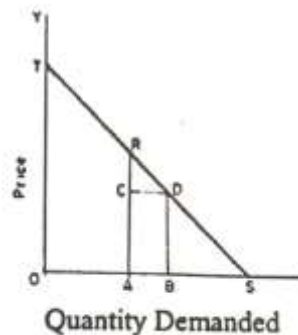
$$= \frac{CD}{CR} \times \frac{AR}{OA} \quad \text{(because AB = CD)}$$

$$= \frac{AS}{AR} \times \frac{AR}{OA} \quad \text{(because RCD and RAS are similar triangles).}$$

Therefore,

$$= \frac{CD}{CR} \times \frac{AS}{AR}$$

$$= \frac{AS}{OA}$$

$$= \frac{RS}{TR}$$

(Because AR, being parallel to OT, divides OS and TS in the same ratio) Note that in the fraction RS/TR, the numerator RS is the lower segment. TR is the upper segment of the straight-line demand curve, which meets the two axis in T and S. Therefore, for measuring elasticity at any point on a downward-sloping straight-line demand curve which meets the two axes, a simple rule of thumb for calculating elasticity at any point on a downward-sloping straight-line demand curve that intersects both axes is to divide the lower segment of the curve by the upper segment.

6.5.4. Arc Method: The point method is useful when changes in price and demand are minimal. In contrast, arc elasticity measures elasticity between two points on a demand curve, providing an average elasticity value. According to Watson, "Arc elasticity is the elasticity at the midpoint of an arc on a demand curve." The formula used to calculate arc elasticity is:

$$ED = \Delta Q/\Delta P \times (P1+P2)/(Q1+Q2)$$

or

$$\frac{\text{Change in D}}{\text{Average D}} \times \frac{\text{Average P}}{\text{Change in P}}$$

Where ΔQ = change in quantity

                     Q1 = original quantity

                     P1 = original price

                     Q2 = new quantity

                     P2 = New price

                     ΔP = change in price

Self-Check Exercise-3

      Q1.   Discuss the different methods of measurement of elasticity of supply.

      Q2.   Discuss the expenditure and outlay method of measurement of elasticity of supply.

6.6 Determinants of Elasticity of Supply

Several factors influence the elasticity of supply:

I. Time Factor

The duration under consideration plays a crucial role in determining the price elasticity of supply. In the short run, an increase in price may not significantly alter the quantity supplied, especially if goods are already in the market. However, over a longer period, supply becomes more elastic as producers can adjust production levels in response to price changes.

II. Cost of Production Changes

The ability to increase production without a substantial rise in costs affects supply elasticity. If producers can shift resources efficiently from other goods to the ones experiencing a price rise, supply tends to be more elastic. For instance, if agricultural land and labour can be easily reassigned from one crop to another, supply elasticity increases.

III. Storage Costs

Goods that can be stored at a low cost generally have a higher supply elasticity than perishable items or products with expensive storage requirements. When prices drop, suppliers can hold back stock and release it when prices rise, provided storage costs remain manageable. However, high storage costs limit this flexibility.

IV. Producers' Responsiveness

The extent to which producers react to price changes determines supply elasticity. If producers do not increase output despite rising prices, supply remains inelastic. Rational producers typically expand supply to maximise profits, but not all follow this behaviour consistently.

V. Production Substitutes and Complements

A product with multiple production substitutes tends to have more elastic supply since producers can switch between similar goods in response to price changes. Conversely, goods that are jointly produced (complements) tend to have inelastic supply since increasing one product's output automatically leads to the production of another, often in fixed proportions.

Self-Check Exercise-4

Q1.   What are the determinants of elasticity of supply?

6.7 Summary

The concept of elasticity of supply is similar to elasticity of demand, as both measure responsiveness to price changes. While various factors affect the quantity supplied, the primary focus is on the impact of a commodity's price. Price elasticity of supply quantifies how sensitive the quantity supplied is to a change in price and is calculated as the percentage change in quantity supplied divided by the percentage change in price. When the supply curve slopes upward, the elasticity of supply ranges between zero and infinity. Based on the coefficient of elasticity, supply can be categorized into five types: perfectly inelastic, inelastic, unitary elastic, elastic, and perfectly elastic. Perfectly inelastic supply occurs when the quantity supplied remains unchanged despite price fluctuations, indicating zero elasticity. Inelastic supply exists when the percentage change in quantity supplied is smaller than the percentage change in price, meaning the coefficient of elasticity lies between zero and one. Unitary elasticity occurs

when the percentage change in quantity supplied equals the percentage change in price. Supply is considered elastic if the percentage change in quantity supplied exceeds the percentage change in price. Supply is perfectly elastic when an infinite quantity is supplied at a given price. Several methods can be used to measure supply elasticity, including the proportional or percentage method, the expenditure or outlay method, the graphical (point elasticity) method, and the arc method. The key determinants of supply elasticity include time, changes in production costs, storage costs, the responsiveness of producers, and the availability of production substitutes and complements.

6.8   Glossary

- **Price Elasticity of Supply:** This refers to how responsive the quantity supplied of a commodity is to a change in its price. It is calculated as the percentage change in quantity supplied divided by the percentage change in price.

- **Proportional or Percentage Method:** This approach calculates demand elasticity by determining the ratio of the percentage change in quantity demanded to the percentage change in price.

- **Expenditure or Outlay Method:** Developed by Marshall, this method assesses demand elasticity by examining the variations in total expenditure resulting from changes in price and quantity demanded.

- **Arc Method:** Unlike the point method, which applies to small price and quantity variations, arc elasticity calculates elasticity between two distinct points on a demand curve. According to Watson, arc elasticity represents the elasticity at the midpoint of an arc on the curve.

6.9.   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 6.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 6.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 6.5.

Answer to Q2. Refer to Section 6.5.2.

Self-Check Exercise-4

Answer to Q1. Refer to Section 6.6.

6.10   References/Suggested Readings

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6.11   Terminal Questions

Question 1   Explains in detail the different methods of measurement of elasticity?

Question 2   What are the different factors that determine the elasticity of supply?

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PRODUCTION FUNCTION

Structure

7.1   Introduction

Firms are economic entities that acquire inputs and convert them into outputs for sale. Production refers to the process of transforming raw materials into finished goods and services. It encompasses both tangible products and intangible services, ensuring the availability of goods to meet consumer needs and preferences. Production plays a central role in economic

activities and has been a subject of study for centuries. While early ideas on production existed before Adam Smith, they were significantly refined in the late 19th century. The theory of production seeks to explain how firms determine the number of goods and services to produce and the allocation of resources such as labour, raw materials, and capital. It explores fundamental economic principles, including the relationship between the cost of inputs and the pricing of final goods. Additionally, the theory examines how the availability and cost of productive factors influence production decisions and market outcomes.

7.2 Learning Objectives

After going through this unit, you will be able to

- Discuss Production Function.
- Describe Short and Long-run Production Functions.
- Describe Cobb Douglas's Production Function.

7.3 Production

Production is an activity that enhances or generates utility, either in the present or future. It creates three types of utility: form, place, and time. Form utility arises when raw materials are transformed into finished products that have greater usefulness. For example, clay is moulded into pots, wood is crafted into furniture, and iron is shaped into various tools. Place utility is generated when resources are transported from locations where they are less useful to places where their demand is higher. For instance, gold ore transported from a mine to a factory or apples shipped from Shimla to different parts of the country gain increased value due to their relocation. Time utility refers to making products available when they are not typically accessible.

A good example is the preservation and sale of dried fruits during the off-season. To illustrate, the process of converting raw wool into woollen fabric creates form utility, transporting these products to markets results in place utility, and selling woollen clothes in winter provides time utility. The production relies on several factors, including land, labour, capital, and entrepreneurship. Land, in economic terms, includes all natural resources such as soil, water, and air. It is a primary factor of production as human activity depends on nature. The law of variable proportions highlights how production changes when different amounts of labour and capital are applied to land. According to John Stuart Mill, human effort can only modify natural materials but cannot create them. The assumption that natural resources are free goods simplifies economic models but does not negate their significance in production. Labour encompasses both mental and physical efforts directed toward production. However, work done purely for personal enjoyment, such as a musician performing for friends, does not qualify as labour in economic terms. Capital represents assets used to generate further wealth, such as factories, machinery, and infrastructure. It is a stock concept that yields income, which is considered a flow concept. Capital formation refers to the sustained accumulation of capital within an economy, often through investment. The entrepreneur plays a crucial role in production by coordinating land, labour, and capital efficiently. Entrepreneurs make key decisions regarding production, such as whether to produce, the quantity to produce, input combinations, and the selection of technology. The biggest challenge in production lies in balancing these factors in optimal proportions. Achieving efficiency in production requires both entrepreneurial expertise for economic efficiency and advanced technology for technical efficiency.

7.3.1 Practical applications of the production theory

The theory of production explains the technical and technological relationship between inputs and output. As more resources such as labour, capital, land, time, and raw materials are utilized, total production increases. For instance, a farmer who expands the use of land, labour, agricultural tools, irrigation, and fertilizers will see a rise in farm output. Even when one factor, such as land, remains constant, increasing other inputs can still boost production until the land reaches its full capacity. This demonstrates a clear link between the quantity of inputs used and the resulting output. Production theory studies this relationship, aiming to formalize and analyze how inputs contribute to output. The fundamental goal of production theory is to understand the connection between resource utilization and production outcomes. It seeks to answer key questions such as: What happens to total output when more units of a variable factor (e.g., labour) are combined with a fixed factor (e.g., capital)? If all inputs are increased proportionally, does output increase at the same rate, or does it change differently? Understanding these relationships helps businesses make informed production decisions.

Business enterprises make production-related decisions at three levels. The first level focuses on choosing the most efficient method to produce a specific quantity of goods using a given plant size and equipment, which relates to short-run cost minimization. The second level involves determining the optimal quantity of products to be produced in a given plant to maximize short-run profits. The third level deals with selecting the most efficient plant size and equipment for long-term profitability, which is linked to long-run profit maximization. These aspects are examined through the study of the production function, helping businesses optimize their operations and maximize efficiency.

Self-Check Exercise-1

Q1.   What are the types of production utility?

Q2.   Discuss the practical application of production theory.

7.4   Production Function

Before we get into the discussion on production function, let us see the brief history of production function.

7.4.1 History of Production Function

The concept of the production function has evolved over time, with contributions from various economic thinkers. Early discussions on production and distribution can be traced back to Roman and Greek scholars, followed by the Scholastics, Mercantilists, and Physiocrats. In the 18th century, Anne Robert Jacques Turgot introduced the idea of diminishing returns, later expanded by Adam Smith in The Wealth of Nations (1776).

Classical economists such as Thomas Malthus and David Ricardo further explored production theory, recognizing that increasing labour and capital led to diminishing agricultural output. In the late 19th century, marginal productivity theory gained prominence through economists like John Bates Clark and Philip Wicksteed, while Knut Wicksell's work paved the way for the famous Cobb-Douglas production function. In the 20th century, Kenneth Arrow and colleagues developed the CES (Constant Elasticity of Substitution) production function, which allows for varying substitution between inputs. Later advancements introduced flexible functional forms like the Translog production function, which reduces constraints on elasticity

and scale. In microeconomics, a production function defines the relationship between inputs (such as labour and capital) and output. It represents the maximum possible output given available technology and resources. Importantly, it focuses on technical efficiency rather than cost considerations, making it a key tool for understanding production processes across different industries.

In general, a production function is represented as

Q= *f*(x1, x2, x3,.....,xn)

The production function expresses the relationship between input quantities and the maximum possible output. It provides key insights into economic concepts such as marginal productivity, substitution between inputs, factor intensity, production efficiency, technological impact, and returns to scale.

A general mathematical representation of the production function is:

Q=f(L, K, R, S, v, e)

where:

- L = Labor input
- K = Capital input
- R = Raw materials
- S = Land input
- v = Returns to scale
- e = Efficiency factor

The efficiency parameter (e) accounts for variations in output despite identical factor inputs and returns to scale, highlighting the role of managerial expertise and entrepreneurship. The concept of the production function has been central to neoclassical economic analysis. While Philip Wicksteed (1894) is often credited with its algebraic formulation, some historical records suggest that Johann Von Thünen may have introduced it as early as the 1840s.

Production functions can be expressed in different mathematical forms. One common type is the additive production function, where inputs are combined through addition, such as Q= a + b X1+ c X2 + d X3, where the parameters a,b,c, and d are determined empirically. Another form is the multiplicative production function, where inputs interact multiplicatively. A well-known example is the Cobb-Douglas production function, represented as $Q = AL^a K^b$, where A denotes efficiency, and a and b reflect the contributions of labour and capital. A more flexible variation is the Constant Elasticity of Substitution (CES) function, which extends the Cobb-Douglas model by allowing different degrees of substitution between inputs. Another variation is the quadratic production function, a type of additive function that includes squared terms to capture non-linear relationships. The choice of a production function and its parameters depends on firm-specific and industry-specific factors. In the short run, at least one input remains fixed, while in the long run, all inputs can be adjusted. Although some theoretical production functions are widely discussed in economics, they are rarely observed in real-world applications.

7.4.2 Homogeneous production functions: A homogeneous production function of degree n follows the property that if all inputs are scaled by a positive constant k, the output scales by k^n.

Mathematically, $f(kX1, kX2) = k^n f(X1, X2)$. When n>1, the function represents increasing returns to scale, while n<1 indicates decreasing returns to scale. If n=1, the function exhibits constant returns to scale.

7.4.3 Homothetic functions: A homothetic function is a specific type of homogeneous function in which the marginal rate of technical substitution (MRTS) remains unchanged along the production function. This means that inputs can be substituted at a constant rate without affecting the efficiency of production.

7.4.4 Aggregate production functions: In macroeconomics, economists construct aggregate production functions to represent the total production of a nation rather than a single firm or industry. Ideally, these functions should be the sum of all individual production functions, but practical challenges arise due to the diversity of goods, services, capital assets, and labor types in an economy. Instead, economists use an aggregation process to develop a single output measure—real Gross Domestic Product (real GDP)—where different goods and services are weighted based on their relative prices.

7.4.5 Fixed Coefficients Production Function: A fixed coefficients production function, also known as the Leontief production function, describes situations where inputs must be used in a fixed proportion, similar to a recipe where ingredients cannot be substituted. For example, in call centers, the number of workers must match the number of telecommunication devices in a one-to-one ratio. In this case, the isoquants of the production function form L-shaped curves, reflecting the rigid relationship between inputs.

Self-Check Exercise-2

Q1.   Define Production Function.

Q2.   Define Homothetic Functions.

7.5   Linear Production Function

A **linear production function** represents a direct and proportional relationship between input factors and total output. This means that an increase in inputs leads to a consistent and predictable increase in output.

For example, consider a production function expressed as:

$$Q = 20K + 40L$$

where K represents capital and L represents labour.

If a firm employs 8 units of capital and 17 workers, the total output can be calculated as:

$$20 \times 8 + 40 \times 17 = 840 \text{ units}$$

This demonstrates how output is determined by the sum of weighted inputs in a linear production setting.

7.5.1 Homogenous Production Function

A homogeneous production function is one in which all input factors can be scaled proportionally, and the output changes according to a specific degree of homogeneity.

Consider a production function represented as $Q = f(X, Y)$, where X and Y are inputs. If both inputs are increased by a constant factor k, the new output becomes:

$$Q* = f(kX, kY).$$

If k can be completely factored out of the function, the production function is classified as homogeneous and can be expressed as:

$$Q = k^v f(X, Y) \text{ or } Q'' = kvQ$$

Here, v is known as the degree of homogeneity and determines the returns to scale:

- If v = 1, the function exhibits constant returns to scale (CRS), meaning output increases in the same proportion as inputs.

- If v < 1, it reflects decreasing returns to scale (DRS), where output increases at a lower rate than input expansion.

- If v > 1, it represents increasing returns to scale (IRS), indicating output grows at a higher rate than inputs.

A production function with v = 1 is termed a linearly homogeneous function, where doubling all inputs results in a proportional doubling of output. Such functions are also called constant returns to scale production functions.

Mathematically, returns to scale are evaluated using the sum of exponents in a production function. For instance, in $X = 60L^{b1}K^{b2}$, the returns to scale are measured by b1 + b2.

7.5.2 Cobb Douglas Production Function

Among the various production functions used in economics, the Cobb-Douglas production function (C-D function) is one of the most widely applied. It represents the relationship between output and inputs in a mathematical form. Although similar functional forms were explored earlier by economist Knut Wicksell (1851-1926), the specific formulation known today was developed by Charles Cobb and Paul Douglas in the 1920s.

Paul Douglas, an economist, was investigating the relationship between inputs and output at a national level. A study by the National Bureau of Economic Research revealed that, between 1909 and 1918, labour's share of total output remained approximately 74%, despite variations in the capital-to-labour ratio. Douglas consulted his friend, mathematician Charles Cobb, to determine if a mathematical function could explain this phenomenon. This collaboration led to the Cobb-Douglas production function, which was introduced in their 1928 paper, "A Theory of Production."

The general form of the Cobb-Douglas production function is:

$$Q = AK^{\beta}L^{\alpha}$$

where:

- Q represents total production (output),

- K is capital input,

- L is labour input,

- A represents total factor productivity (technology), which is assumed to be constant,

- α and β denote the output elasticities of labour and capital, respectively.

The values of α and β determine how responsive output is to changes in labour and capital, assuming all other factors remain constant. For example, if α = 0.15, a 1% increase in labour would result in an approximate 0.15% increase in output.

A key property of the Cobb-Douglas function is its returns to scale, which are determined by the sum of α + β:

- If α + β = 1, it indicates constant returns to scale, meaning that doubling all inputs results in a proportional doubling of output.

- If α + β < 1, it reflects decreasing returns to scale, where output grows at a slower rate than input expansion.

- If α + β > 1, it signifies increasing returns to scale, where output increases at a higher rate than inputs.

Douglas and Cobb initially believed that labour and capital had constant shares in total output over time in developed economies. However, modern economists question whether this constancy truly holds across different periods. Nonetheless, for an ideal Cobb-Douglas function, the assumption α + β = 1 remains a standard theoretical simplification.

7.5.2.1 Properties of a Cobb-Douglass Function

1). Linearly Homogeneous of Degree One: The Cobb-Douglas production function exhibits constant returns to scale, meaning that if all inputs are increased by a factor of λ, the output also increases by the same factor λ. This implies that the function maintains proportionality in production.

2) Average Product of Inputs: The average product of capital and labour can be determined by expressing output as a ratio of the respective inputs. Specifically, the average product of labour is calculated by dividing total output by the quantity of labour employed. Similarly, the average product of capital is obtained by dividing output by the amount of capital used.

$$Q = A\,L^{\alpha}\,K^{\beta}$$

$$AP_L \;=\; \frac{Q}{L} \;=\; \frac{AL^{\alpha}K^{\beta}}{L}$$

$$=\; \frac{AK^{\beta}}{L^{-\alpha}L}$$

$$=\; \frac{AK^{\beta}}{L^{1-\alpha}}$$

$$=\; \frac{AK^{\beta}}{L^{\beta}}$$

Since α + β = 1, 1 - α = β

$$A\left[\frac{K}{L}\right]^{\beta}$$

Thus, we have shown that the AP_L can be expressed as the ratio of the two inputs K and L Similarly

$$AP_K = \frac{Q}{K} = \frac{AL^{\alpha}K^{\beta}}{K}$$

$$= \frac{AL^{\alpha}}{K^{-\beta}K}$$

$$= \frac{AL^{\alpha}}{K^{1-\beta}}$$

$$= \frac{AL^{\alpha}}{K^{\alpha}}$$

Since $\alpha + \beta = 1$, $1 - \beta = \alpha$

$$A\left[\frac{L}{K}\right]^{\alpha}$$

3) The marginal products of capital and labour can be represented as input ratios.

$$MP_K = \beta A \cdot \left[\frac{L}{K}\right]^{\alpha}$$

Thus, the marginal product of capital (MP_K) can be represented in terms of input ratios L and K. It is also equal to β times AP_K. That is, $MP_K - \beta AP_K$

Similarly, the MP_L can be expressed in terms of ratios of inputs Land K.

$$\text{Symbolically } MP_L = \alpha \ A \left[\frac{K}{L}\right]^{\beta}$$

It is also equal to a times AP_L. That is, $MP_L = \alpha AP_L$

4.   The Cobb-Douglas function satisfies Euler's theorem.

$$L \ \frac{dQ}{dL} \ + K \ \frac{dQ}{dK} \ = \ Q$$

5.   The elasticity of substitution in a Cobb-Douglas production function is equal to one. This concept, independently introduced by John Hicks (1932) and Joan Robinson (1933), quantifies the degree to which one factor can be substituted for another in production. It is defined as the elasticity of the input ratio concerning the ratio of their marginal products. This measure reflects the curvature of an isoquant, indicating the ease of substituting one input for another.

6.   Factor intensity in a Cobb-Douglas production function, expressed as $Q = AL^{\alpha}K^{\beta}$, is determined by the ratio α/β. A higher ratio signifies a more labor-intensive production process, while a lower ratio indicates greater capital intensity.

7.   A strict Cobb-Douglas production function assumes constant returns to scale, as indicated by the condition $\alpha + \beta = 1$.

7.5.5 Mathematical Characteristics of Production Functions

Several key mathematical characteristics define production functions. One fundamental aspect is the relationship between the production function and the cost function. For well-structured functions, a cost function can be derived from a production function and vice versa. This is significant because cost functions, which depend on factor prices and output levels, are generally easier to estimate empirically compared to production functions. Another important characteristic is homogeneity and homotheticity. While all homogeneous functions are homothetic, not all homothetic functions are homogeneous. Homogeneous functions can have varying degrees, commonly degree zero or one in economics. If a production function is homogeneous of degree k, its first partial derivatives will be homogeneous of degree (k-1). For example, a function with linear homogeneity (degree one) results in marginal products that are homogeneous of degree zero, meaning they depend on relative input proportions rather than absolute input levels. Homogeneity also implies that isoquants will be proportionally scaled versions of each other, maintaining parallel slopes along a ray from the origin. Additionally, Euler's Theorem is directly related to homogeneity.

Homotheticity, a broader concept, plays a crucial role in economic analysis. Since all homogeneous functions are homothetic, the previously mentioned properties apply to homothetic functions as well. A homothetic production function ensures that the output elasticities of all inputs remain equal at any given point. This elasticity can be represented by the ratio of marginal cost to average cost. If a firm experiences increasing average costs, its output elasticity exceeds one, whereas decreasing average costs implies an output elasticity below one. Under homotheticity, all inputs must be normal goods.

Another potential characteristic of a production function is separability. Many production processes involve more than two inputs, making it complex to analyze them as a single function. If a production process can be broken into distinct stages—where intermediate inputs are produced first and then combined to generate the final output—the production function is considered separable. This separability simplifies economic analysis by reducing the number of parameters required to evaluate cost or production efficiency.

70

Self-Check Exercise-3

Q1. Discuss the Homogeneous Production Function.

Q2. Discuss Cobb-Douglas production function. What are the properties of the Cobb-Douglas production function?

7.6 Uses of a production function

A production function serves several important purposes in economic analysis:

I. It helps estimate the level of output when the physical quantities of inputs are known.

II. If the output level (Q) is fixed, the production function provides various input combinations that can produce the same output.

III. It aids in identifying the most technically efficient input combination and selecting the least-cost option when budget constraints are considered.

IV. The production function is useful in determining the degree of returns to scale in a production process.

V. It allows for the calculation of the marginal product of different input factors.

Production functions can be applied at different levels, ranging from individual firms to entire industries or even national economies. Generally, a production function remains unchanged for a given technology but evolves as technological advancements occur. The characteristics of a production function depend on factors such as the dataset used, the time period analyzed, and the type of technology in place. From the early 1950s to the late 1970s, production functions were a key focus of economic research. During this period, numerous mathematical models were developed to describe the relationship between inputs and output, leading to various theoretical insights. However, after the resolution of the capital controversy, the pace of new production function formulations slowed. Economic analysis typically begins with short-run production functions before expanding into long-run or multi-output models.

Self-Check Exercise-4

Q1. Discuss the uses of a production function.

7.7 Summary

A production function represents the relationship between inputs and output for a firm, industry, or economy. It reflects technological possibilities and the feasibility of substituting inputs based on existing knowledge.

Types of Production Functions

1. Fixed Proportion Production Function: This type requires a specific combination of inputs, such as capital and labour, to produce output efficiently, with no possibility of input substitution. It follows constant returns to scale and forms the basis of input-output analysis, also known as the Leontief Isoquant.

2. Variable Proportion Production Function: In this type, the output can be produced using different combinations of inputs, allowing flexibility in the use of factors like capital and labour. It assumes an infinite number of possible input combinations.

71

7.8 Glossary

- **Production Function:** Describes the relationship between inputs and output for a firm, industry, or economy, reflecting current technology and input substitution possibilities.

- **Fixed Proportion Production Function:** This function requires a specific input combination, like capital and labour, to produce output with no input substitution.

- **Variable Proportion Production Function:** This function allows output to be produced using different input combinations, offering flexibility in input use.

- **Linear Production Function:** Assumes a direct, proportional relationship between inputs and total output.

- **Homothetic Functions:** A type of homogeneous function where the marginal rate of technical substitution remains constant.

- **Homogeneous Production Functions:** A function $Q=f(X1,X2)$ is homogeneous of degree n if $f(kX1,kX2)=k^n f(X1,X2)$, indicating increasing returns for n>1, decreasing returns for n<1, and constant returns for n=1.

7.9 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 7.3.

Answer to Q2. Refer to Section 7.3.1.

Self-Check Exercise-2

Answer to Q1. Refer to Section 7.4.

Answer to Q2. Refer to Section 7.4.3.

Self-Check Exercise-3

Answer to Q1. Refer to Section 7.5.1.

Answer to Q2. Refer to Section 7.5.2 & 7.5.2.1.

Self-Check Exercise-4

Answer to Q1. Refer to Section 7.6.

7.10 References/Suggested Readings

1. Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2. Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3. Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4. Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

7.11 Terminal Questions

1. What is production function? Discuss the fixed proportions and variable proportions production functions.

2.   Discuss different types of production functions?

****

SHORT RUN AND LONG RUN PRODUCTION FUNCTION

8.1   Introduction

Now that we have introduced the production function, we turn to its analysis. Production analysis is typically divided into short-run and long-run perspectives. This distinction is important because input-output relationships change over different time frames. For instance, inputs like labor can be adjusted quickly, whereas factors like land require a longer period to change. The following section elaborates on the differences between short-run and long-run production.

8.2   Learning Objectives

After going through this lesson, you will be able to:

- Describe Short and Long run Production Function

- Explain law of variable proportion.

- Explain TP, MP and AP

8.3   Short Run and Long Run

Inputs in production are classified as fixed or variable. Fixed inputs, such as plant and machinery, cannot be easily changed in the short term due to high costs and logistical constraints. In contrast, variable inputs, like labor and raw materials, can be adjusted quickly based on production needs. The classification of inputs depends on the time frame considered. In the short run, at least one input remains fixed, typically land or capital. In the long run, all inputs become variable, allowing firms to adjust production capacity as needed. For instance, in automobile manufacturing, firms can choose between labor-intensive or capital-intensive methods. Meanwhile, certain industries, like pharmaceuticals, require fixed input proportions, though minor adjustments may be possible. In summary, the short run limits adjustments to variable factors like labor, while the long run allows firms to modify all production factors, enabling supply to meet demand more effectively.

Basis	Short Period	Long Period
1. Time Frame	A period shorter than the time needed to adjust fixed factors.	A period where all production factors can be changed.
2. Output	Output increases by altering variable factors only.	Output can be adjusted by changing both fixed and variable factors.
3. Nature of factors of production	Inputs are classified as fixed and variable.	No distinction between fixed and variable inputs; all can be modified.
4. Effect on price	Demand has a stronger influence on price.	Both supply and demand influence price equally, as supply can adjust over time.

Let's now analyze production, beginning with the short-run production analysis, followed by the long-run production analysis.

Self-Check Exercise-1

Q1.   Define

1)   Short Period

2)   Long Period

8.4   The Law of Variable Proportions

In short-run production analysis, labour is considered the only variable factor, while other inputs remain fixed. Suppose we examine an agricultural production function where land is fixed at one acre. As we add more labourers to this land, output changes. Before analyzing this relationship, let's understand key concepts related to production:

8.4.1   Total Product (TP) or Total Physical Product (TPP)

Total Product (TP) or Total Physical Product (TPP) refers to the **total output produced** using given inputs within a specific period. As the quantity of a variable input increases, TP also increases, but at varying rates. In the short run, firms can increase production only by adding variable factors.

8.4.2 Average Product (AP) or Average Physical Product (APP)

Average Product (AP) or Average Physical Product (APP) is the output per unit of a variable factor. It is calculated as:

AP=TP/Q

For example, if 20 workers produce 100 units of output, the Average Product of Labour (APL) is:

APL=100/20=5

That means each worker contributes, on average, 5 units of output.

8.4.3 Marginal Product (MP) or Marginal Physical Product (MPP)

Marginal Product (MP) or Marginal Physical Product (MPP) is the additional output gained by employing one more unit of a variable factor. It is given by:

MP=ΔTP/ΔL

For instance, if three workers produce 100 kg of wheat on one acre of land, and adding a fourth worker increases output to 120 kg, the Marginal Product of Labour (MPL) is:

MPL=120−100=20 kg

This means the fourth worker contributed 20 kg of additional wheat.

Now, let's examine how TP, AP, and MP behave as more labour is added to the fixed input (land).

Table 8.1: The law of variable proportions

	Fixed Factor (Land)	Variable Factor (Labour)	Total Product	Average Product of Labour $AP_L = TP/Q$	Marginal Product of Labour $MP_L = \Delta TP/\Delta L$	Stage of Production
A	1	0	0	0	0	I Stage
B	1	1	8	8	8	
C	1	2	18	9	10	
D	1	3	30	10	12	
E	1	4	48	12	18	
F	1	5	65	13	17	
G	1	6	78	13	13	
H	1	7	84	12	6	II Stage
I	1	8	88	11	4	
J	1	9	90	10	2	
K	1	10	90	9	0	
L	1	11	88	8	-2	III Stage

M	1	12	84	7	-4	

The table illustrates the impact of adding more workers to a fixed piece of land, highlighting key changes in production.

a. Initially, the land has no workers (hypothetical case). When the first worker is introduced, Total Product (TP) becomes 8 units, while Average Product (AP) and Marginal Product (MP) are also 8 units. The MP of 8 indicates that the first worker contributes an additional 8 units of output.

b. With the addition of a second worker, TP rises to 18, AP increases to 9, and MP becomes 10. Since land remains fixed, all variations in output result from changes in labour input. When a third worker is added, TP reaches 30, and MP rises to 12. As TP grows to 48, MP reaches 18. Eventually, when TP peaks at 90, MP drops to zero. If TP decreases to 88 and 84, MP turns negative, illustrating the relationship between TP and MP.

c. Observing the TP-MP relationship, we notice that TP initially rises at an increasing rate (from point A to G), where MP also increases. However, from H to K, although TP continues to grow, MP declines, indicating that TP is increasing at a decreasing rate. Finally, from L to M, TP starts to fall, making MP negative, reflecting diminishing returns.
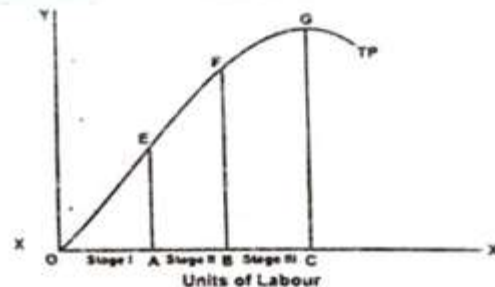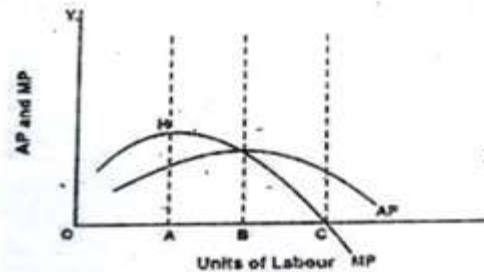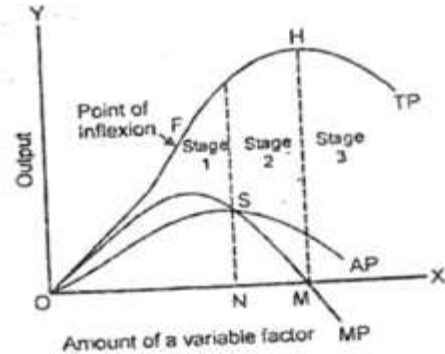
This pattern aligns with the Law of Variable Proportions, which explains how changes in the proportion of variables to fixed inputs affect output. Initially, inputs are mixed in equal proportions (1:1), but as production progresses, the ratio changes (1:2, 1:3, etc.), demonstrating variable input combinations.

To better understand these changes, production is typically analyzed in three stages, which can be illustrated through TP, AP, and MP curves in a graphical representation.

8.4.4 Stages of Production

Stage I

The first stage extends from the origin to the point where the Average Product (AP) reaches its peak. This phase can be divided into two parts: initially, Total Product (TP) increases at an accelerating rate, followed by a phase where it grows at a decreasing rate. The transition between these two phases is marked by the inflection point, where the curvature of the TP curve changes. This stage also includes the point where the Marginal Product (MP) reaches its maximum. At the end of Stage I, where AP is at its highest, MP intersects AP, making them equal at this point. This behaviour can be observed through the graphical representation of production functions.

Stage II

The second stage starts when AP reaches its maximum and extends to the point where TP is at its highest or where MP becomes zero. During this phase, TP continues to increase but at a decreasing rate. Meanwhile, AP declines, and MP keeps falling until it reaches zero.

Stage III

The third stage begins once TP starts to decline and MP turns negative. AP continues to fall but never reaches zero or negative values. However, MP remains in the negative range. This stage is characterized by over-utilization of the variable factor, leading to inefficiencies.

Explanation of the Stages

Each stage occurs due to different levels of factor utilization. Stage I happens because additional variable factor units help maximize the fixed factor's efficiency. This aligns with the law of diminishing returns, which states that adding more units of a variable factor leads to diminishing marginal returns after a certain point.

Stage II is considered the most efficient stage of production. Although AP and MP decline, they remain positive, and TP continues to rise, making this the ideal stage for production.

Stage III represents inefficiency in production. Here, TP declines, and MP becomes negative. An example of this can be seen in agricultural production: if too many workers are employed on the same piece of land, output may stagnate or even decline. This situation, where some workers contribute nothing or have a negative impact on production, is known as disguised unemployment.

Choice of Stage by a Rational Producer

A profit-driven producer will not operate in Stage I because adding more labour at this point increases the AP, meaning productivity can still be improved. Similarly, Stage III is undesirable since reducing the labour force would increase efficiency and lower costs. The most logical choice is Stage II, where TP is maximised, and the production process remains efficient.

Self-Check Exercise-2

Q1.   Define

1)   Total Product (TP)

2)   Average Product (AV)

3)   Marginal Product (MP)

Q2.   Explain the law of variable proportions with the help of total product and marginal product curves.

8.5   The long-run production function and returns to scale

In the long run, all factors of production are variable, eliminating the need to assume that one input remains fixed while another varies. This flexibility allows firms to adjust their scale of operations. A small-scale firm can expand into a medium-scale enterprise, and a medium-scale firm can grow into a large-scale business. The study of how output responds when the entire scale of production changes is known as the law of returns to scale.

Laws of Returns to Scale

Returns to scale describe the relationship between proportional changes in inputs and the resulting changes in output. If all inputs are increased by a certain percentage, the output may respond in one of the following ways:

- **Constant Returns to Scale (CRS):** When output increases in the same proportion as inputs. For example, if all inputs are doubled, output also doubles.

- **Increasing Returns to Scale (IRS):** When output increases by a greater proportion than the increase in inputs. For instance, if inputs are doubled, output more than doubles.

- **Decreasing Returns to Scale (DRS):** When output increases by a smaller proportion compared to the increase in inputs. In this case, doubling inputs results in less than double the output.

These three scenarios illustrate how changes in input levels influence production efficiency and firm growth over the long run.

Self-Check Exercise-3

Q1.   Discuss the law of returns to scale.

8.6   Summary

Production inputs are classified into fixed and variable inputs. Fixed inputs, such as machinery and land, cannot be easily adjusted within a given period due to high costs or logistical constraints. In contrast, variable inputs, like labour and raw materials, can be modified as needed, allowing firms to respond quickly to changes in demand. The short run is characterized by the ability to adjust only variable inputs, while fixed inputs remain unchanged. In the long run, all factors become variable, enabling firms to expand or reduce production as required. This flexibility allows supply to be adjusted according to demand.

Key production concepts include:

Total Product (TP): The total output produced using given inputs over a specific period. While increasing input usage raises TP, the rate of increase varies at different levels of employment.

Average Product (AP): The output per unit of a variable input, calculated as TP divided by the quantity of the input.

Marginal Product (MP): The additional output generated by employing one more unit of a variable input, measured as the change in TP divided by the change in input quantity.

These production measures help firms analyze efficiency and make informed decisions regarding resource allocation in both the short and long run.

8.7 Glossary

- **Short Run:** The short-run refers to a period during which only variable factors, such as labour, can be adjusted while fixed inputs remain unchanged.

- **Long Run:** In the long run, all factors of production can be modified. Both fixed and variable inputs can be altered, allowing firms to adjust supply in response to changes in demand.

- **Total Product (TP) or Total Physical Product (TPP):** This represents the total quantity of output produced using a given set of inputs within a specific time frame.

- **Average Product (AP) or Average Physical Product (APP):** This measures output per unit of variable input and is calculated as AP = TP/Q.

- **Marginal Product (MP) or Marginal Physical Product (MPP):** This indicates the additional output generated when one more unit of a variable input is employed.

8.8 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 8.3.

Self-Check Exercise-2

Answer to Q1. Refer to Sections 8.4.1, 8.4.2 & 8.4.3.

Answer to Q2. Refer to Section 8.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 8.5.

8.9 References/Suggested Readings

1. Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2. Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3. Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4. Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

8.10 Terminal Questions

1. Discuss diagrammatically the laws of variable proportion. Whic is the best stage of Production in the law of Variable Proportions?

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Iso-Quant

Structure

9.1   Introduction

In this unit, we discuss the concept of isoquants, which illustrate different combinations of two inputs that yield the same level of output. Isoquants play a crucial role in production analysis, helping firms determine efficient input combinations. We begin with an introduction to isoquants, followed by a discussion on their different types, including linear, right-angled, kinked, and smooth convex isoquants. The unit also covers the concept of an isoquant map, which represents multiple isoquants for different output levels. Further, we explore the properties of isoquants, which help understand input substitution and efficiency in production.

Finally, we examine the optimal input combination that maximizes output, ensuring cost-effectiveness and efficiency in resource utilization.

9.2   Learning Objectives

After going through this unit, you will be able to:

- Define iso quant and list its different types
- Explain the Optimal Input Combination for Maximisation of Output
- Explain the properties of isoquant

9.3   Iso-quant

The term iso originates from Greek, meaning "equal" or "same." An isoquant is a curve that represents different combinations of inputs that yield the same level of output. Due to this characteristic, it is also known as an equal product curve. An isoquant is conceptually similar to an indifference curve in consumer theory, but instead of two goods, it represents two inputs—typically labour and capital—used in production. Since isoquants deal with production levels, output is expressed numerically. For instance, an isoquant may indicate an output level of 100 units, another may represent 200 units, and a third may correspond to 300 units, and so on. Unlike indifference curves, where ordinal measurement is used, isoquants allow for quantifiable output levels.

To understand isoquants further, we consider a production function that employs labour and capital as key inputs.

Table 9.1: A production function with two inputs
Iso Quant

	Labour (L)	Capital
A	2	12
B	1	10
C	2	5
D	3	3
E	4	2.3
F	5	1.7
G	6	1.2
H	7	0.8
I	8	1

Table 9.1 presents a production scenario where both labour and capital change simultaneously. For example, in situation A, the input combination consists of 2 units of labour and 12 units of capital. Moving to situation B, both inputs are adjusted, with 1 unit of labour and 10 units of capital now in use. In situation C, the quantity of labour increases to 2 units, while capital decreases to 5 units, and so forth.
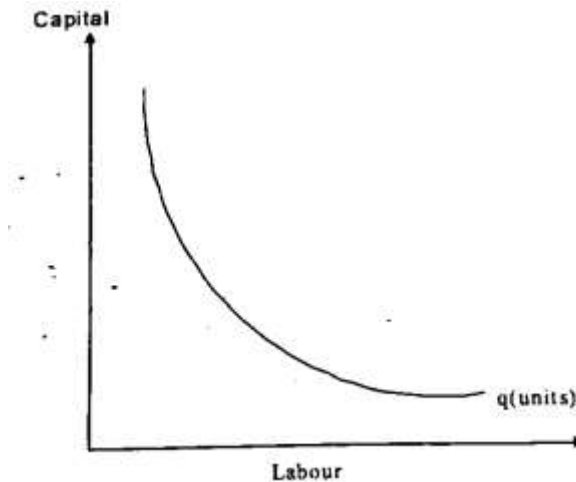
Fig. 9.1

Since all inputs are variable, this represents a long-run production process. The assumption here is that each combination of labour and capital (from A to I) leads to the same level of output. Plotting these combinations on a graph results in an isoquant curve. An isoquant represents the locus of different input combinations that produce the same output level. In other words, it depicts how labour and capital can be substituted while maintaining a constant production level. Since every point on an isoquant corresponds to an equal output, it is also referred to as an equal product curve.

9.3.1 Types of Iso quants

The shape of an isoquant varies based on the degree of substitutability between labour and capital.

9.3.1.1 Linear Iso quant:

A linear isoquant appears as a straight line, indicating perfect substitutability between labour and capital. This means that a given output level can be achieved by using only capital, only labour, or any combination of both. At point A, output is produced using capital alone, whereas at point B, it is produced using labour alone. However, this scenario is unrealistic since labour and capital are rarely perfect substitutes in real-world production.

83

Linear Isoquant
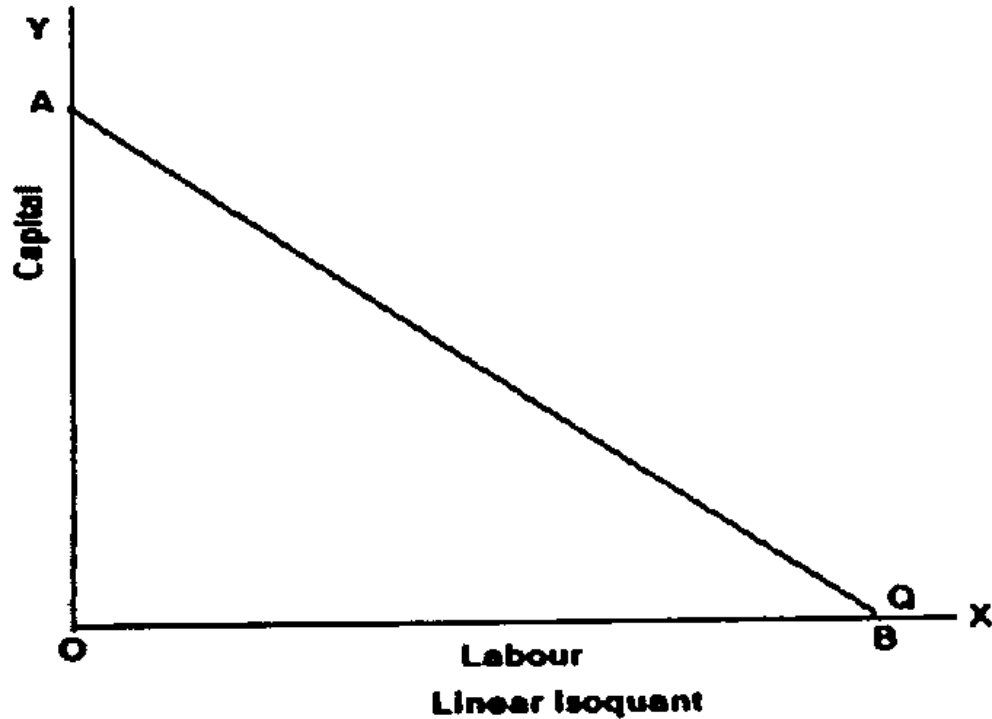
Fig. 9.2

9.3.1.2 Right Angled Iso quant.

A right-angled isoquant represents a situation where labour and capital are perfect complements, meaning they must be used in fixed proportions. This type of isoquant forms an L-shape, with output increasing only when both inputs increase in a specific ratio. The point where the two arms meet (e.g., point C) indicates the required combination of labour and capital for production. This type of isoquant is also referred to as a Leontief Isoquant, named after the economist Wassily Leontief, who introduced input-output analysis.

Right Angled Isoquant
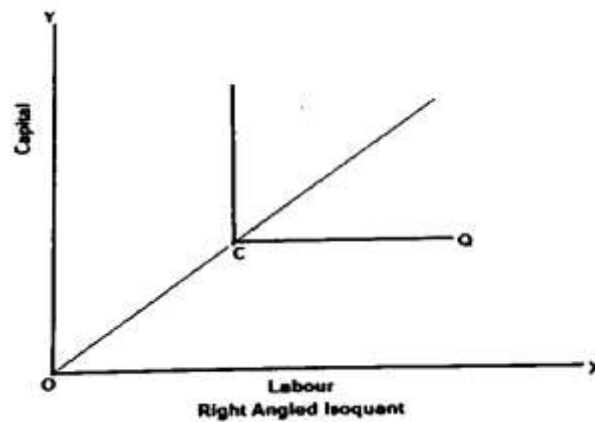
Fig. 9.3

9.3.1.3. Kinked Iso quant:

A kinked isoquant illustrates a scenario where capital and labour are only partially substitutable. Instead of a smooth curve, the isoquant consists of distinct kinks (e.g., A1, A2, A3, A4), each representing a specific production process. Substitution between inputs is only feasible at these kinked points. This isoquant is considered more realistic, as it aligns with actual production practices, where engineers and production managers implement discrete, rather than continuous, production processes.

Kinked Isoquant
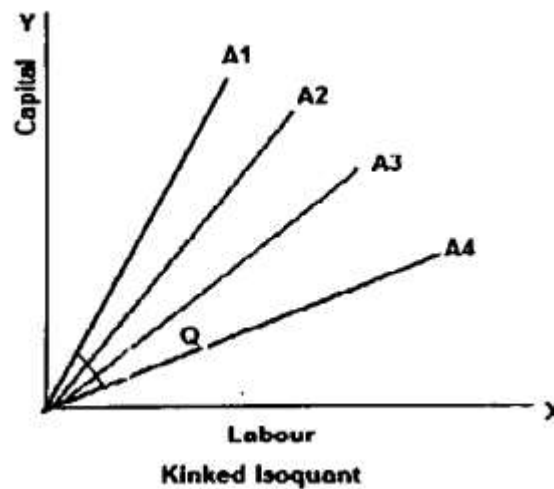
Fig. 9.4

9.3.1.4. Convex Iso quant:
A smooth convex isoquant assumes continuous substitutability of labour and capital within a certain range. Beyond this range, substitution is no longer possible. This type of isoquant is commonly used in traditional economic analysis due to its simplified structure. It is an approximation of the kinked isoquant, and as the number of production processes increases, it takes the shape of a smooth curve.

Smooth Convex Isoquant
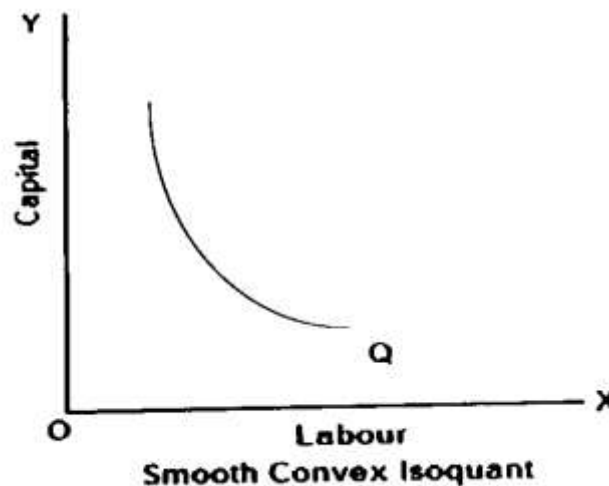
Fig. 9.5

9.3.2 Iso quant Map

85

Isoquants can be labeled in terms of physical output units without difficulty. Since each isoquant represents a specific output level, it is possible to compare the differences in output between various isoquants. This concept is illustrated through an isoquant map in Fig. 9.6.
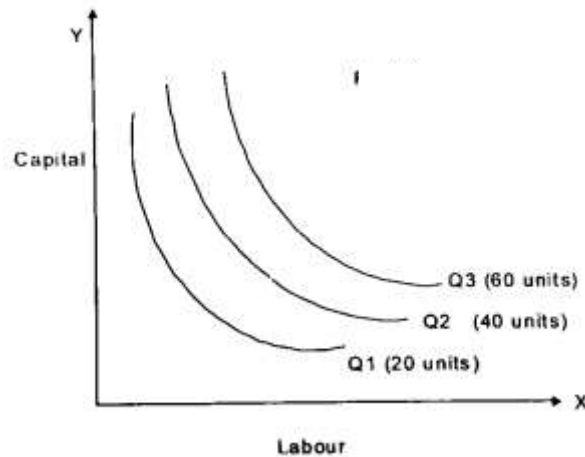
Fig. 9.6

The map shows output levels of 20 units, 40 units, and 60 units corresponding to Q1, Q2, and Q3, respectively. The difference in output between Q2 and Q1 is 20 units, while Q3 produces 40 units more than Q1. Thus, an isoquant map helps in measuring and comparing physical output levels across different isoquants. In theory, an isoquant map consists of an infinite number of isoquants, as it assumes a continuous response of output to changes in labour and capital inputs.

9.3.4 Properties of Iso quants

The key characteristics of isoquants are as follows:

1 **Isoquants Slope Downwards to the Right:** This indicates that to maintain a constant level of output, an increase in one input must be compensated by a decrease in another. An upward-sloping isoquant would imply that the same product could be produced using lower quantities of both inputs, which is not optimal for a profit-maximizing producer. Therefore, equilibrium points cannot exist on an upward-sloping, horizontal, or vertical isoquant section. The downward slope, as illustrated in Fig. 9.7, ensures efficiency in resource use.

Iso quant Sloping downwards
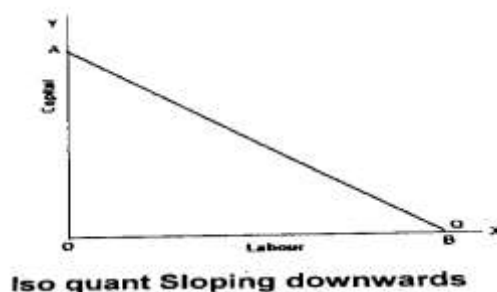
Fig. 9.7

2 **Isoquants are Convex to the Origin:** The negative slope of an isoquant represents the marginal rate of technical substitution (MRTS) between labour and capital. Mathematically, it is given by:

$$MRTS_{LK} = \Delta K / \Delta L$$
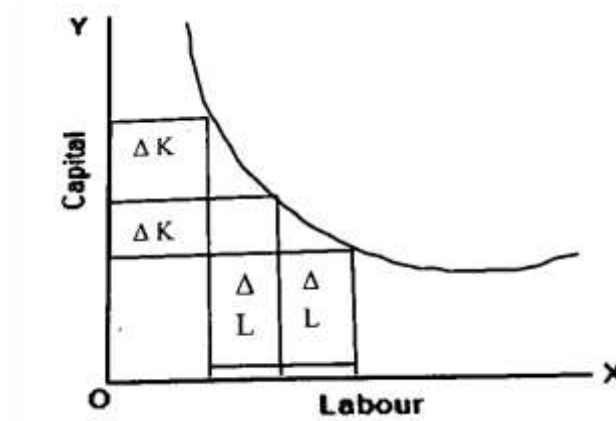
Fig. 9.8

where ΔK represents changes in capital, ΔL represents changes in labour, MPL is the marginal product of labour, and MPK is the marginal product of capital. The convex shape indicates that as labour input increases, progressively smaller amounts of capital are given up to maintain the same output level. This diminishing MRTS is demonstrated in Fig. 9.8. If an isoquant were concave to the origin, it would imply an increasing MRTS, which is unrealistic, as shown in Fig. 9.9.
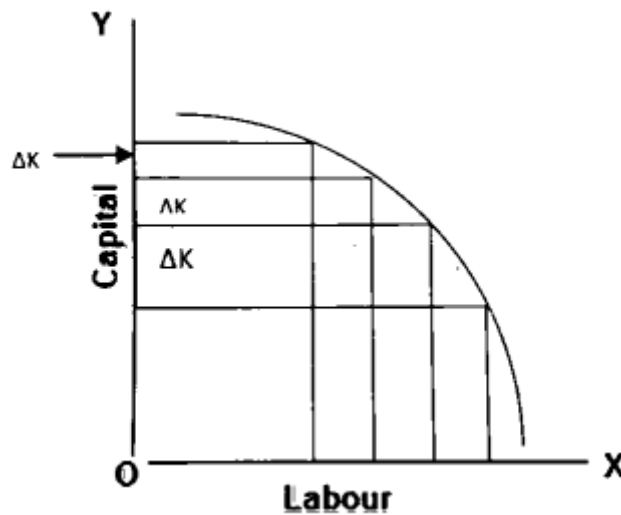
Fig. 9.9

3 **Isoquants Do Not Intersect:** Similar to indifference curves in consumer theory, isoquants cannot cross each other. If they did, it would imply contradictory output levels for the same combination of inputs, violating the definition of isoquants.

4 **Isoquants Do Not Touch Either Axis:** If an isoquant touches one of the axes, it suggests that output can be produced using only one input, either labor or capital, which is not practical in real-world production. This is illustrated in Fig. 9.9.

Iso quant touching axis
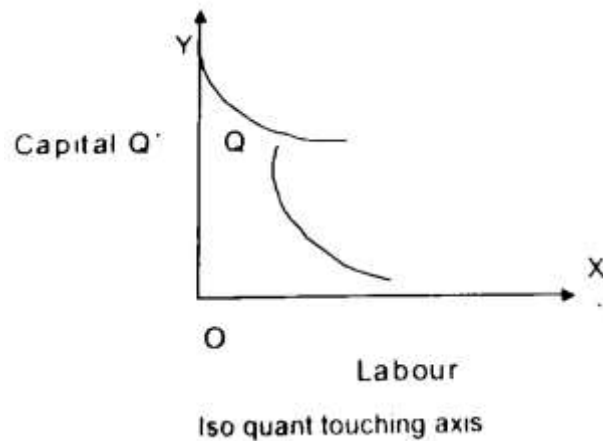
Fig. 9.10

5 Higher Isoquants Represent Higher Production Levels: As input quantities increase, output also rises, leading to higher isoquants on the graph. For instance, Table 1.2 shows that:

- On Isoquant I, point A corresponds to 2 units of labour and 12 units of capital.

- On Isoquant II, point A shifts to 4 units of labour and 11 units of capital, reflecting a higher level of input and output.

- On Isoquant III, point A further increases to 6 units of labour and 13 units of capital, indicating an even higher output.

This confirms that a higher isoquant represents a greater production level. Due to this property, isoquants cannot intersect, as that would imply identical output levels at the intersection, contradicting the principle of increasing output with increased inputs. When plotted graphically, these isoquants create an isoquant map, depicting different production levels, as discussed earlier in this chapter.

Table 9.2

	Iso quant I		Iso quant II		Iso quant III	
	Labour (L)	Capital (K)	Labour (L)	Capital (K)	Labour (L)	Capital (K)

A	2	12	4	11	6	13
B	1	10	3	10	5	12
C	2	5	4	7	6	9
D	3	3	5	5	7	7
E	4	2.3	6	4.2	8	6.2
F	5	1.7	7	3.5	9	5.5
G	6	1.2	8	3.2	10	5.2
H	7	0.8	9	3	11	5
I	8	1	10	3.7	12	5.9
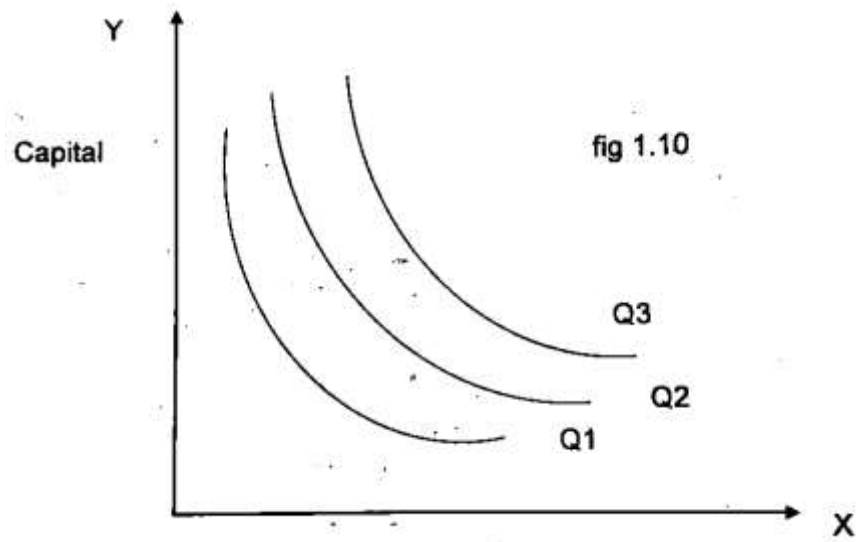
Fig. 9.11

(Note that the above figure is not drawn strictly based on the data in Table 2.)
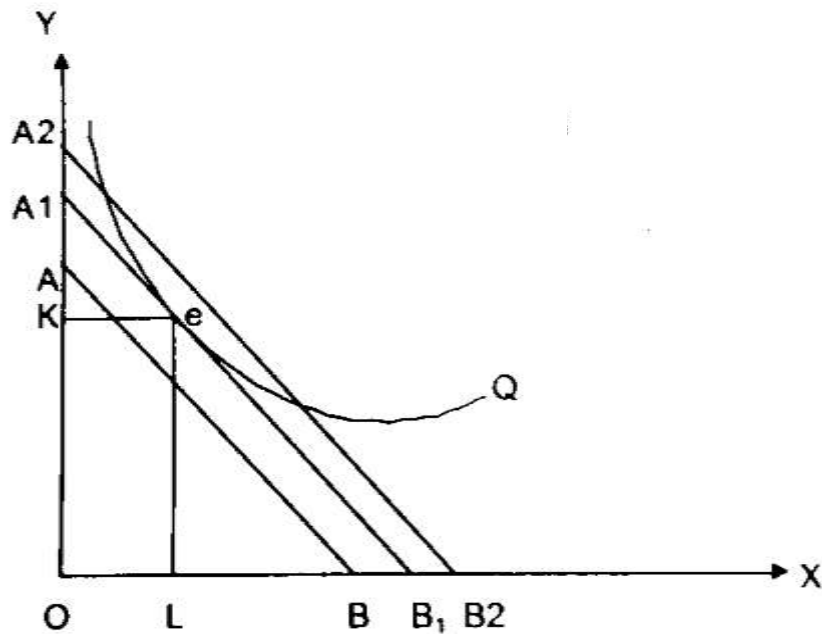
Fig. 9.12

The firm achieves cost minimization at point E, where the isoquant Q is tangent to the iso-cost line A_1B_1. At this point, the optimal combination of inputs is determined, represented by OK units of capital and OL units of labor. This point ensures that the given level of output is produced at the lowest possible cost. Any point below E would be preferable but unattainable for producing output Q, while points above E lie on higher iso-cost lines, indicating increased costs. Therefore, E represents the least-cost combination of inputs. The production of Q is efficiently achieved using OK units of capital and OL units of labor. At equilibrium, the iso-cost line's slope matches the isoquant's slope at E, satisfying the first equilibrium condition. The second condition requires the isoquant to be convex to the origin at equilibrium. Thus, at point E, the ratio of the marginal products of the two inputs is equal to the ratio of their respective prices.

Self-Check Exercise-1

Q1.   What do you mean by Iso quant?

Q2.   Draw an Iso quant with a numerical example.

Q3.   List the properties of Iso quant.

9.4   Optimal Input Combination for Maximisation of Output

The firm's budget constraint is illustrated by the iso-cost line AB. The maximum attainable output within this budget is Q_2, as indicated by point E on the isoquant Q_2. At this point, the iso-cost line just touches the isoquant, establishing E as the optimal production point. In contrast, other points like S and T, which also lie on the iso-cost line, correspond to a lower isoquant Q_1, reflecting a reduced level of output.

90
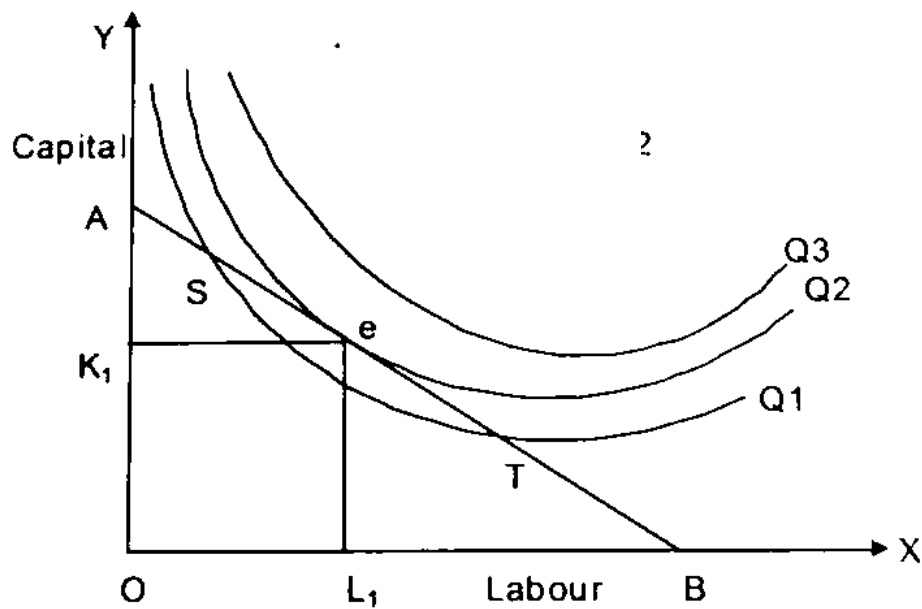
Maximisation of Output

Fig. 9.13

While output levels beyond point E may seem desirable, they cannot be achieved due to financial limitations. As a result, Q_2 represents the highest possible output within the firm's budget. At this point, the ideal combination of inputs includes OK units of capital and OL units of labour. This evaluation highlights that the most efficient use of resources—whether to reduce costs for a specific output or to achieve maximum production within a set budget—occurs where an isoquant touches an iso-cost line. If factor prices change, the firm will adjust its input combination to maintain cost efficiency or maximize output within the new cost constraints.

Self-Check Exercise-2

> Q1. With the help of a diagram, show the point where the firm's iso-cost line is tangent to the highest possible isoquant.
>
> Q2. Using a diagram, identify the optimal combination of inputs for maximising output given a cost constraint.

9.5   Summary

An isoquant represents different combinations of inputs that produce the same level of output, illustrating a firm's ability to substitute between inputs. Isoquants slope downward, are convex to the origin, do not intersect, and higher isoquants indicate higher production levels. The firm minimizes costs where an isoquant is tangent to an iso-cost line. The optimal input combination depends on factor prices, which influence cost efficiency. There are different types of isoquants, including linear isoquants, right-angled isoquants, kinked isoquants, and smooth convex isoquants, each representing varying degrees of input substitution possibilities in production.

9.6   Glossary

- **Isoquant:** A curve representing different combinations of inputs that yield the same output level.

- **Marginal Rate of Technical Substitution (MRTS):** The rate at which one input (e.g., labour) can replace another input (e.g., capital) while maintaining the same level of output.

- **Iso-cost Line:** A graphical representation of various input combinations (labour and capital) that a firm can afford within a given budget.

9.7   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 9.3.

Answer to Q2. Refer to Section 9.3.

Answer to Q3. Refer to Section 9.3.4.

Self-Check Exercise-2

Answer to Q1. Refer to Section 9.4.

Answer to Q2. Refer to Section 9.4.

9.8   References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3.   Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4.   Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

9.9   Terminal Questions

1.   Explain the Optimal Input Combination for Maximisation of Output.

2.   Explain properties of iso quant.

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RETURNS TO SCALE

Structure

10.1   Introduction

This chapter examines the concept of returns to scale, which explains how changes in input levels affect overall production. There are three main types: constant, increasing, and decreasing returns to scale. When input levels rise proportionally and output expands at the same rate, it signifies constant returns to scale. If output increases at a faster pace than the inputs, it indicates increasing returns to scale. On the other hand, when the growth in output is slower than the rise in inputs, it represents decreasing returns to scale. Later in this chapter, we will discuss economies and diseconomies of scale. Economies of scale refer to cost benefits that businesses achieve as they expand operations. Various factors contribute to a reduction in the average cost per unit when production increases. This concept is relevant in the long run, as it highlights how costs decline with larger facility sizes and increased input usage.

10.2   Learning Objectives

After going through this unit, you will be able to:

- Explain concepts of Economies and Diseconomies of scale.

- Explain the returns to scale in detail.

10.3   Laws of Returns to Scale

The concept of returns to scale applies to long-term production analysis, where output is adjusted by varying all input factors. This analysis examines how production changes when the overall scale of operations expands. Scaling up occurs when all inputs increase in the same proportion. The term "scale" refers to the total quantity of inputs optimally combined to produce a given level of output. Returns to scale measure how output responds to proportional changes in all inputs. There are three categories: constant, increasing, and decreasing returns to scale. If output grows at the same rate as the inputs, it reflects constant returns to scale. When output increases more than the proportional rise in inputs, it indicates increasing returns to scale. In contrast, decreasing returns to scale occur when output expands at a slower rate than the input increase. Therefore, returns to scale can be constant, increasing, or decreasing, depending on whether output grows in the same, greater, or lesser proportion relative to input expansion. The following section elaborates on these three types of returns to scale.

10.3.1 Constant Returns to scale

At this stage, inputs and outputs change in the same proportion, whether increasing or decreasing. This concept can be illustrated using Figure 10.1.
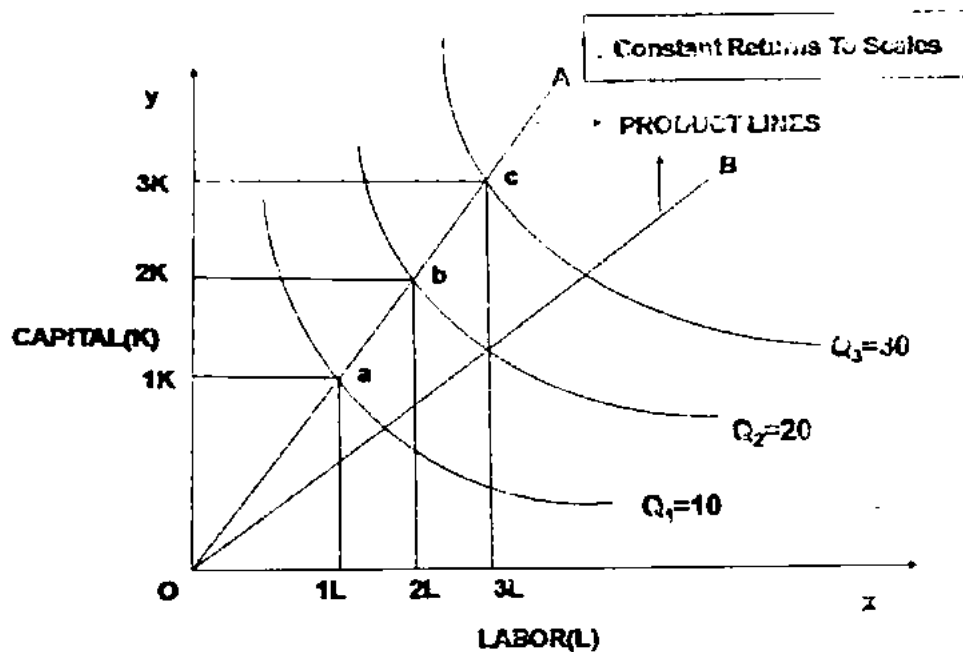
Fig. 10.1

In Figure 10.1, the expansion paths OA and OB represent two hypothetical production techniques, while isoquants Q1 (10 units), Q2 (20 units), and Q3 (30 units) indicate different levels of output. The transition from point *a* to *b* reflects a doubling of both inputs, from 1K + 1L to 2K + 2L. As a result, output also doubles, increasing from 10 to 20 units. Similarly, moving from point *b* to *c* shows an increase in inputs from 2K + 2L to 3K + 3L, which is a 50% rise. This leads to an identical 50% increase in output, from 20 to 30 units. Such a proportional input-output relationship characterises constant returns to scale.

10.3.1.1 Reasons for constant returns to scale

Constant returns to scale occur when the advantages of large-scale production begin to level off. While economies of scale initially reduce costs and enhance efficiency, a stage is reached where further expansion does not provide additional benefits. This is because managing increased inputs becomes challenging due to coordination, communication, and administrative inefficiencies. Once economies of scale diminish but before diseconomies take effect, the production process experiences constant returns to scale. In essence, this phase transitions between increasing and decreasing returns to scale.

10.3.2 Increasing Returns to Scale

Increasing returns to scale occur when output grows faster than the inputs used in production. This means that the percentage increase in output is greater than in inputs. For instance, if all inputs double (100% increase), the output may rise by 150% or more. This indicates that each additional unit of input contributes more to output than before, leading to enhanced efficiency.

95
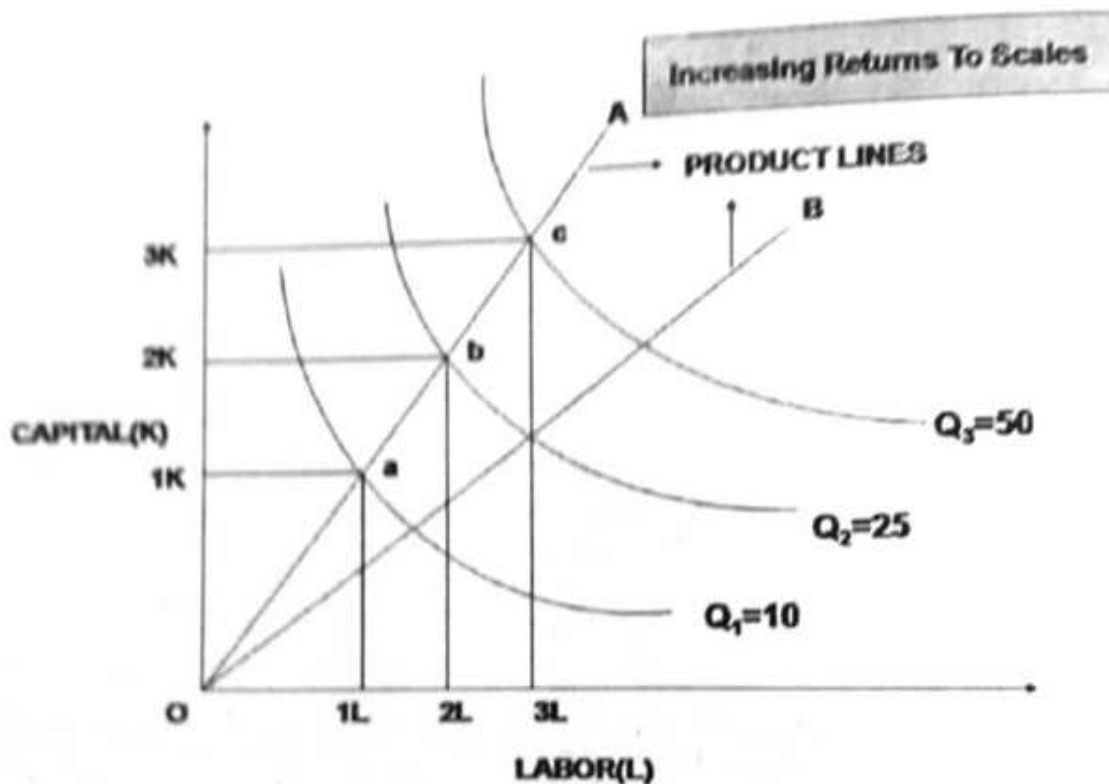
Fig. 10.2

This concept is illustrated in Figure 10.2, where Q1, Q2, and Q3 represent different levels of output (10, 25, and 50 units, respectively). The production paths OA and OB depict how inputs relate to output. The movement from point a to b shows an increase in input combinations (labour and capital) from 1K + 1L to 2K + 2L. Correspondingly, output increases from 10 units to 25 units, demonstrating that when inputs double, output more than doubles. The same pattern is observed in the transition from point b to c, reinforcing the principle of increasing returns to scale.

10.3.2.2 Reasons for increasing return to scale:

The key factors that contribute to increasing returns to scale include:

(a) Greater Specialization

As the scale of production expands and more inputs, such as labor and machinery, are utilized, a higher degree of specialization becomes possible. Specialized workers and managers can enhance efficiency, leading to greater productivity per unit of input. The collective expertise of a specialized workforce contributes to higher output growth, resulting in increasing returns to scale.

(b) Indivisibility of Technical and Managerial Resources

Certain production inputs, such as machinery and management, function effectively only within a specific range of output. These inputs often come in a fixed size and cannot be divided

96

into smaller units for small-scale production. For example, a turbine cannot be used in halves, and a locomotive engine must operate as a whole. Similarly, a manager cannot be employed in fractions. Due to this indivisibility, when production scales up, the efficiency of these inputs increases significantly, leading to rising returns to scale.

(c) Dimensional Advantages

In some industries, an increase in input dimensions results in disproportionately higher output. For instance, consider a manufacturer producing water tanks. If six metal plates of **1 square foot** each are used, the tank may hold **1 cubic foot** of water. However, if six plates of **2 square feet** each are used, the tank's capacity increases to **8 cubic feet**. This demonstrates that doubling inputs can lead to an even greater increase in output, illustrating increasing returns to scale.

(d) Marketing Efficiencies

As production scales up, businesses can achieve significant marketing advantages. For example, bulk purchases of raw materials allow firms to obtain supplies at a lower cost. Additionally, suppliers often prioritize large buyers, ensuring high-quality materials and timely deliveries. These efficiencies contribute to a faster rate of output growth.

(e) Enhanced Risk Management

Larger firms have a greater ability to absorb business risks compared to smaller enterprises. As production and input levels increase, so does the firm's capacity to manage uncertainties. Large-scale businesses can diversify their product lines and markets, reducing their dependence on a single source of revenue. This flexibility enables them to sustain and expand production efficiently.

10.3.3 Decreasing Returns to scale

Decreasing returns to scale occur when output grows at a slower rate than the increase in inputs. In other words, when input levels (such as labor and capital) rise, but the resulting output increases by a smaller proportion, it indicates decreasing returns to scale. This concept can be illustrated through the following example:
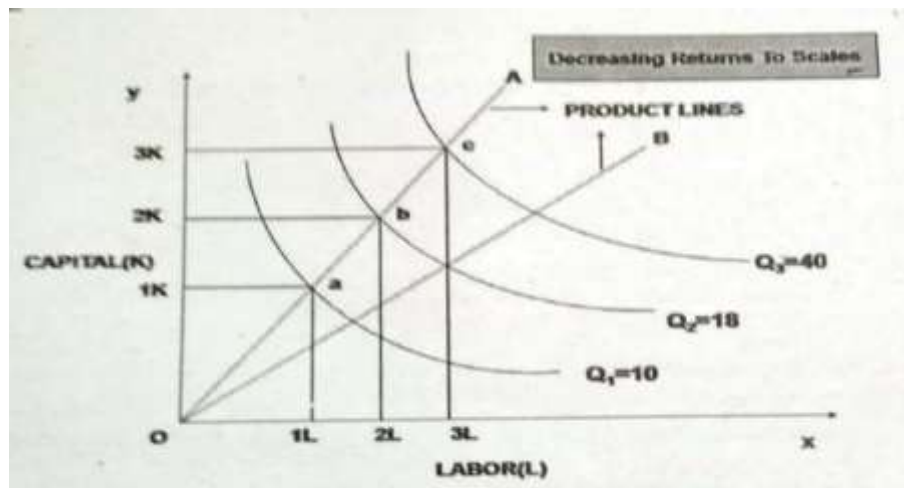
Fig. 10.3

In the diagram, OA and OB represent two different production techniques, while isoquants Q_1 (10 units), Q_2 (18 units), and Q_3 (40 units) denote different output levels. If both inputs are doubled, shifting from 1K + 1L to 2K + 2L, output rises from 10 units to 18 units, an 80% increase—which is lower than the proportionate rise in inputs. Similarly, moving from point b to c, inputs increase by 50%, but output grows by only 33.33%, demonstrating decreasing returns to scale.

10.3.3.1　Reasons for decreasing returns to scale:

Decreasing returns to scale primarily result from diseconomies of scale, which limit efficiency as production expands. Some key reasons include:

(a) Managerial Inefficiencies

As firms expand, managing operations effectively becomes more challenging. Coordination issues arise, decision-making slows down, and miscommunication may occur, leading to reduced productivity.

(b) Limited Natural Resources

The availability of natural resources can also restrict output growth. For example, doubling the size of a **coal mining plant** will not necessarily double coal production due to resource depletion or challenges in extraction.

(c) Challenges in Supervision and Control

In smaller firms, the owner can oversee all operations efficiently. However, as the business expands and new departments are created, maintaining the same level of control becomes difficult. Inefficiencies in management and supervision may arise, negatively impacting production.

The diagram below illustrates the three types of returns to scale—increasing, constant, and decreasing returns—in a single representation.
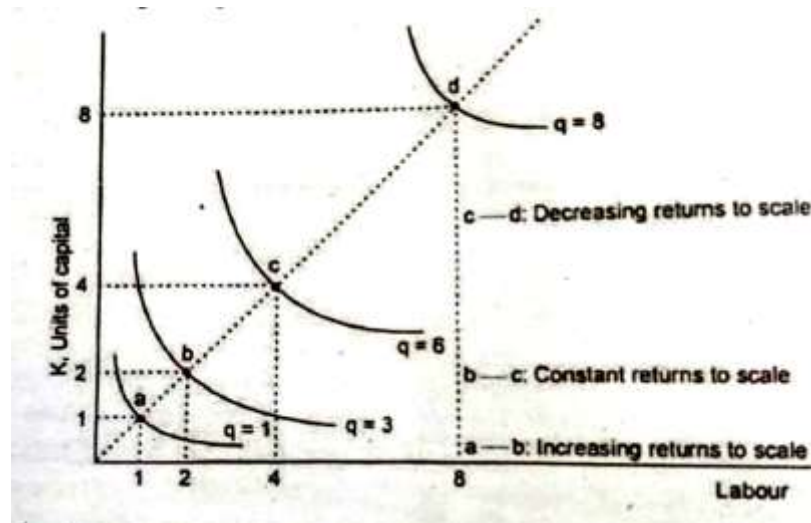
Fig. 10.4

Initially, at point a, the firm employs one unit of labor and one unit of capital, yielding one unit of output (q = 1). When inputs are doubled (2L + 2K), output rises more than proportionately from

q = 1 to q = 3, indicating increasing returns to scale. However, as production moves from 3 to 6 units, the rate of increase slows. Finally, from point c to d, doubling inputs to 4L + 4K results in only a two-unit increase in output (from 6 to 8 units), signaling decreasing returns to scale.

Self-Check Exercise-1

Q1.   Define laws of returns to scale.

Q2.   Write short notes on

1)   Constant returns to scale

2)   Increasing returns to scale

3)   Decreasing returns to scale

10.4   Economies of Scale

10.4.1 Concept of Economies of Scale

Economies of scale refer to the cost savings that businesses experience as they expand operations. This concept applies in the long run and involves a decline in per-unit costs as production facilities grow and input utilization increases. In contrast, diseconomies of scale lead to rising costs as businesses expand beyond an optimal size.

Key sources of economies of scale include:

- **Labour Efficiency:** Improved division of labor enhances productivity.
- **Bulk Purchasing:** Buying raw materials in large quantities through long-term agreements reduces costs.
- **Managerial Specialization:** Larger firms can assign specialized managers, improving efficiency.
- **Financial Advantages:** Bigger companies often secure loans at lower interest rates and have access to diverse financial instruments.
- **Marketing Benefits:** Advertising costs are spread across a larger output, reducing per-unit expenses.
- **Technological Efficiency:** Larger-scale production allows firms to benefit from increasing returns in the production process.

Each of these factors reduces production's long-run average costs (LAC) by shifting the short-run average total cost (SATC) curve down and to the right. Economies of scale are also derived partially from learning by doing.

10.4.2 Economies and Diseconomies of Scale

Economies and diseconomies of scale can be categorised into internal and external. Internal factors arise due to a firm's own expansion, whereas external factors result from the industry's overall growth. Since external economies and diseconomies originate outside the firm, they influence all businesses within the sector.

Internal economies and diseconomies impact the shape of the long-run average cost (LRAC) curve. When firms benefit from internal economies, the LRAC decreases as production expands. Conversely, internal diseconomies lead to a rise in LRAC as output increases.

On the other hand, external economies and diseconomies influence the position of both short-run and long-run cost curves. External economies shift the cost curves downward, reducing overall costs, while external diseconomies push them upward, increasing costs.

Self-Check Exercise-2

Q1.	Define economies of scale.

Q2.	Distinguish between economies and diseconomies of scale.

**10.5	Internal Economies of Scale**

Internal economies of scale refer to a firm's benefits from expanding its production capacity. These advantages arise as a result of the firm's efforts to scale up its operations. They play a crucial role in shaping the long-run average cost (LRAC) curve and contribute to increasing returns to scale. Many economists attribute internal economies to the indivisibility of certain production factors. As output grows, these large, indivisible resources can be utilized more effectively, leading to greater efficiency and cost reductions.

Internal economies of scale are broadly categorized into two types, as illustrated in the following chart:
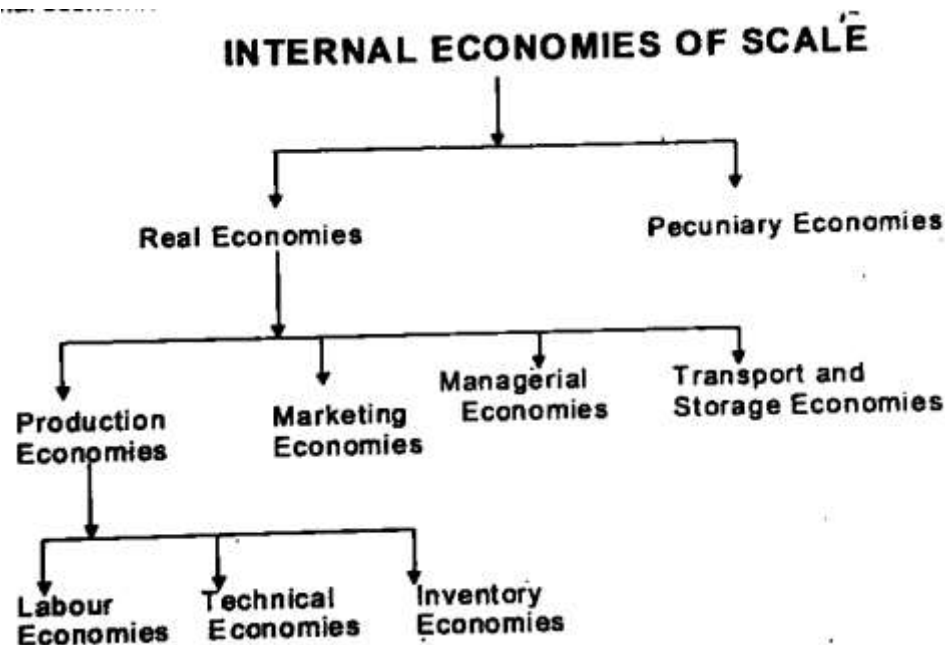
**10.5.1	Real Economies of Scale**

Real economies of scale refer to cost savings that result from a decrease in the physical quantity of inputs required for production, such as raw materials, different types of labor, and capital. These economies often arise due to the indivisibility or fixed nature of certain production factors, making them more efficient at larger scales of operation.

The major types of real economies include:

1.	Production economies

2.	Marketing economies

100

3. Managerial economies

4   Transport and storage economies

10.5.1.1 Production Economies

Production economies emerge from the efficient utilisation of various factors of production. These economies can be categorized into: (i) labour economies, (ii) technical economies, and (iii) inventory economies

10.5.1.1.1 Labour Economies

As the size of output increases the firm enjoys labour economies due to (a) specialisation, (b) time-saving. (c) automation of the production process and (d) cumulative volume economies. As the size of production increases the firm merits from the advantages of division of labour and specialisation of labour which enhance the productivity of the various types of labour. The advantages of division of labour are emphasised by Adam Smith in his book, The Wealth of Nations published in 1776. Division of labour also condenses the time lost in changing from one type of work to another. Division of labour promotes invention of tools and machines which, in turn, leads to mechanization of the production process. This assists the labour in working faster and therefore, increases the labour productivity. Further, large scale production helps the technical personnel to acquire considerable experience from the 'cumulative effect. This 'cumulative volume' experience leads to higher productivity. Hence, as the size of output increases the unit cost falls.

10.5.1.1.2 Technical Economies

The important technical economies result from the use of specialised capital equipment, which comes into effect only when the output is produced on a large scale. Technical economies also arise from the indivisibilities, which are the characteristics of the modern techniques of production. In other words, as the scale of production increases the firm reaps the advantages of mechanisation of using mass production methods. This will reduce the unit cost of production.

10.5.1.1.3 Inventory Economies

Inventories play a crucial role in ensuring a firm's operations run smoothly by managing fluctuations in both input supply and output demand. They help stabilize production by maintaining adequate stocks of raw materials, spare parts, and finished goods. As production scales up, inventory levels also rise, but not in direct proportion to output growth. This allows larger firms to hold a relatively smaller percentage of inventories while effectively handling unexpected changes in supply and demand.

10.5.1.2. Marketing Economies

Marketing economies stem from the firm's ability to sell its products more efficiently as it grows. One key aspect is advertising, where costs do not increase in direct proportion to output. As production expands, the cost of advertising per unit declines. Similarly, expenses related to sales promotion, such as employing sales personnel or distributing samples, rise at a slower rate than output growth. Additionally, larger firms can establish exclusive partnerships with dealers to enhance after-sales service. Consequently, as the firm expands, its average selling costs decrease.

10.5.1.3 Managerial Economies

The Large scale production makes possible the division of managerial functions. Thus, there exists a production manager, a sales manager, a finance manager, a personnel manager and so on in a large firm. However, all or most of the managerial decisions are taken by a single manager in a small firm. This division of managerial functions increases their efficiency. The decentralization of managerial decision-making also increases the efficiency of management. Large firms are also in a position to introduce mechanization of managerial functions through the use of telex machines, computers and so on. Hence, as output increases the managerial costs per unit of output continue to decline.

10.5.1.4. Transport and Storage Economies

As the output increases, the unit cost of transportation of raw materials, intermediate products and finished products falls. This is because a large firm may be able to reduce transport costs by having their own transportation means or by using larger vehicles. Similarly, as the size of the firm increases the storage costs will also fall.

10.5.2 Pecuniary Economies

Pecuniary economies, also known as monetary economies, arise when a firm benefits from lower costs of production and distribution due to large-scale operations. These cost advantages occur mainly through bulk purchasing and favorable financial arrangements.

- A firm can secure raw materials at reduced prices when buying in large quantities.

- Additionally, well-established firms with strong market reputations can access financial resources at lower interest rates, reducing borrowing costs. These factors contribute to lowering the overall monetary expenses for the firm. The large firm may be given lower advertising rates if they advertise at large.

- Transport rates may also be low if the amount of commodities transported is large.

Self-Check Exercise-3

Q1.   Define internal economies of scale.

Q2.   What are the different types of internal economies of scale?

10.6   Internal Diseconomies of Scale

Internal economies of scale are beneficial only up to a certain plant size, referred to as the optimum plant size. At this level, all cost advantages are fully utilized. However, when production exceeds this optimal level, inefficiencies arise, leading to diseconomies of scale, particularly in management. One primary reason for diseconomies of scale is managerial inefficiency. As production expands, the burden on top management increases, making coordination and decision-making more complex, which ultimately reduces efficiency. While technical inefficiencies can be addressed by replicating optimal plant units, managerial constraints become a significant challenge.

Additionally, diseconomies of scale may also stem from resource limitations. For instance, increasing the number of fishing vessels does not always lead to a proportional rise in fish catch due to resource constraints.

Self-Check Exercise-4

Q1.   Define Internal diseconomies of scale.

10.7   External Economies

External economies emerge outside an individual firm due to advancements in the broader industrial environment. While these benefits are external to a single firm, they remain internal to the industry as a whole. They often result from the activities of other firms within the same or related industries and can influence the cost structure of firms by altering factor prices. These economies contribute to shifts in both short-run and long-run cost curves.

10.7.1 Reduction in Material and Equipment Costs

As an industry expands, demand for raw materials and capital equipment increases. This leads to large-scale production, which in turn lowers production costs and results in reduced prices for these inputs. Firms within the industry benefit from lower input costs.

10.7.2 Growth of Technical Know-how

Industry growth fosters innovation and technological improvements. Firms gain access to better machinery and improved production techniques, enhancing efficiency and reducing overall costs.

10.7.3 Development of Skilled Labour

With industry expansion, opportunities for workforce training improve. This leads to a more skilled labor force, boosting worker productivity and benefiting firms within the industry.

10.7.4 Growth of Subsidiary and Ancillary Industries

Expansion of an industry may facilitate the growth of subsidiary and ancillary industries to produce tools, equipments, machines, etc., and to provide them to the main industry at the lower prices. Likewise, firms may also come up to transform the waste of the industry into some useful products. This tends to reduce the cost of production. Development of Transportation and Marketing Facilitates: The expansion of an industry may expedite the development of transportation and marketing facilities which will reduce the cost of transportation.

10.7.5 Development of Information Services

External economies also arise from the interchange of technical information between firms. With the expansion of an industry, the firms may give the information about the technical knowledge through the publication of trade and technical journals. The firms may also set up joint research institutes to develop new improved techniques.

Self-Check Exercise-5

Q1.   Define External Economies.

Q2.   List the important external economies of scale.

10.8   External Diseconomies

As an industry grows, it may lead to external diseconomies that increase production costs. The rising demand for limited resources, such as raw materials and capital goods, can drive up their prices. Additionally, industries requiring skilled labor may face higher wage costs due to shortages in the labor market. Infrastructure constraints, such as transportation congestion, can further contribute to inefficiencies. Industrial expansion may also result in environmental issues, such as pollution of water bodies, negatively impacting other industries like fisheries. These factors collectively add to the challenges faced by firms operating within the

expanding industry. Pollution of this sort will also create health hazards to the people in the adjoining areas. The expansion of an industry may also pollute the air with smoke from factories or fumes from vehicles. This too will have similar diseconomies.

Thus, expanding the size of an industry (or industries) may generate several external diseconomies, which will raise the costs of individual firms.

Self-Check Exercise-6

Q1.   Define external diseconomies.

Q2.   Distinguish between external economies and external diseconomies.

10.9   Summary

Returns to scale measure how output changes in response to proportional changes in all inputs. There are three types: constant, increasing, and decreasing returns to scale. Increasing returns lead to economies of scale, which can be internal (firm-level) or external (industry-wide). Firms can expand production by either maintaining factor proportions or altering them. When all inputs increase proportionally, returns to scale depend on whether output grows at the same, higher, or lower rate. Replication—adding identical plants—ensures at least constant returns to scale. Economies of scale can be **real** (technical efficiencies reducing input use) or **pecuniary** (cost reductions due to bulk purchases). These factors influence a firm's production decisions and overall efficiency.

10.10   Glossary

- **Constant Returns to Scale:** Occurs when output increases in the same proportion as the increase in inputs.

- **Increasing Returns to Scale:** When output grows at a higher rate than the increase in inputs.

- **Decreasing Returns to Scale:** When output rises at a lower rate compared to the increase in inputs.

- **Economies of Scale:** Cost benefits gained by businesses as they expand, leading to lower average costs per unit with increased production. It is a long-term concept associated with facility size and input usage.

- **Internal Economies and Diseconomies:** Gains or disadvantages a firm experience due to its own expansion.

- **External Economies and Diseconomies:** Benefits or drawbacks that arise due to the overall growth of an industry, impacting firms from external factors.

10.11   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 10.3.

Answer to Q2. Refer to Sections 10.3.1, 10.3.2 & 10.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 10.4.1.

Answer to Q2. Refer to Section 10.4.2.

Self-Check Exercise-3

> Answer to Q1. Refer to Section 10.5.

> Answer to Q2. Refer to Section 10.5.

Self-Check Exercise-4

> Answer to Q1. Refer to Section 10.6.

Self-Check Exercise-5

> Answer to Q1. Refer to Section 10.7.

> Answer to Q2. Refer to Section 10.7.

Self-Check Exercise-6

> Answer to Q1. Refer to Section 10.8.

> Answer to Q2. Refer to Sections 10.7 & 10.8.

10.12 References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3.   Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4.   Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

10.13 Terminal Questions

Question 1 Discuss diagrammatically the laws of returns to scale.

Question 2 Write short notes on

> (a)   Internal Economies of Scale

> (b)   External Diseconomies of Scale

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COST ANALYSIS

11.1   Introduction

This unit explores various aspects of cost and revenue, with a focus on cost analysis. It covers different types of costs, short-run and long-run cost curves. The cost of production refers to the total expenditure, including both explicit and implicit costs, incurred in converting inputs into outputs. Understanding different cost concepts and their relationship with output plays a crucial role in cost analysis.

11.2   Learning Objectives

After going through this unit, you will be able to:

- Outline Concepts of Cost Functions

- Compare Short and Long run Cost Function

11.3   Meaning

Cost is viewed from the producer's perspective and is measured in monetary terms. It plays a vital role in managerial decision-making. In the production process, a producer utilises various factor inputs, which require compensation for their contribution. This compensation

106

represents the cost of production. The total cost includes both explicit and implicit expenses incurred in converting inputs into outputs. Understanding different cost concepts and the cost-output relationship is essential for effective cost analysis.

Self-Check Exercise-1

Q1.   Define Cost Analysis.

11.4   Different Kinds of Cost Concepts

11.4.1. Money Cost and Real Cost

Money cost refers to the expenses incurred by a firm in monetary terms for acquiring factor inputs to produce a commodity. Since economic transactions occur in a monetary framework, cost calculations are typically expressed in money, making its measurement straightforward. Real cost, on the other hand, represents the physical, mental, or psychological efforts and sacrifices made by individuals involved in production. It includes discomforts, exertions, and inconveniences faced by workers and society. Unlike money cost, real cost is subjective and cannot be precisely measured.

11.4.2. Implicit or Imputed Costs and Explicit Costs

Explicit costs involve direct payments made by a firm to acquire factors of production, such as wages, rent, interest, and raw material costs. These costs are recorded in financial statements. Implicit costs, also known as imputed costs, refer to the value of resources owned by the entrepreneur and used in production, such as self-owned capital or foregone earnings. These costs do not involve direct cash payments and are not reflected in accounting records, but they contribute to the overall cost of production.

11.4.3. Actual Costs and Opportunity Costs

Actual costs, also called outlay or acquisition costs, are financial expenditures incurred in producing goods or services. These include expenses such as wages, raw materials, fuel, and utilities, which can be precisely recorded in accounts.

Opportunity cost represents the potential revenue lost when choosing one alternative over another. It reflects the value of the best foregone option. Since opportunity cost is based on sacrificed alternatives, it cannot be directly recorded in financial accounts. However, it plays a crucial role in decision-making, helping businesses select the most cost-effective option. For example, a firm deciding between hiring workers or purchasing a machine must weigh the long-term costs and benefits of each choice.

11.4.4. Direct costs and indirect costs

Direct costs are expenses that can be directly linked to a specific product, department, or production process. Examples include the cost of raw materials, wages paid to workers, and salaries of departmental managers. Indirect costs, on the other hand, are expenditures that cannot be directly assigned to a single product or process. These costs include electricity, water, telephone bills, and administrative expenses, which contribute to overall operations but are not specific to one activity.

11.4.5. Past and future costs

Past costs refer to expenses that have already been incurred in previous periods, whereas future costs are anticipated expenses that will be incurred at a later stage. Understanding past costs helps in making informed financial decisions for future planning.

11.4.6. Marginal and Incremental costs

Marginal cost represents the additional expense incurred when producing one more unit of output. This cost is directly associated with variable costs and does not consider fixed costs. Incremental cost refers to the added expenses resulting from a change in business activity, such as increasing production by a batch of 100 units or setting up a new sales office in another location. It accounts for costs that arise due to an expansion or modification in operations.

11.4.7. Fixed costs and variable costs.

Fixed costs remain constant regardless of the level of production. These costs, also known as overhead or supplementary costs, exist even when there is no production. Variable costs, however, fluctuate in direct proportion to output levels. These costs, sometimes called prime or direct costs, increase or decrease based on production volume.

11.4.8. Accounting costs and economic costs

Accounting costs refer to the actual expenses incurred in the production of goods or services, covering only acquisition and tangible costs recorded in financial statements. Economic costs, in contrast, consider both actual expenses and opportunity costs—the value of the best alternative foregone. These costs are crucial in decision-making and business strategy formulation.

Self-Check Exercise-2

Q1.   Distinguish between

1)   Money Cost and Real Cost

2)   Implicit Cost and Explicit Cost

3)   Actual Cost and Opportunity Cost

Q2.   Define

1)   Accounting Cost

2)   Economic Cost

11.5   Determinants of Costs

Cost behavior is shaped by various factors, which can differ significantly across firms and industries. However, certain common determinants have been identified by economists, playing a crucial role in business decision-making. Key factors influencing production costs include:

1 **Technology:** Advanced technology enables efficient resource utilization, minimizes waste, saves time, and lowers production costs, resulting in higher output. In contrast, outdated technology tends to increase costs.

2 **Rate of Output (Utilization of Resources):** Maximizing the use of machinery and equipment helps reduce costs, whereas underutilization leads to higher production expenses.

3 **Scale of Production:** Large-scale production often benefits from economies of scale, leading to a lower cost per unit. Bigger firms with extensive facilities generally experience cost advantages.

4 **Prices of Inputs:** The cost of production is directly influenced by the prices of raw materials, labor, and other inputs. An increase in input costs raises overall production expenses, while lower input prices reduce costs.

5 **Efficiency of Resources:** The productivity of labor, capital, and other inputs plays a crucial role in cost determination. Higher efficiency results in lower production costs, whereas inefficiencies lead to higher expenses.

6 **Consistency in Production:** Maintaining a steady production level allows firms to use resources optimally, reducing hidden costs related to interruptions and inefficiencies. Stable output helps lower production costs over time.

7 **Law of Returns:** When a firm experiences increasing returns, production costs decrease, while diminishing returns lead to higher costs.

8 **Time Frame:** In the short run, costs tend to be higher due to inflexible production constraints. However, in the long run, adjustments in processes and resource allocation help reduce costs.

Self-Check Exercise-3

Q1. Discuss the various determinants of cost.

11.6 Types of cost function

Generally speaking, there are two types of cost functions.

11.6.1. Short run cost function.

11.6.2. Long run cost function

11.6.1.1 Cost-Output Relationship and Cost Curves in the Short-Run

The relationship between cost and output varies across different time periods—short-run and long-run. Generally, production costs tend to be higher in the short run compared to the long run. This is because firms have limited time to adjust their production processes in the short run, whereas in the long run, they can make necessary modifications to optimize costs. When cost-output relationships are illustrated graphically, they generate short-run and long-run cost curves, providing insights into cost behavior over time.

11.6.1.2 Meaning of Short Run.

The short-run refers to a time frame where only variable factors of production can be adjusted, while fixed factors—such as plant size and machinery—remain unchanged. Consequently, a firm's production capacity is fixed during this period, and the number of firms in the industry remains constant. New firms cannot enter, nor can existing firms exit the market in the short run.

To increase output, a firm can employ additional variable inputs, introduce extra work shifts, extend working hours, or make more intensive use of its existing resources. Since adjustments in production are only partial, the short-run cost function is defined by two main components:

- **Fixed Inputs:** These remain unchanged regardless of production levels.

- **Variable Inputs:** These can be adjusted to change the level of output.

In the short run, production adjustments are constrained by the firm's existing facilities, which results in costs being categorized as either fixed or variable.

11.6.1.3 Fixed costs

Fixed costs are associated with resources that do not change in the short run, such as land, buildings, equipment, and high-level management salaries. Since these costs remain constant irrespective of output levels, they must be borne by the firm even if production drops to zero.

Even when a firm temporarily halts production but remains operational, fixed costs still apply. These costs are often contractual and unavoidable, making them independent of production levels.

Economist Alfred Marshall referred to fixed costs as supplementary costs, which include expenses such as:

- Rent payments

- Interest on borrowed capital

- Insurance premiums

- Depreciation and maintenance costs

- Administrative salaries

- Business taxes and license fees

Since these expenses must be covered regardless of production levels, they are commonly termed overhead costs or indirect costs and are distributed across all units produced.

11.6.1.4. Variable costs

Variable costs are expenses that fluctuate with production levels. These costs arise from inputs such as raw materials, wages for regular labor, transportation, power, fuel, and water—each of which varies in proportion to output. In the short run, variable costs change directly with the production level. If a firm temporarily halts its operations, it will not use variable inputs, thereby avoiding these costs. Conversely, when production resumes, variable costs are incurred again, increasing or decreasing based on output levels. Alfred Marshall referred to variable costs as prime costs or direct costs because they directly impact a firm's production volume. Production expenses, therefore, comprise both fixed and variable costs. The distinction between the two is relevant primarily in the short run. In the long run, however, all costs become variable, as firms can adjust all factors of production. Nevertheless, firms must cover at least their variable costs to sustain operations in the short run. Even if a firm decides to halt production temporarily but intends to stay in business, it will still incur fixed costs.

11.6.1.5 Cost-output relationship and nature and behaviour of cost curves in the short run

To examine how production costs change with output levels, a cost schedule is prepared. A cost schedule is a tabulated representation of cost variations resulting from changes in output. It helps analyze the relationship between production volume and cost fluctuations.

Table 11.1: Cost Schedule of a firm

Output in Units	TFC	TVC	TC	AFC	AVC	AC	MC
0	360	-	360	-	-	-	-
1	360	180	540	360	180	540	180
2	360	240	600	180	120	300	60
3	360	270	630	120	90	210	30
4	360	315	675	90	78.75	168.75	45
5	360	420	780	72	84	156	105
6	360	360	990	60	105	165	210

By graphically representing the data from a cost schedule, different short-run cost curves emerge, illustrating the cost behavior at varying production levels. In the short run, the following cost concepts and curves are typically analyzed to understand cost-output relationships.

11.6.1.6 Total Fixed Cost (TFC)

Total Fixed Cost (TFC) represents the expenses incurred on fixed inputs such as machinery, equipment, and plant in the short run. These costs do not fluctuate with changes in production levels and remain constant even when output is zero. Regardless of whether the firm produces 1 or more units, the TFC remains unchanged.

Graphically, the TFC curve is a horizontal line parallel to the X-axis, indicating that it does not vary with output. The curve originates from a point on the Y-axis, signifying that even at zero production, fixed costs must still be covered. In a numerical example, if TFC is Rs. 360, this amount is obtained by multiplying the quantity of fixed inputs by their respective unit prices.
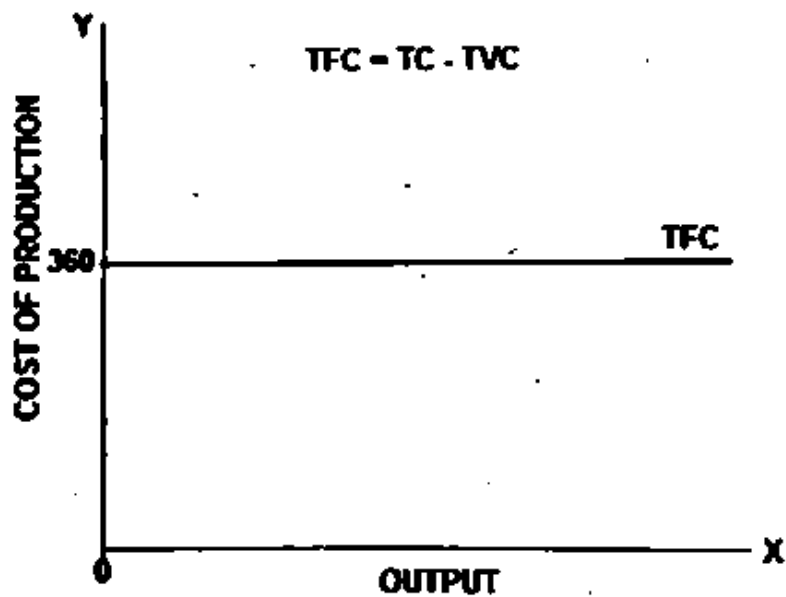
Fig. 11.1

11.6.1.7 Total Variable Cost (TVC)

Total Variable Cost (TVC) represents the expenditures on variable inputs such as raw materials, fuel, power, transportation, and communication in the short run. Unlike TFC, these costs fluctuate with output levels. TVC is computed by multiplying the quantity of variable inputs used by their respective prices. Mathematically, it is expressed as:

TVC=TC−TFC

This means that TVC depends on output levels, denoted as TVC = f(Q). If production is zero, TVC is also zero, as no variable inputs are used. The TVC curve starts at the origin and slopes upward, indicating that variable costs increase as production expands. Initially, TVC rises slowly, then more gradually, and finally steeply due to the law of variable proportions. This law explains that at first, variable inputs increase output efficiently, but beyond a certain point, diminishing returns set in, requiring a larger quantity of inputs to achieve the same increase in output.
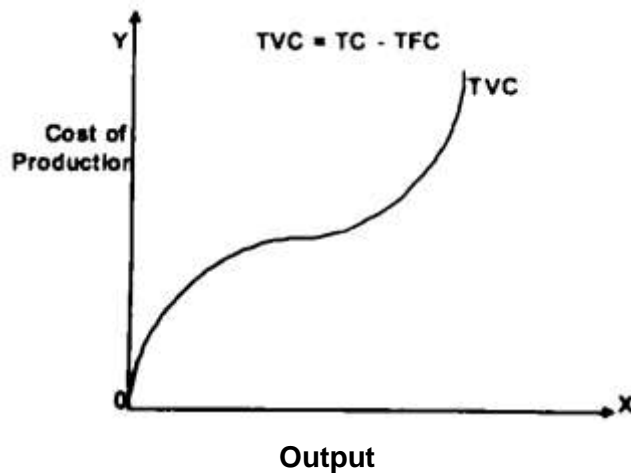
Output

Fig. 11.2

11.6.1.8 Total Cost (TC)

Total Cost (TC) is the overall expense a firm incurs in producing a given level of output. It includes both fixed and variable costs and is mathematically expressed as:

TC=TFC+TVC

Since TFC remains constant, variations in TC are solely due to changes in TVC. The total cost curve rises as output increases, following the same trend as the TVC curve. The TC curve starts from the value of TFC (e.g., Rs. 360), representing the minimum cost incurred even at zero production. The vertical gap between the TC and TVC curves remains constant, equal to TFC. The shape of the TC curve mirrors the TVC curve because any increase in output affects both proportionally, with TFC remaining unchanged.
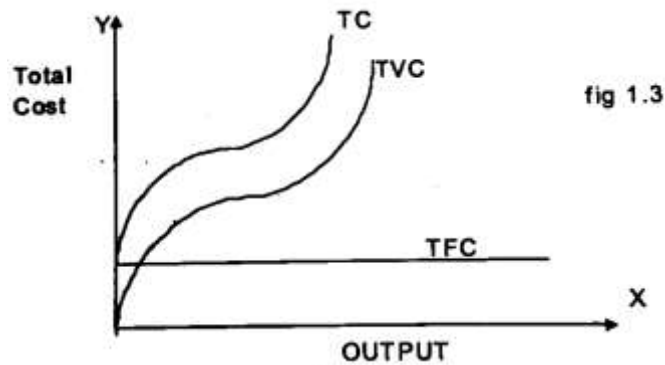
Fig. 11.3

11.6.1.9. Average fixed cost (AFC)

Average Fixed Cost (AFC) is the fixed cost allocated per unit of output. It is calculated by dividing Total Fixed Cost (TFC) by the quantity of output produced: AFC = TFC/Q

113
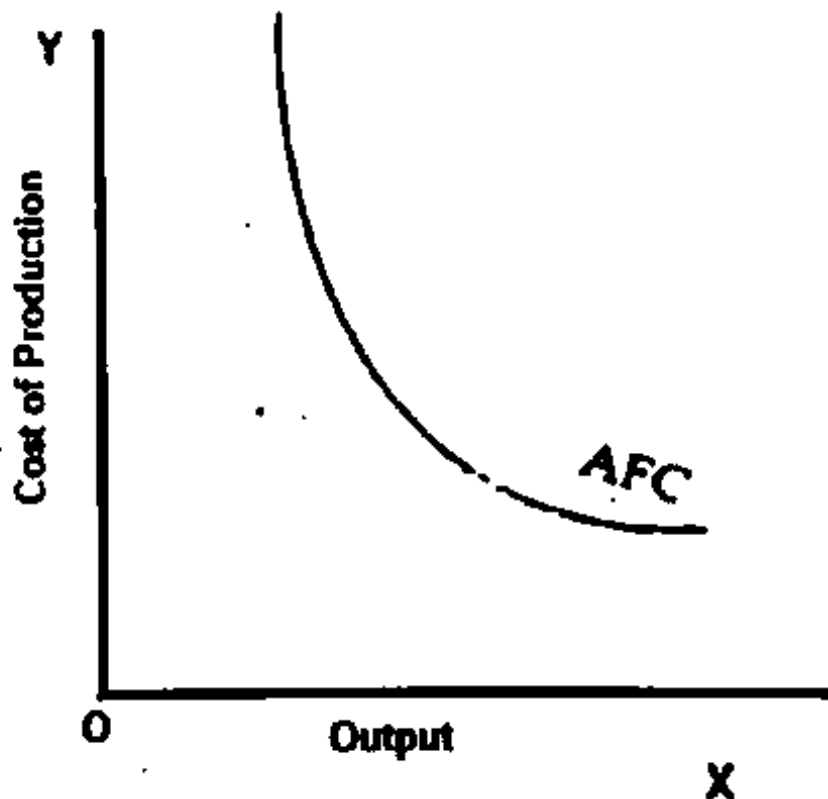
Fig. 11.4

AFC and output share an inverse relationship. At lower production levels, AFC is high, whereas it decreases as output increases. This occurs because TFC remains constant while the denominator (output) increases, causing AFC to decline. Essentially, as production expands, the fixed cost is distributed over more units, leading to a continuous decrease in AFC.

The AFC curve has a downward slope, decreasing sharply at first, then more gradually, and eventually approaching the X-axis without touching it. Mathematically, AFC diminishes with increasing output but never reaches zero, as fixed costs remain positive. Additionally, due to the limitations of plant capacity, AFC cannot decline indefinitely.

11.6.1.10 Average variable cost: (AVC)

Average Variable Cost (AVC) represents the variable cost per unit of output and is calculated as: $AVC=TVC/Q$. Initially, AVC declines as production increases, reflecting improved efficiency in utilizing variable inputs within a fixed plant. However, beyond a certain point, AVC begins to rise as diminishing returns set in, reducing the efficiency of additional variable inputs. This behavior follows the principles of production economics, where initial cost reductions are due to better resource utilization, but beyond a threshold, inefficiencies cause costs to increase.

114
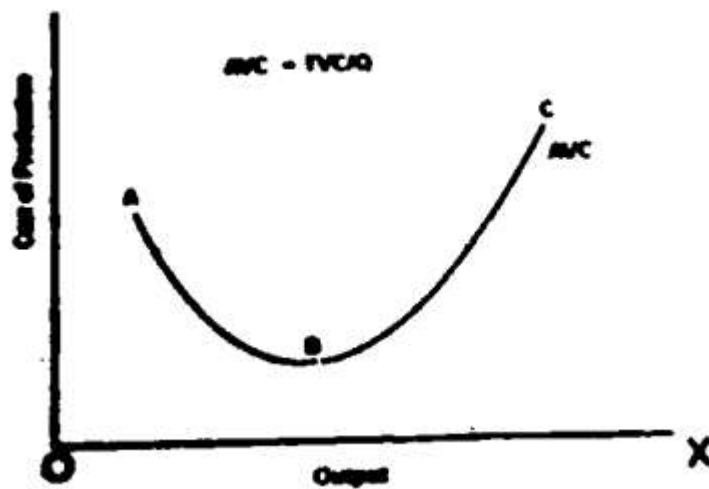
Fig. 11.5

The Average Variable Cost (AVC) curve follows a U-shape and consists of three distinct phases:

1. Decreasing Phase

At the initial stage (from point A to B), AVC declines as output increases. This happens because when additional variable inputs are combined with fixed inputs, production efficiency improves, leading to a more than proportional increase in output. This phase reflects the benefits of increasing returns to scale.

2. Constant Phase

At point B, AVC reaches its minimum. This occurs when the combination of fixed and variable inputs is optimal, leading to the most efficient production level. At this stage, the firm operates at full capacity, and AVC is at its lowest.

3. Increasing Phase

Beyond point B (from B to C), AVC begins to rise as production exceeds the optimal level. Additional variable inputs contribute less efficiently to output due to diminishing returns. Consequently, costs per unit increase, reflecting inefficiencies in resource utilization. This phase illustrates the economic principle that beyond a certain point, increasing production leads to higher per-unit costs.

11.6.1.11 Average total cost (ATC) or Average cost (AC)

Average Cost (AC) represents the cost incurred per unit of output. It is also referred to as unit cost since it reflects the expenditure required to produce each unit. AC is derived by summing Average Fixed Cost (AFC) and Average Variable Cost (AVC) or by dividing Total Cost (TC) by total output: AC=TC/Q, Also AC is the sum of AFC and AVC.
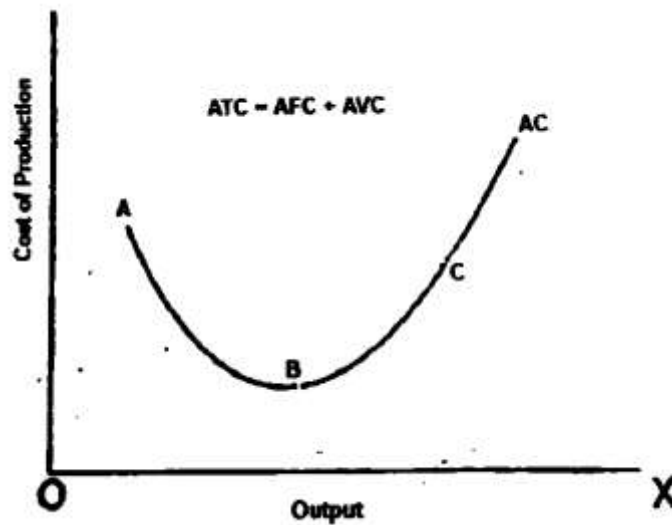
Fig. 11.6

Since AC is influenced by both AFC and AVC, its curve follows a U-shape in the short run. Initially, AC declines due to falling AFC and decreasing AVC. As output increases, the reduction in AFC outweighs the rise in AVC, leading to lower AC. This phase benefits from increasing returns and economies of scale, ensuring efficient resource utilization.

At the minimum point of the AC curve, the firm reaches its least-cost output level, also known as the optimal production point. Beyond this level, as AVC increases at a faster rate than AFC declines, AC starts to rise. This increase is attributed to diminishing returns and diseconomies of scale, where inefficient input combinations raise costs. The short-run AC curve is often called the plant curve, representing the most efficient use of a given production facility.

11.6.1.12. Marginal Cost (MC)

Marginal Cost (MC) is the additional cost incurred when one more output unit is produced. It represents the change in total cost resulting from a change in output. Mathematically, it is expressed as: $MC = \Delta TC / \Delta TQ$. where ΔTC is the change in total cost and ΔQ is the change in total output. Alternatively, it can be written as:

$$MC = TC_n - TC_{n-1}$$

MC is directly influenced by Total Variable Cost (TVC) since fixed costs remain unchanged. The MC curve also exhibits a U-shape in the short run, reflecting the law of variable proportions. When MC decreases, the firm operates under increasing returns. As MC starts rising, diminishing returns take effect, leading to higher per-unit costs.
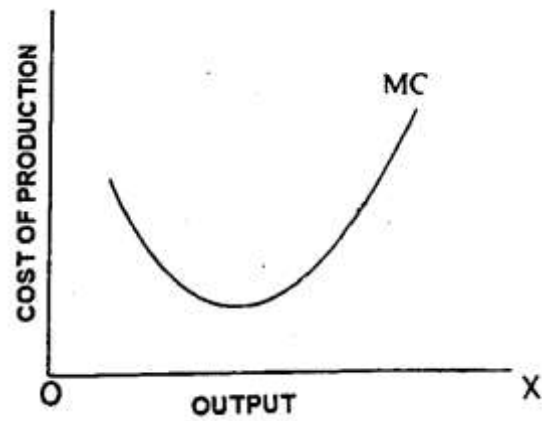
Fig. 11.7

Table 1.2 the table indicates the relationship between AC & MC

Output in units	TC in Rs.	AC in Rs.	Difference in Rs. MC
1	150	150	-
2	190	95	40
3	220	73.3	30
4	236	59	16
5	270	54	34
6	324	54	54
7	415	59.3	91
8	580	72.2	165

Fig. 11.8

117
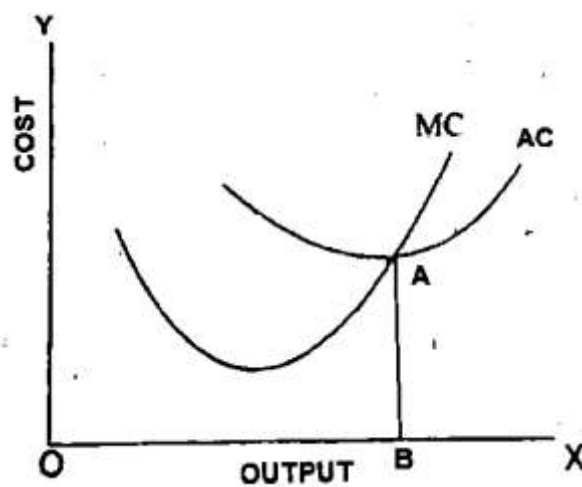
11.6.1.13 Relation between AC and MC

The relationship between AC and MC can be observed through the following key points:

1. Both AC and MC initially decline as output increases but begin to rise after reaching their respective minimum points.

2. When AC is decreasing, MC is also decreasing, but at a certain level of output, MC starts to rise even while AC continues to decline. During this phase, MC remains lower than AC because MC is associated with the cost of an additional unit, whereas AC represents the cost spread over all units.

3. As long as AC is falling, MC stays below AC, indicating that the rate of decline in MC is greater than the decline in AC. Notably, MC reaches its lowest point before AC does.

4. When AC starts increasing, MC surpasses AC. This occurs because the rise in MC impacts only the additional unit, while AC reflects the cost spread over all units.

5. As AC continues to rise, MC remains greater than AC, which suggests that the increase in MC is sharper than the increase in AC.

6. The MC curve intersects the AC curve at AC's minimum point. This happens because when MC is lower than AC, it pulls AC downward, and when MC is higher than AC, it pushes AC upward. The point where they meet represents the least-cost output level or the optimal production point. At this output level, the firm operates at maximum efficiency with the lowest possible AC. Beyond this point, costs begin to rise as production expands further.

11.6.2 Cost Output Relationship in the Long Run

The long-run period is characterized by complete flexibility in production, allowing firms to adjust both fixed and variable factors. Unlike the short run, where firms are constrained by existing plant capacity, the long run enables firms to modify their scale of operations.

Key aspects of long-run cost-output relationships include:

- Firms can expand output by increasing plant size, installing new machinery, and hiring additional staff. This flexibility allows firms to operate more efficiently by optimizing resource utilization.

- If demand for a product declines, firms can reduce output by downsizing operations, lowering production costs, and cutting unnecessary expenses.

- In the long run, all costs are variable, eliminating the distinction between fixed and variable costs. Since there are no fixed costs, total cost represents the sum of all variable costs.

- Decision-making in the long run focuses on average total cost (ATC) rather than short-run cost components. Firms aim to achieve the lowest possible ATC to maximize efficiency and profitability.

By adjusting production capacity based on demand, firms can ensure cost efficiency and sustainable growth in the long run.

11.6.2.1 The LAC Curve

Long-run average cost (LAC) refers to the total cost incurred in the long run, divided by the level of output. It represents the per-unit cost of production across different output levels, achieved by adjusting plant size or production scale.

11.6.2.2 Derivation of Long Run Average Cost-(LAC)

In the long run, all costs are variable, making the distinction between fixed and variable costs unnecessary. The LAC curve is derived from short-run average cost (SAC) curves, as firms modify their plant size to achieve cost efficiency at higher output levels. The LAC curve acts as the envelope of various SAC curves, tracing the lowest possible cost at each production level.
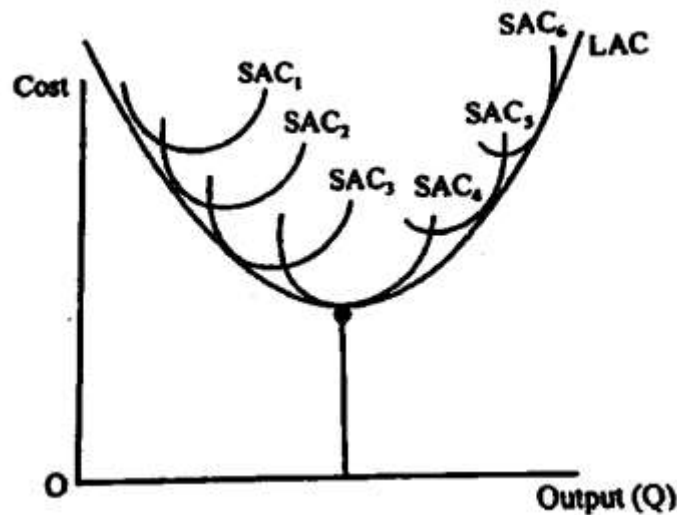
Fig. 11.9

Key characteristics of the LAC curve:

- Initially, the LAC curve slopes downward due to increasing returns to scale, leading to lower average costs as production expands.

- After reaching the minimum cost point, the curve slopes upward due to decreasing returns to scale, reflecting higher costs.

- At its lowest point, the LAC curve represents constant returns to scale, where production is most efficient.

In graphical representation, the LAC curve is formed by connecting the lowest-cost points of multiple SAC curves (e.g., SAC_1, SAC_2, SAC_3). Since all factors of production are adjustable in the long run, firms transition from one SAC curve to another as they expand or contract their operations.

11.6.2.3 Long Run Marginal Cost (LMC)

The long-run marginal cost (LMC) curve is obtained as follows:

1. **Identifying Key Points**: Perpendicular lines are drawn from points on the LAC curve where LAC equals SAC, marking specific output levels (e.g., AQ_1, BQ_2, CQ_3).

2. **Locating Marginal Cost Intersections**: The intersections of these perpendiculars with the corresponding short-run marginal cost (SMC) curves are identified (e.g., A_1, B_1, C_1).

3. **Forming the LMC Curve**: By connecting these points, the LMC curve is drawn, passing through the minimum point of the LAC curve.

This relationship highlights how long-run and short-run cost curves interact, guiding firms in optimizing production costs over time.
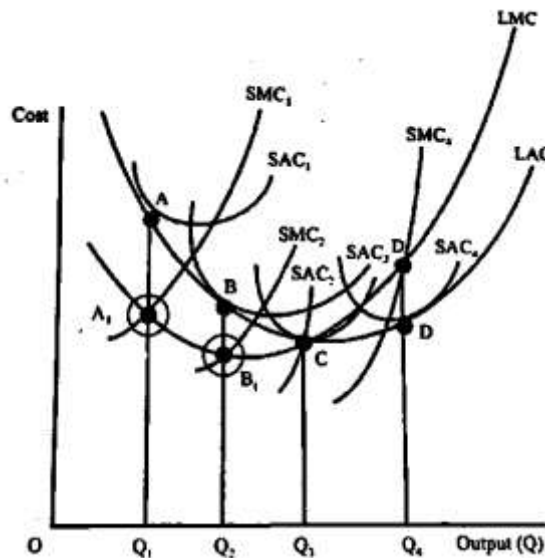
Fig. 11.10

11.6.2.4 Important features of long run AC curves

1. Tangent Curve

Short-run average cost (SAC) curves represent different plant sizes and operational capacities in the short run. The LAC curve is formed by connecting points of tangency from these SAC curves, but it never intersects them. This implies that, at any given output level, SAC cannot be lower than LAC. Therefore, in the long run, the LAC curve serves as a boundary for all SAC curves.

2. Envelope Curve

The LAC curve is often called an "Envelope Curve" because it encloses a series of SAC curves, each corresponding to different output levels. It outlines the lowest possible cost for every level of production.

3. Flatter U-Shaped or Dish-Shaped Curve

Similar to SAC curves, the LAC curve also exhibits a U-shape but is flatter. This is due to economies and diseconomies of scale, which cause costs to decrease initially and then rise gradually as output expands.

4. Planning Curve

The LAC curve serves as the firm's "Planning Curve" as it represents the lowest cost for producing various levels of output. An entrepreneur can use it to determine the most efficient plant size, ensuring production at the minimum possible LAC. The optimal plant size is where the SAC curve's minimum point aligns with the minimum point of the LAC curve.

5. Minimum Point of LAC is Lower than the Minimum of SAC

The LAC curve always touches SAC curves at their minimum points but never rises above them. This means SAC can never be lower than LAC. The entrepreneur aims to operate at the optimum scale of production, where SAC and LAC meet at their respective minimum points. The output level corresponding to this intersection ensures the lowest per-unit production cost.

At points of tangency before or after this optimal scale, SAC curves may be rising or falling, indicating higher costs compared to the least-cost production point.

Self-Check Exercise-4

Q1. Define

1) Total Fixed Cost (TFC)

2) Total Variable Cost (TVC)

3) Total Cost (TC)

Q2. Write a short note on the cost-output relationship, nature and behaviourof cost curves in the short run.

11.7 Summary

The cost function represents how costs change with variations in output, technology, and input prices. It is derived from the production function, which defines the technical relationship between inputs and output levels. The cost function can be expressed as C = f(X, T, Pf), where C represents total cost, X denotes output, T refers to technology, and Pf indicates the prices of production factors. Several factors influence costs, including technology, output rate, plant size and scale, input prices, efficiency of production factors, stability of output, the law of returns, and the time period. There are two main types of cost functions: the short-run cost function, where some inputs remain fixed, and the long-run cost function, where all inputs are variable. Average Cost (AC) refers to the cost per unit of output and is the sum of Average Fixed Cost (AFC) and Average Variable Cost (AVC). Marginal Cost (MC) represents the additional cost incurred to produce one more unit of output.

The relationship between AC and MC follows a typical pattern. Initially, both AC and MC decline as output increases but eventually rise. When AC is falling, MC is lower than AC but starts rising before AC reaches its minimum point. At the lowest point of AC, the MC curve intersects AC. Once AC begins to rise, MC becomes greater than AC. This indicates that the MC curve lies below AC when AC is decreasing and moves above AC when AC starts increasing.

11.8 Glossary

- **Money Cost:** The cost measured in monetary terms for producing a good or service.

- **Real Cost:** The effort, both physical and mental, required to produce a good or service.

- **Explicit Cost:** Direct expenses incurred in production, such as wages, rent, interest, raw materials, and utilities.

- **Implicit Cost:** The estimated cost of using self-owned resources, which do not involve direct payments or appear in financial records. Actual Cost – Also known as outlay cost, it includes recorded expenses for production or acquiring goods and services.

- **Opportunity Cost:** The value of the next best alternative forgone when resources are used for a specific purpose, also called alternative cost.

- **Direct Cost:** Expenses directly linked to a particular product, department, or production process.

- **Indirect Cost:** Costs that cannot be directly assigned to a single product, department, or process.

- **Short-Run Cost Function:** Represents production costs in the short term, where some inputs remain fixed while others vary to adjust output.

- **Total Fixed Cost (TFC):** The cost incurred on fixed inputs such as machinery and tools, which remain constant regardless of output levels.

- **Total Variable Cost (TVC):** The cost of variable inputs like raw materials, power, and transport, which change with production levels.

- **Total Cost (TC):** The total expenditure a firm incurs to produce a specific quantity of goods or services.

- **Average Fixed Cost (AFC):** The fixed cost per output unit, calculated by dividing TFC by total output. Average Variable Cost (AVC) – The variable cost per unit, obtained by dividing TVC by total output.

- **Marginal Cost (MC):** The additional cost incurred to produce one extra unit of output.

11.9   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 11.3.

Self-Check Exercise-2

Answer to Q1. Refer to Sections 11.4.1, 11.4.2 and 11.4.3.

Answer to Q2. Refer to Section 11.4.8.

Self-Check Exercise-3

Answer to Q1. Refer to Section 11.5.

Self-Check Exercise-4

Answer to Q1. Refer to Sections 11.6.1.6, 11.6.1.7 & 11.6.1.8.

Answer to Q2. Refer to Section 11.6.1.5.

11.10   References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

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11.11 Terminal Questions

Q 1   Discuss Relationship between AC, AFC, AVC and MC Curves.

Q. 2   Discuss Cost-output relationship, nature and behaviour of cost curves in the short-run.

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CONCEPT OF REVENUE

Structure

12.1   Introduction

In this unit, we discuss the concept of revenue in economic theory, focusing on how firms generate revenue under different market structures. We begin by understanding the Revenue Function, which explains the relationship between output sold and total revenue earned. Next, we examine the Revenue Curve of an Individual Firm Under Perfect Competition, where firms act as price takers, leading to specific revenue patterns. Moving forward, we analyse the revenue curve of an individual firm under imperfect competition, where firms have pricing power that influences their revenue structure. Finally, we explore the relationship between Average Revenue, Marginal Revenue, and the Elasticity of Demand.

12.2   Learning Objective

After going through this lesson, you will be able to

- Outline Concepts of Revenue Functions

- State the Relation between AC and MC

12.3   Revenue function

The revenue function represents the relationship between the quantity of goods sold and the revenue generated at a given price. If a firm sells 'x' units of a product for Rs. 'p' per unit, then the total revenue, $R(x)$, is given by the equation:

$R(x) = px$, where p and x are positive.

where both price (p) and quantity (x) are positive values.

Revenue refers to the total income a firm earns from selling its output. It can be categorised into three main types:

    1   Total Revenue (TR)

    2   Marginal Revenue (MR)

    3   Average Revenue (AR)

12.3.1 Total Revenue (TR):

Definition: Total revenue is the overall amount a firm receives from selling a given quantity of goods.

Example: Suppose a firm sells 200 meters of cloth at Rs. 8 per meter. The total earnings from this sale amount to:

$$TR = Price \times Quantity$$

$$TR = 8 \times 200 = Rs.1600$$

The total revenue changes as the quantity sold varies.

12.3.2 Marginal Revenue (MR):

Definition: Marginal revenue is the additional income generated when a firm increases its sales by one unit. It represents the change in total revenue resulting from the sale of an extra unit of output.

Example: If a firm initially sells 200 meters of cloth at Rs. 8 per meter, the total revenue is Rs. 1600. If sales increase to 201 meters, raising total revenue to Rs. 1608, the marginal revenue from selling the additional meter is:

$$Formula: MR = \frac{\Delta TR}{\Delta Q}$$

MR can also be found using another formula i.e.,

$$MR = TR_n - TR_{n-1}$$

TR_n is the total revenue at 'n' units and TR_{n-1} is the total revenue at 'n-1' units.

For instance, if the total revenue from 2 units is Rs. 10 and from 3 units is Rs. 14, then:

$$MR = 14 - 10 = 4$$

This demonstrates how marginal revenue quantifies the effect of selling an additional unit on total revenue.

12.3.3 Average Revenue (AR):

Definition: Average revenue refers to the revenue earned per unit of output. It is calculated by dividing the total revenue by the quantity of goods sold.

Formula:

$$\text{Average Revenue} = \frac{\text{Total Revenue}}{\text{Quantity}} = \frac{\text{TR}}{\text{Q}}$$

AR is average revenue, TR is total revenue, and Q is the quantity sold.

Example: If a firm generates Rs. 600 in total revenue from selling 200 meters of cloth, the average revenue is:

$$AR = 600/200 = Rs.\ 3$$

Thus, average revenue reflects the selling price per unit of the product. The average revenue curve is often considered the same as the demand curve, as it shows the price at which different quantities are sold in the market.

12.3.4 Relationship between TR, AR and MR

Table : 12.1 The following table shows the relationship between TR, AR and MR.

Quantity Sold (Q)	Price Per unit (P)	TR = P x Q	AR = TR / Q	MR = TRn - TRn-1
1	10	10	10	10
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2
6	5	30	5	0
7	4	28	4	-2

The interaction between TR, AR, and MR can be understood through a graphical representation. The following observations summarize their relationship:

TR and MR Relationship

1. Total revenue (TR) continues to rise as long as marginal revenue (MR) is positive. This trend can be observed up to a certain output level.
2. TR reaches its maximum point when MR becomes zero. At this stage, selling an extra unit does not generate additional revenue.
3. When both AR and MR are declining, MR decreases faster than AR, meaning MR always lies below AR.
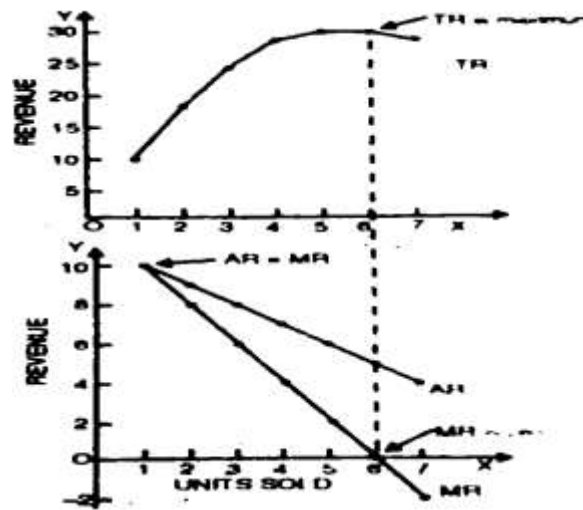
Average revenue represents the revenue earned per unit of output and is calculated by dividing total revenue by the quantity sold. Marginal revenue, on the other hand, refers to the additional revenue obtained from selling one more unit of output. It is derived from the first derivative of the TR function. Since both AR and MR are derived from TR, they share a close mathematical

126

relationship. A general principle in economics states that when MR is less than AR, the AR curve declines; when MR is greater than AR, the AR curve rises; and when MR equals AR, AR remains constant. This relationship applies across various economic concepts, including cost, product, and consumption functions.

The relationship between Average Revenue (AR) and Marginal Revenue (MR) varies based on market structure. In a perfectly competitive market, the price remains unchanged for every unit sold, ensuring that AR and MR are equal to the price. As a result, both AR and MR curves appear as horizontal lines. However, in imperfectly competitive markets such as monopoly and monopolistic competition, firms must reduce prices to increase sales. This causes the AR (demand) curve to slope downward, while the MR curve declines at a faster rate. In such markets, MR is always lower than AR because marginal revenue decreases more rapidly. Therefore, market structure plays a key role in determining the relationship between AR and MR, with perfect competition maintaining their equality and imperfect competition leading to MR falling below AR.

Self-Check Exercise-1

Q1.   Define Revenue Function.

Q2.   Define

  1)   Total Revenue (TR)

  2)   Marginal Revenue (MR)

  3)   Average Revenue (AR)

Q3.   What is the relationship between Total Revenue, Average Revenue and Marginal Revenue?

12.4   Revenue Curve of an Individual Firm Under Perfect Competition

In a perfectly competitive market, there are numerous buyers and sellers, preventing any single participant from influencing the market price. Firms operate as price takers, meaning they must sell their products at the prevailing market rate. Consumers have complete knowledge of product prices and quality, ensuring transparency in transactions. Likewise, factors of production are well-informed about potential earnings in different markets. Additionally, resources can move freely between regions and industries, with no artificial barriers restricting their allocation.

Since sellers offer identical and homogeneous products, there is a uniform price across the market. If a seller attempts to charge a price lower than the market rate, their products will sell out immediately, as consumers are fully informed about prices. Conversely, if a seller tries to set a higher price, buyers will turn to other sellers offering the same product at the standard market price. As a result, firms operating under perfect competition must sell their entire output at the prevailing market price to maximize profit, as illustrated in the figures below.
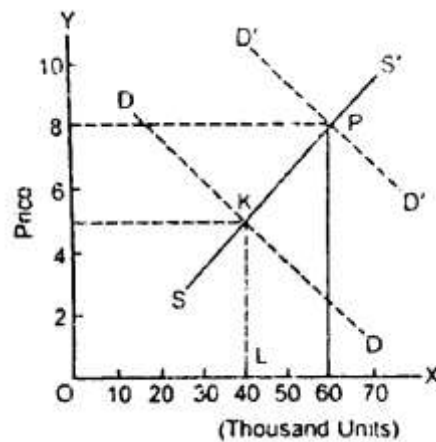
Fig. 12.2
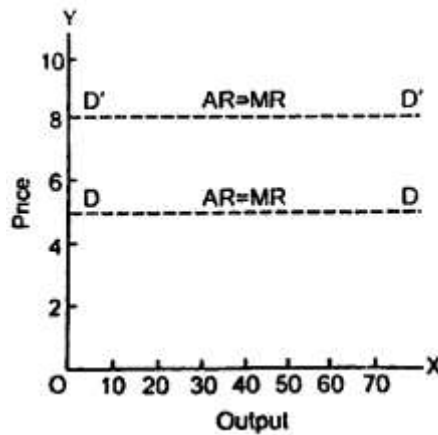
Fig. 12.3

In the given figure, the market demand and supply curves intersect at point K, determining the equilibrium price of Rs. 5. The curve DD represents the demand an individual firm faces. Regardless of whether a firm produces 5 or 50 units, it must sell its product at the prevailing market price of Rs. 5. If overall market demand increases, causing the price to rise to Rs. 8 (point PR), the firm can sell its products at this new price, following the new demand curve D'D' shown in the figure.

Under perfect competition, every output unit is sold at the same price as the first unit. As a result, the average revenue (AR) is always equal to marginal revenue (MR), causing both curves to coincide. For example, when the market price is Rs. 5 per unit, a firm selling 10 units earns a total revenue of Rs. 50. If the firm increases its output to 11 units, it must still sell at Rs. 5, resulting in a total revenue of Rs. 55. The additional revenue from selling one extra unit, which is the marginal revenue, remains Rs. 5. Similarly, average revenue is calculated by

128

dividing total revenue by the number of units sold (50/10 = 5, 55/11 = 5, 60/12 = 5). Therefore, in a perfectly competitive market, marginal revenue, average revenue, and price are always equal, making their curves identical in the given schedule and diagram.

Table 12.2

Units	Price Per Unit (Rs.)	Total Revenue (Rs.)	Marginal Revenue (Rs.)	Average Revenue (Rs.)
10	5	50	5	5
11	5	55	5	5
12	5	60	5	5
13	5	65	5	5
14	5	70	5	5
15	5	75	5	5
16	5	80	5	5

In a perfectly competitive market, the demand curve faced by an individual firm is a straight horizontal line, indicating that the firm can sell any amount of its product at the existing market price. Consequently, both marginal revenue (MR) and average revenue (AR) remain constant and coincide with the price level. This implies that MR, AR, and price are always equal, as depicted in Figure 12.4.
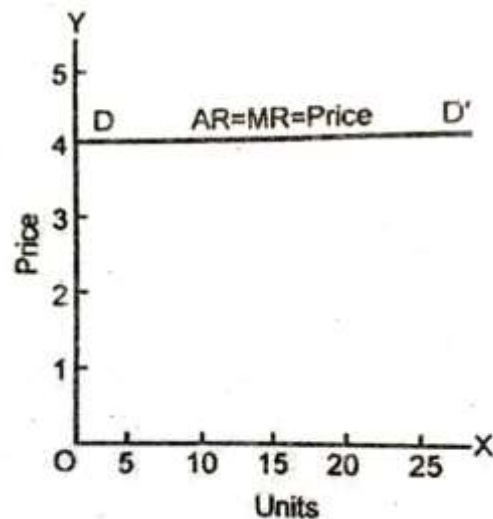
Fig. 12.4

Self-Check Exercise-2

Q1. Under perfect competition, why do the marginal revenue (MR) and average revenue (AR) curves coincide with the market price line?

In a perfectly competitive market, what happens to a firm's revenue if it tries to sell its goods at a price higher than the market price?

12.5   Revenue Curve of an Individual Firm under Imperfect Competition

In markets characterized by imperfect competition, such as monopoly, duopoly, or oligopoly, the firm's demand curve slopes downward from left to right. This indicates that the firm has some control over pricing, allowing it to sell more units at lower prices and fewer units at higher prices. In such market structures, the marginal revenue (MR) curve always lies below the average revenue (AR) curve. As output increases, the gap between these two curves widens. Additionally, the AR curve represents the price line, as demonstrated in the accompanying schedule.

Units sold	Price (Rs.)	Total Revenue (Rs.)	Marginal Revenue (Rs.)	Average Revenue (Rs.)
1	15	15	15	15
2	14	28	13	14
3	12	36	8	12
4	9	36	0	9
5	7	35	-1	7
6	5	30	-5	5
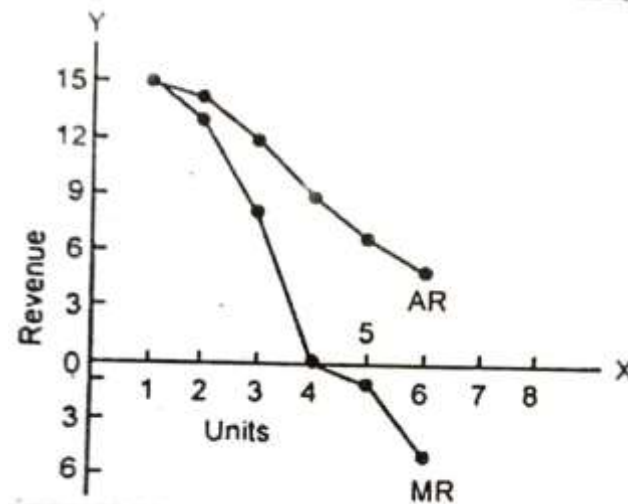
Fig. 12.5

From the given figure, it is evident that both the average revenue (AR) curve and the marginal revenue (MR) curve have a downward slope. The MR curve is positioned below the AR curve since additional output is sold at decreasing prices. Generally, this relationship can be depicted in the following diagram.

Average Revenue

Quantity   Marginal Revenue
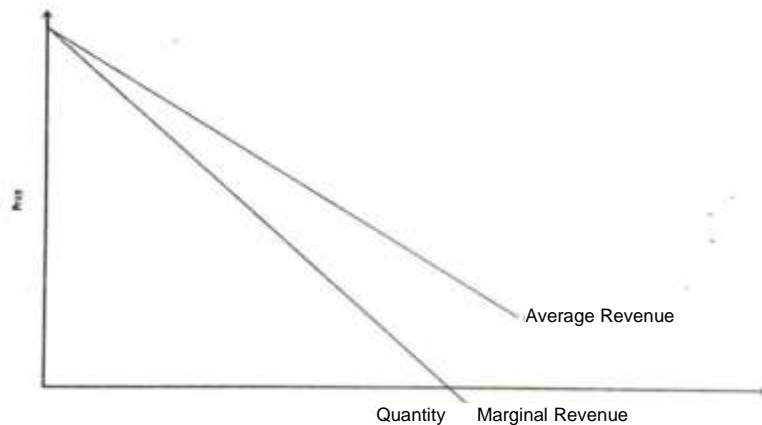
Fig. 12.6

The figure below provides a comparative representation of the Average Revenue (AR) and Marginal Revenue (MR) curves in both market scenarios.
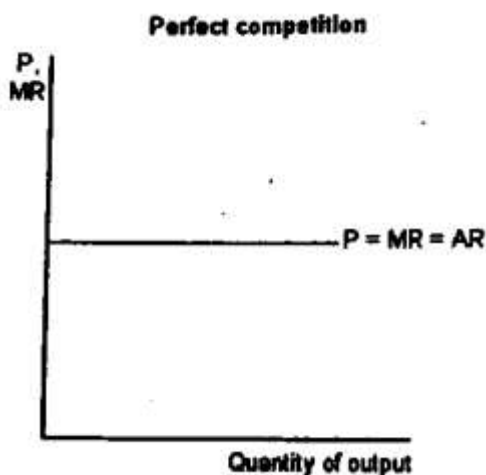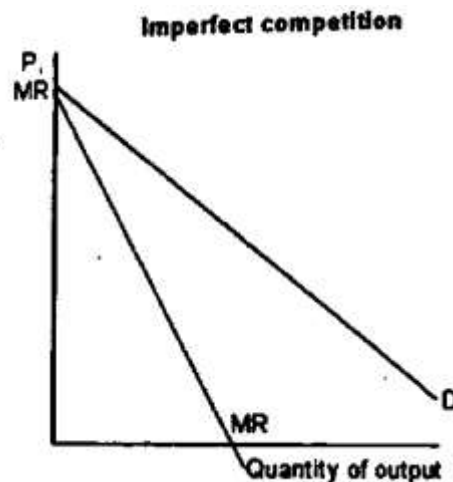
Fig. 12.7   **Fig. 12.8**

Self-Check Exercise-3

Q1.   Why does the marginal revenue (MR) curve lie below the average revenue (AR) curve in an imperfectly competitive market?

Q2.   What happens to the marginal revenue (MR) as the production expands in an imperfectly competitive market?

12.6   Average Revenue, Marginal Revenue and Elasticity of Demand

A strong connection exists between demand elasticity, average revenue, and marginal revenue at any given output level. Since a firm's average revenue curve represents the demand curve for its product, the elasticity of demand at any point on the consumer's demand curve is

the same as that on the firm's average revenue curve. The elasticity of demand at a specific point on the average revenue curve is determined by the ratio of the segments along the demand curve. Using this concept of point elasticity, we can analyze the connection between average revenue, marginal revenue, and price elasticity at different output levels. In the given diagram, the curves labeled AR and MR represent average revenue and marginal revenue, respectively.

$$= \frac{RT}{Tt}$$

Now in triangle PtR and MRT

$<tPR = <RMT$ (right angles)

$<tRP = <RTM$ (corresponding angles)

And $<PtR = < MRT$

Therefore, triangles PIR and MTR are equiangular

Hence, $\frac{RT}{Rt} = \frac{RM}{Pt}$ ....(i)

In the triangles, PtK and KRQ are congruent (i.e., equal in all respect

Hence

Pt = RQ .... (ii)

From i and ii we get

Elasticity at R = $\frac{RT}{Rt} = \frac{RM}{Pt} = \frac{RM}{RQ}$

Now it is evident from the figure that.

$$\frac{RM}{PQ} = \frac{RM}{RM - QM}$$

Hence, elasticity at

$$R = \frac{RM}{RM - OM}$$

From the figure, it is evident that RM represents the average revenue, while QM denotes the marginal revenue at the output level OM, which aligns with point R on the average revenue curve. Consequently, the elasticity at this point can be determined accordingly.

$$R = \frac{\text{Average Revenue}}{\text{Average Revenue} - \text{Marginal Revenue}}$$

If, A stands for average revenue

M stands for marginal revenue

e stands for elasticity on the average revenue curve

132

Then

$$e = \frac{A}{A - M}$$

It follows from this that

e. A – e. M = A

e. A – A = e.M

A (e-1) = e.M

$$A = \frac{e.M}{e - 1}$$

Hence,

$$A = \frac{M(e)}{e - 1}$$

And also,

$$M = \frac{A(e)}{e - 1}$$

Self-Check Exercise-4

Q1.   What is the relationship between average revenue (AR), marginal revenue (MR), and price elasticity of demand?

12.7   Summary

The revenue function represents the relationship between total revenue, price, and quantity sold. Total revenue refers to the overall income generated from sales. Marginal revenue (MR) is the additional revenue earned from selling one more output unit. In contrast, average revenue (AR) is calculated by dividing total revenue by the number of units sold. When MR is lower than AR, the average revenue decreases. Conversely, when MR exceeds AR, the average revenue rises. If MR is equal to AR, the average revenue remains unchanged.

12.8   Glossary

- **Total Revenue (TR):** The overall income a firm generates from selling its goods or services.

- **Revenue Function:** A mathematical representation of revenue as a function of the price of goods and the quantity sold.

- **Marginal Revenue (MR):** The additional revenue gained when one more output unit is produced and sold. It reflects the change in total revenue due to an incremental increase in sales.

- **Average Revenue (AR):** The revenue earned per unit of output, calculated by dividing total revenue by the number of units sold.

12.9   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 12.2.

Answer to Q2. Refer to Sections 12.3.1, 12.3.2 & 12.3.3.

Answer to Q3. Refer to Section 12.3.4.

Self-Check Exercise-2

Answer to Q1. Refer to Section 12.4.

Answer to Q2. Refer to Section 12.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 12.5.

Answer to Q2. Refer to Section 12.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 12.6.

12.10 References/Suggested Readings

1. Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2. Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3. Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4. Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

12.11 Terminal Questions

Question 1 what is the relationship between AR, MR and elasticity of demand?

Question 2 write short notes on

(i)   Average Revenue

(ii)   Marginal Revenue and

(iii)   Total Revenue

*****

MARKET STRUCTURE

Structure

13.1   Introduction

The word 'Market' is generally understood to mean a particular place or locality where goods are sold and purchased. However, in economics, the term 'market' does not mean any particular place or locality where transactions take place. What is required for a market is the existence of contact between sellers and buyers so that transactions take place at an agreed

price between them. The seller and buyer may be spread over a whole region, sometimes in different countries, but they contact and communicate and sell and buy commodities. The primary role of a market is to facilitate the exchange of goods and services. It serves as a platform where buyers and sellers interact to conduct transactions.

13.2   Learning Objectives

After going through the unit you will be able to:

- Define the term 'Market Structure'.

- State the Elements of Market structure.

- Explain the Determinants of Market Structure.

- Classify various Forms of Market Structure.

- Define Perfect and Imperfect forms of market

- Explain the features/Characteristics of Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly forms of market.

13.3   Definition of Market

In the words of Augustine Cournot, a French economist "Economists understand by the term market not a particular market-place in which things are bought and sold, but the whole of any region in which buyers and sellers are in such free intercourse with one another that the price of the same goods tend to equality easily and quickly".

Frederic Bentham defines, "A market is any area over which buyers and sellers are in such close touch with one another, either directly or through dealers that the prices obtainable in one part of the market affect the prices paid in other parts." This concept implies that a market does not have to be confined to a specific physical location or building, nor does it require buyers and sellers to be physically present together.

Sidgwick defines, "A market is a body of persons in such commercial relations that each can easily acquaint himself with the rates at which certain kinds of exchanges of goods or services are from time to time made by the others."

According to Jevons "The word market has been generalised so as to mean anybody of persons who are in intimate business relations and carry on extensive transactions in any commodity."

To Ely. "Market means the general field within which the forces determining the price of a particular product operate".

The key requirement for a market is that buyers and sellers remain in continuous communication, whether they are physically present in the same location or connected through instant means such as telephone communication.

Self-Check Exercise-1

Q1.   Define Market.

Q2.   What is the essential requirement for a market?

13.4   Components of Market

The fundamental elements of a market include the following:

1. The presence of buyers for a product. If a population consists mainly of individuals with very low income, the demand for luxury items like cars or high-end electronics would be minimal.

2. The availability of a commodity for sale. Without goods or services being offered, there can be no transactions, making the presence of sellers essential.

3. Effective communication between buyers and sellers, ensuring they can interact and negotiate.

4. A defined price for the product. Transactions take place at a mutually agreed price between buyers and sellers.

Self-Check Exercise-2

Q1.   Why is the presence of buyers essential for a market?

Q2.   What is the significance of having a price for a commodity in a market?

13.5   Classification of Market

Markets can be categorized into different types based on various factors:

1. Based on Geographic Area

Markets can be classified as local, national, or international. A local market involves buyers and sellers within a specific region, typically dealing with perishable goods like fruits and vegetables. A national market exists when goods and services are traded across an entire country. An international market includes transactions on a global scale, involving buyers and sellers from different countries. The nature of a market depends on factors such as the type of commodity, consumer preferences, storage facilities, business methods, political stability, and the ease of transporting goods.

2. Based on Time Frame

The time element plays a crucial role in market classification, as suggested by economist Alfred Marshall. Markets can be divided into:

- Very short period markets, where supply remains fixed, and prices are influenced only by demand (e.g., fresh food items).

- Short period markets, where supply can increase but within limited capacity.

- Long period markets, where firms have sufficient time to adjust production by expanding their facilities.

- Very long period markets, which account for broader economic changes like population growth, availability of raw materials, and capital supply.

3. Based on Nature of Transactions

- Spot markets involve immediate transactions where goods are bought and sold on the spot.

- Futures markets involve contracts for transactions to be completed at a later date.

4. Based on Volume of Business

- Wholesale markets handle large-scale transactions, acting as intermediaries between producers and retailers.

- Retail markets involve selling goods in smaller quantities directly to consumers.

5. Based on the Role of Sellers

- Primary markets deal with the initial sale of goods directly from producers.

- Secondary markets involve transactions among wholesalers and retailers.

- Terminal markets are the final points where goods reach consumers or undergo further processing.

6. Based on the Degree of Competition

- Perfect competition, where numerous buyers and sellers exist, and no single entity controls prices.

- Monopolistic competition, where firms sell similar but slightly differentiated products.

- Monopoly, where a single seller dominates the market.

- Oligopoly, where a few large firms control the market.

Apart from perfect competition, all other market structures fall under imperfect competition.

Self-Check Exercise-3

Q1.   What are the different types of markets based on the degree of competition?

Q2.   How did Marshall classify markets based on time?

13.6   The Essentials of a market

1.   A commodity to deal with.

2.   The existence of buyers and sellers.

3.   A place, it may be a particular place, a region or the whole country or the entire world

4.   The facilities for free interaction between sellers and buyers.

Self-Check Exercise-4

Q1.   What are the essential components required for the existence of a market?

13.7   Market Structure

Market structure refers to the way firms are organized within an industry based on specific characteristics. It defines the number of businesses producing similar goods or services and the conditions under which they operate.

A market structure is characterised by factors such as the number of firms, the degree of similarity among products, and the ease with which new firms can enter or exit the market. Different industries operate under varying market structures, influencing competition and pricing strategies.

Market structure represents the overall framework within which businesses function, shaping competitive behavior and market dynamics.

13.7.1 Elements of Market Structure

1. Number and size, Distribution of Firms
2. Entry Conditions
3. Extent of Product Differentiation

Types of Market Structure influence how a firm behaves regarding the following:

1. Price
2. Supply
3. Barriers to Entry
4. Efficiency
5. Competition

13.7.2 Determinants of Market Structure

1. Freedom of Entry and Exit
2. Nature of the Product Homogeneous or Differentiated
3. Control over Supply /Output
4. Control over Price
5. Control to Entry

Self-Check Exercise-5

Q1. What are the key traits that define a market structure?

Q2. What are the three main elements of market structure?

Q3. What are the determinants of market structure?

13.8 Forms of Market

13.8.1 Perfect Competition

Perfect competition is an ideal market structure where many buyers and sellers participate freely. There are no restrictions on market entry or exit, and the products sold are identical. Firms in this market cannot set their own prices, as prices are determined by overall demand and supply.

Key Characteristics of Perfect Competition:

1. **Many Buyers and Sellers:** Since the market has a large number of buyers and sellers, no single participant can influence prices. Instead, the forces of supply and demand decide the market price, making individual firms price takers.

2. **Identical Products:** All firms offer the same type of product with no differences in quality or features. This makes products from different sellers perfect substitutes for each other.

3. **Free Market Entry and Exit:** Firms can join or leave the market without restrictions. While businesses may experience short-term profits or losses, long-term competition ensures that only normal profits are sustained.

4. **Complete Market Information:** Both buyers and sellers are fully aware of product prices and market conditions. This transparency prevents firms from charging different prices, keeping the market fair and competitive.

13.8.2 Monopoly

A monopoly is a market structure where a single seller controls the entire supply of a product that has no close alternatives. Unlike competitive markets, a monopoly operates without direct competition, giving the seller significant power over pricing. Monopolies can emerge due to factors such as economies of scale, exclusive access to key resources, patents, or government regulations.

Key Features of a Monopoly:

1 **Sole Producer:** A monopoly consists of only one firm supplying a product. This can result from legal protections like patents, exclusive rights, government restrictions, or natural advantages. Since no rival firms exist, the monopolist determines supply and price, though consumer demand still plays a role in setting prices.

2 **No Close Substitutes:** The product offered by a monopolist has no direct replacement, limiting consumer options. This lack of alternatives makes demand relatively inelastic, meaning consumers must either purchase the product at the set price or go without it.

3 **Entry Barriers:** New firms face significant challenges in entering a monopolistic market. Barriers may include:

- Ownership of key raw materials or specialized production knowledge

- Patent protections

- Government regulations and licensing requirements

- Natural monopolies, where large-scale production reduces costs

These barriers prevent competition, allowing the monopolist to maintain high profits over time.

4 **Price Differentiation:** A monopolist may charge different prices for the same product based on consumer type or usage. This strategy, known as price discrimination, helps maximize revenue. For example, electricity tariffs in Delhi vary for residential, commercial, and industrial consumers.

5 **Long-Term Profitability:** Due to restricted market entry, monopolists can sustain high profits over an extended period. Unlike competitive firms, they are not pressured to reduce prices or innovate as frequently.

6 **Limited Consumer Choice:** Since the monopoly is the sole provider, consumers have restricted options. The absence of competitors means buyers must accept the monopolist's terms or forgo the product entirely.

7 **Higher Prices than Marginal Cost:** Monopolists set prices above the cost of producing an additional unit, as they have full control over price determination. This pricing strategy allows them to maximize earnings while restricting output.

13.8.3 Monopolistic Competition

Monopolistic competition is a market structure in which many firms compete while offering slightly different products. This differentiation gives each firm some degree of pricing power. Although multiple sellers operate in the market, their products are not identical, allowing consumers to choose based on brand preferences and unique features. Examples of such markets include industries producing mobile phones, cosmetics, detergents, and toothpaste.

Features of Monopolistic Competition

1. **Large number of buyers and sellers:** In this form of market, while the buyers are as large as it is under perfect competition or monopoly, the number of sellers is not as large as that under perfect competition. Therefore, each firm has the ability to alter or influence the price of the product it sells to some extent.

2. **Product Differentiation:** Under Monopolistic Competition products are differentiated. This means that the product is same, brands sold by different firms differ in terms of packaging, size, colour features etc. For example soaps, toothpaste, mobile instruments etc. The importance of Product Differentiations is to create an image in the minds of the buyers that the product sold by one seller is different from that sold by another seller. The Products are very similar to each other, but not identical. This allows substitution of the product of one firm with that of another. Due to a large number of substitutes being available Demand for a firm's product is relatively elastic.

3. **Selling Costs:** As the products are close substitutes of each other, they are needed to be differentiated for this firms incurs selling cost in making advertisements, sale promotions, warranties, customer services, packaging, colours are brand creation.

4. **Free Entry and Exit of firm:** Like perfect competition, free entry and exit of firms is possible under this market form. Since there are no barriers to entry and exit, firms operating under Monopolistic Competition, in the long run, earn only normal profits.

13.8.4 Oligopoly

The term Oligopoly means 'Few Sellers'. An Oligopoly is an industry composed of only few firms, or a small number of large firms producing bulk of its output. Since the market consists of a small number of firms or a few dominant players, any adjustment in price or output by one firm can significantly impact the revenue and production levels of its competitors. Major Soft Drink firms, Airlines and Milk firms can be cited as an example of Oligopoly.

Features of Oligopoly

1. **A Few Firms:** Oligopoly as an industry is composed of few firms, or a few large firms controlling bulk of its output.

2. **Firms are Mutually Dependent:** Each firm in an oligopoly market carefully considers how its actions will affect its rivals and how its rivals are likely to react. This makes the firms mutually dependent on each other for taking price and output decisions.

3. **Barriers to the Entry of Firms:** The main cause of a limited number of firms in an oligopoly is the barriers to the entry of firms. One barrier is that a new firm may require huge capital to enter the industry. Patent rights are another barrier.

4. **Non Price Competition:** When there are only a few firms, they are normally afraid of competing with each other by lowering the prices, it may start a Price War and the firm who starts the price war was may ultimately lose. To avoid price war, the firm uses other ways of competition like: Customer Care, Advertising. Free Gifts etc. Such a competition is called non-price competition.

Exercise 1.1

Q1.   Define Market.

Q2.   What are the criteria for market classification?

Q3.   Differentiate between perfect competition and monopoly.

Self-Check Exercise-6

Q1.   What are the characteristics of a perfect competition market structure?

Q2.   What defines a monopoly market structure?

Q3.   What are the key features of monopolistic competition?

Q4.   What are the characteristics of an oligopoly market structure?

13.9   Summary

Understanding types of markets is essential for understanding how economics works. Each type of market, whether perfectly competitive, monopolistic, or oligopolistic, has its characteristics that affect how prices are set, how much competition exists, and what choices consumers have. Studying these market structures helps learners see how businesses operate, what challenges they encounter, and what strategies they use. For example, in a perfectly competitive market, prices are determined by supply and demand, while in a monopoly, one company controls the market and can set prices.

13.10   Glossary

- **Market:** A platform, physical or virtual, where buyers and sellers engage in transactions, influencing prices based on demand and supply.

- **Perfect Competition:** A market setup with many firms, where no single firm can influence prices, ensuring a standardized rate for all.

- **Imperfect Competition:** A market condition where some firms can influence prices due to market limitations or product differentiation.

- **Monopoly:** A market structure where a single seller controls supply, offering a unique product without close alternatives.

- **Equilibrium:** A situation where a firm has no motivation to change its production level, as supply and demand are balanced.

13.11 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 13.3.

Answer to Q2. Refer to Section 13.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 13.4.

Answer to Q2. Refer to Section 13.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 13.5.

Answer to Q2. Refer to Section 13.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 13.6.

Self-Check Exercise-5

Answer to Q1. Refer to Section 13.7.

Answer to Q2. Refer to Section 13.7.1.

Answer to Q3. Refer to Section 13.7.2.

Self-Check Exercise-6

Answer to Q1. Refer to Section 13.8.1.

Answer to Q2. Refer to Section 13.8.2.

Answer to Q3. Refer to Section 13.8.3.

Answer to Q3. Refer to Section 13.8.4.

13.12 References/Suggested Readings

1. Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2. Koutsoyiannis. (1991). Modern microeconomics. Macmillan.

3. Salvatore, D. (1991). Microeconomic theory. HarperCollins.

4. Varian, H. (1992). Microeconomic analysis. W.W. Norton & Company.

13.13 Terminal Questions

Q1.   Define the term market. List the components of a market.

Q2.   Classify the different types of market.

*****

NATIONAL INCOME ACCOUNTING

Structure

14.1   Introduction

National Income Accounting.

National Income Accounting is a fundamental framework used to measure a country's economic performance. It provides a systematic approach to calculating aggregate economic activities, including production, income, and expenditure. By analyzing these measures, economists and policymakers can assess economic growth, understand income distribution, and formulate policies for sustainable development. This unit explores key concepts related to the circular flow of income, highlighting the interaction between different economic agents. It covers the Saving-Investment Identity, the circular flow in a three-sector economy including the government sector, and the money flow in a four-sector open economy incorporating foreign trade. Additionally, it introduces various national income and national product concepts, offering insights into how a nation's economic output is measured.

14.2.   Learning Objectives

After going through this lesson, you will be able

- To understand the National Income Accounting of an economy.

- To learn different concepts of National Income

- To understand the calculation of National Income

14.3. Circular Flow of Income

A modern economy operates as a monetary system where money facilitates the exchange of goods and services by acting as a medium of exchange. Households provide economic resources and factors of production to firms and, in return, receive monetary compensation. To understand this flow, consider a two-sector economy, which consists of only households and firms.
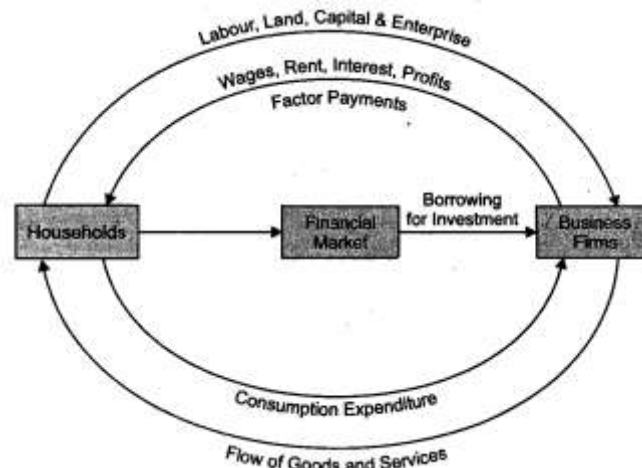
Fig. 14.1

Fig. 14.1 Circular Flow of Money in Simple Two Sector Economy

(Ahuja, 2016, p.21)

This model assumes that households spend all their earnings on consumer goods and services, leaving no savings. Similarly, businesses do not engage in investment activities. As illustrated in the circular flow, households supply factors of production—such as labor, land, capital, and entrepreneurship—to firms and receive income in the form of wages, rent, interest, and profits. This income then flows back to firms as households use it for consumption expenditure on goods and services. Consequently, there is a continuous movement of money in one direction and goods and services in the opposite direction, maintaining a circular flow of income in the economy.

This simplified model does not account for foreign trade, savings, or government intervention. The flow of income and money described here represents a **closed economy**, where economic activities occur without external influences.

13.3.1 Saving-Investment Identity in National Income Accounts

Although individuals who save and businesses that invest are distinct entities, in a simple two-sector economy without government or foreign trade, total savings always equate to total investment in national income accounting. National income accounts focus on actual savings and actual investment rather than planned or intended values. This means that the savings and investments recorded are those that have been realized in the economy.

In a basic economy with no government intervention or foreign trade, the total value of output produced, represented as Y, must be equal to the value of output sold. Since the production sold consists of consumption and investment expenditures, the relationship between income, savings, and investment can be expressed accordingly.

$$Y = C + I .... (i)$$

Where,

Y = Value of Aggregate Output, C = Consumption Expenditure, I = Investment Expenditure.

When some output remains unsold, it leads to an accumulation of inventories. In national income accounting, this increase in inventories is considered part of actual investment. It is treated as if firms are purchasing their own goods to add to their stock.

Since National Income (Y) (which in equal to GNP) can be either consumed or saved, we have $Y = C + S$ (ii)

From the identities (i) and (ii) we get

$$C + I = Y = C + S \qquad (iii)$$

As a result, the total Gross National Product (GNP) generated in the economy is either used for consumption (C) or investment (I). This relationship is expressed as:

$$C+I=Y$$

which represents aggregate demand, or the total spending on goods and services.

Similarly, the national income is allocated to either consumption (C) or savings (S):

$$Y=C+S$$

Therefore, this fundamental identity confirms that the total value of goods and services produced or sold in an economy always corresponds to the total income earned within that economy.

Now from identity (iii) we have $\cancel{C} + I = \cancel{C} + S$

$$I = S$$

Therefore, in a two-sector simple economy without government or foreign trade, investment is always equal to saving as a matter of accounting identity.

14.3.2 Circular Income Flow in a Three-Sector Economy with Government Sector

In our above analysis of money flow, we have ignored the existence of government for the sake of making our circular flow model simple. In this Three-Sector Economy model of the circular flow of income with Government sector, we will try to understand how govt. sector plays an important role in the circular flow of money.
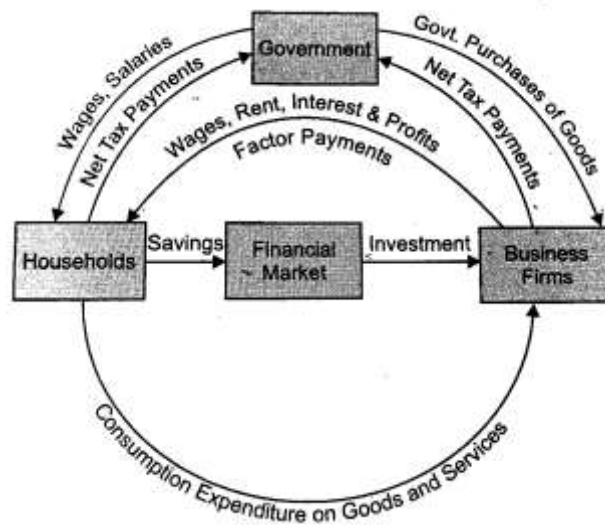
Fig. 14.2 Circular Flow of Money with Government Sector *(Ahuja, 2016, p.25)*

The government sector plays a crucial role in the economy through taxation, spending, and borrowing activities. Similar to households and firms, the government also purchases goods and services, contributing to economic transactions. As illustrated in **Figure 14.2**, government spending flows into the economy when it acquires goods and services from businesses and households.

Government expenditure is primarily financed through taxation, asset utilization, or borrowing. Additionally, both government operations and business activities may rely on borrowing from financial markets. This inclusion of the government sector significantly influences overall economic conditions.

An increase in government borrowing raises credit demand, leading to higher interest rates. These changes in interest rates, in turn, impact the financial decisions of businesses and households. Within this model, the total economic expenditure now comprises multiple contributing factors.

Total Expenditure (E) = C + I + G ....(i)

Where, C is consumption, I = Investment and G = Govt. Expenditure

Whereas,

Total Income (Y) =C + S + T.....(ii)

Where, C = Income allocated to consumption, S = Saving and T = Taxes

Since, expenditure (E) made must be equal to income received (Y), from equations (i) and (ii) we have

¢ + I + G = ¢ + S + T ....(iii)

Subtracting (C) consumption from both sides, we have

I + G = S + T .... (iv)

By rearranging we obtain

$$G - T = S - I \quad \text{..........................(v)}$$

From equation (v), it follows that when government expenditure (G) exceeds tax revenue (T), represented as G > T, a budget deficit occurs. For the economy to maintain equilibrium, the combined total of private savings and public savings must match the level of investment. This relationship can be expressed as: $Y - T - C + (T - G) = I$.

14.3.3 Money Flow in the Four-Sector Open Economy: Adding Foreign Sector

In an open economy, where trade occurs with other countries, financial transactions occur between domestic firms, households, and foreign entities. These transactions include exports and imports of goods and services and financial activities such as borrowing and lending in international markets. Exports refer to goods and services produced within a country's borders and sold to foreign buyers. Conversely, imports are goods and services purchased from abroad by domestic households and businesses. The economy experiences a balanced trade position when exports and imports are equal. However, this is rarely the case. A trade surplus occurs when the value of exports exceeds imports, while a trade deficit arises when imports surpass exports.
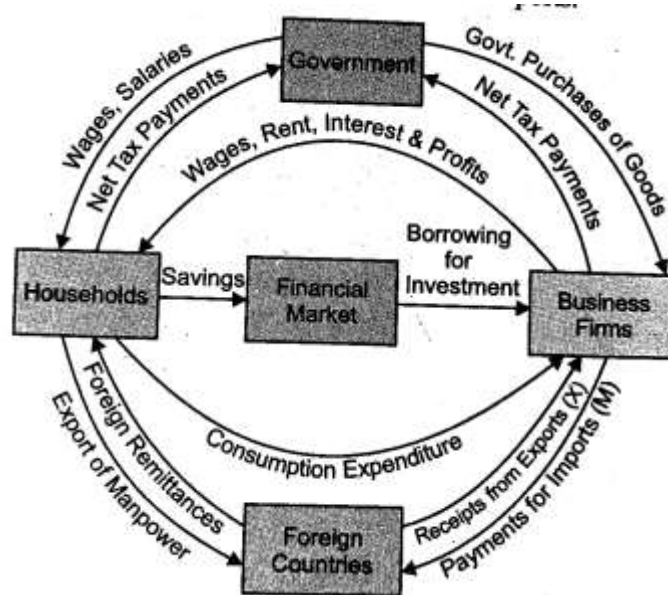
Fig. 14.3 *(Ahuja, 2016, p.26)*

Self-Check Exercise-1

Q1. Describe the components involved in the circular flow of income in a two-sector economy.

Q2. How does the inclusion of the government sector alter the circular flow of income? Discuss its impact on overall economic activity.

14.4. National Income and National Product.

National income represents the total earnings of individuals within a country over a specific period. It is measured as the overall monetary value of all goods and services produced within a nation. It accounts for the total income generated from all productive activities during a given year. The national product is the total worth of final goods and services produced by various businesses within a year. This can be calculated by multiplying the total output of these goods and services by their respective market prices.

Thus, the national product, expressed in monetary terms, is distributed among different factors of production—such as wages, rent, interest, and profits—based on their contribution to the production process.

$$\text{National Product} = \begin{bmatrix} \text{Value of Final} \\ \text{Goods and Services Produced} \end{bmatrix} = \begin{bmatrix} \text{Wages} \\ + \\ \text{Rent} \\ + \\ \text{Interest} \\ + \\ \text{Profits} \end{bmatrix} = \text{National Income}$$

As mentioned earlier, national income is the total sum of wages, interest, rents, and profits earned within an economy. In a simplified two-sector model, where neither the government nor foreign trade is considered, national income is equivalent to the national product.

14.2.1 Concepts of National Income

We will study various concepts of national income one by one.

1. **Gross Domestic Product (GDP)** – The total market value of all final goods and services produced within a country's domestic territory in a year. It accounts only for final goods to avoid double counting and includes production by both national and foreign firms operating domestically.

2. **Gross National Product (GNP)** – GDP plus net factor income from abroad (NFIA), which includes income earned by nationals from overseas investments minus income earned by foreign entities within the country.

Components of GDP:

- **Consumption (C):** Household spending on final goods and services.
- **Gross Private Investment (I):** Capital goods production and inventory accumulation.
- **Government Expenditure (G):** Public sector purchases of goods and services.
- **Net Exports (NX):** Exports (X) minus imports (M).

Thus, GDP is calculated as: GDP = C + I + G + (X – M)

(II)   Gross National Product (GNP)

Gross National Product (GNP) represents the total monetary value of all final goods and services produced by a country's residents, including income earned from abroad. It accounts for both domestic and international earnings by nationals, distinguishing it from Gross Domestic Product (GDP). The key difference between GDP and GNP arises from Net Factor Income from Abroad (NFIA), which includes income earned by residents from foreign sources minus income earned by foreigners within the domestic economy.

$GNP_{MP} = GDP_{MP}$ + net factor income from abroad

Or

GNP = GDP + Factor income earned by the domestic factors of production employed in the rest of the world – Factor income earned by the factors of production of the rest of the world employed in the domestic economy.

Definitions of the Terms: Factor cost, Basic Price, and Market Price

(a)   Factor Cost: refers to the total expenses incurred in utilizing all production factors to generate goods and services available in the market. It represents the actual cost of production, excluding taxes but including subsidies.

(b)   Basic Price: Basic Price is the value or amount a producer expects to receive from the consumer by selling one product unit.

Basic Price = Factor Cost + Production Taxes – Production Subsidy.

(c)   Market Price: Market Price refers to the price at which goods or services are offered for sale to consumers in the market. It includes production costs, taxes, and any applicable margins or markups.

Market Price = P + T - S

alternatively, market price = Factor Cost + Net Indirect Taxes

Where,

P = Basic Price, T = Production Taxes, S = Production Subsidy

(d)   Gross Value Added (GVA): measures the total value of goods and services produced in an economy, representing the contribution of different sectors to overall economic output. It is calculated as the value of output minus the value of intermediate goods used in production.

Therefore,

(i)   GDP at Factor Cost

GDP_{FC} = Sum of all GVA at factor Cost

(ii)   GDP at Market Price

$GDP_{MP} = GDP_{FC}$ + Production Taxes + Product taxes – Product Subsidies – Production Subsidies.

(III)   Net Domestic Product (NDP)

Net Domestic Product (NDP) represents the value of goods and services produced within a country after accounting for depreciation. Depreciation refers to the wear and tear of fixed capital such as machinery and equipment used in production. NDP is calculated as:

NDP at Market Price = GDP at Market Price – Depreciation

Or

$NDP_{MP} = GDP_{MP}$ – Depreciation

The difference between National Income (NI) at Factor Cost and Net National Product (NNP) at Market Price exists due to the presence of indirect taxes and subsidies. Indirect taxes increase the market price of goods, while subsidies lower it. This leads to a variation between the total income earned by factors of production and the final market value of output.

Therefore,

National Income		Net National Product (National Income at
Or	=	Market Prices) – Net Indirect Taxes
National Income at Factor Cost		

Here, net of indirect taxes and subsidies, is called Net Indirect Taxes.

Therefore,

National Income = Net National Product – Net Indirect Taxes.

(IV)   Personal Income (PI)

Personal Income represents the total income actually received by individuals or households in a given year. It differs from National Income, which measures total earnings. Certain earned incomes, such as corporate taxes, undistributed profits, and social security contributions, are not received by households. On the other hand, transfer payments, which are received but not earned, are included in Personal Income.

Therefore,

Personal Income = National Income – Social Security Contributions

– Corporate Income Taxes – Undistributed corporate Profits + Transfer Payments (old age pensions, unemployment compensation etc.)

(V)   Personal Disposable Income (PDI)

Not all of the income received by individuals is available for consumption, as a portion is deducted in the form of personal taxes, such as income tax and property tax. The amount left after these deductions is known as Personal Disposable Income, which represents the income available for spending and saving. Therefore,

Personal Disposable Income (PDI) = Personal Income – Personal Taxes

Because Personal disposable income can either be consumed or saved. Hence

Personal Disposable Income = Consumption + Saving

Self-Check Exercise-2

Q1.   Define Gross Domestic Product (GDP) in terms of its components.

Q2.   Define

1)   Gross National Product (GNP)

2)   Net Domestic Product (NDP)

3)   Personal Income (PI)

4)   Personal Disposable Income

14.5. Summary

This unit covered the fundamentals of National Income accounting and its key concepts. Using the circular flow of income, we explored how money and income move through different types of economies, including two-sector, three-sector, and four-sector models. Additionally, we examined various national income measures such as GDP, GNP, NDP, PI, and PDI, along with their calculations.

14.6. Glossary

- **National Income:** The total value of goods and services generated within a country during a financial year.

- **National Product:** The market value of all final goods and services produced.

- **Gross Domestic Product (GDP):** The total market value of all final goods and services produced within a country's domestic territory in a given year.

- **Gross National Product (GNP):** The monetary value of all final goods and services a country's residents produces, including net factor income from abroad.

- **Net Domestic Product (NDP):** GDP adjusted for depreciation, calculated as GDP minus the consumption of fixed capital.

- **Personal Income (PI):** The total income received by individuals or households in a specific year.

- **Personal Disposable Income (PDI):** The income remaining after deducting personal taxes from personal income.

14.7 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 14.3.

Answer to Q2. Refer to Section 14.3.2.

Self-Check Exercise-2

Answer to Q1. Refer to Section 14.2.1.

Answer to Q2. Refer to Section 14.2.1.

14.8. References/Suggested Readings

1.   Ahuja, H. L. (2016). Advanced economic theory. S. Chand and Company.

2.   Branson, W. H. (1985). Macroeconomics Theory and Policy. Universal Book Stall.

14.9. Terminal Questions

Q.1   Define different concepts of National Income?

Q.2   What are the different components of GNP?

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INFLATION, DEFLATION AND STAGFLATION

Structure

15.1.   Introduction

The purpose of this unit is to define Inflation, Deflation and stagflation. Inflation has remained one of the major concerns for economists to deal with for the smooth functioning of an economy. In this unit, we will try to understand what causes inflation in an economy and what are the types of inflation. Further, we will understand deflation, which is quite opposite of inflation. Moreover, there is one more important topic called stagflation. In this unit, we will also discuss about stagflation.

15.2.   Learning objectives

After going through this unit, you will be able to

* Define and differentiate between inflation, deflation and stagflation.

- Understand the causes and consequences of inflation deflation and stagflation

15.3. Inflation

Inflation is the continuous increase in the overall price level of goods and services over time. It represents the rate at which prices rise, impacting the cost of living and reducing the purchasing power of money. Unlike a one-time price surge, inflation is a sustained upward trend in prices. Conversely, deflation refers to a prolonged decline in prices. In India, inflation remains a significant economic challenge, particularly affecting lower-income groups who struggle with rising costs of essential commodities such as food grains.

15.3.1 History of Inflation in India

After independence, the inflation remained subdued-averaging less than 2 percent. However, there was a lot of variation in the inflation rate during 1950s. At the end of 1950s, inflation was under control and in the range of averages of about 6 percent. During the 1960s, India fought two wars-with China (in 1962) and Pakistan (1965) which resulted in the division of government revenues towards defence as against industrialization or economic development. Also, two consecutive droughts in 1965 and 1966 created severe food shortages and stoked food inflation. Therefore, between 1964 to 1967, prices rose at double digit rates. By the end of 1960s, (prices) inflation cooled down and more even negative, aided by a bumper crop and green revolution initiatives.

Further, the 1970s were perhaps the most tumultuous period in terms of inflationary uncertainty. (During) In 1974, international crude oil prices were up by over 250 percent amidst the first oil shock of 1973. In the 1980s, the inflation was ever higher-averaging 9.2% p.a. due to expansionary fiscal policies of the government and its monetization.

A severe economic crisis happened in 1991 triggered by a balance of payment crises emanating from an adverse impact of high fiscal and current account deficits of the 1980s. During the crisis year of 1991, inflation was 13.9 percent. To counter grave economic problems, the govt. came up with a spate of economic reforms-financial, external and industrial. Despite the drought of 2002-03, the adequate release of surplus stock of food grains kept a check on food prices. From 2003 onwards, inflation culminated and crossed double digits in 2009 and 2010, after crude oil prices hit of all time high of $ 147 per barrel in July of 2008. Surprisingly, even the 2008 global financial crises Couldn't cool inflation. Between 2008 and 2013, inflation averaged 10.1% p.a. due to rising global oil and metal prices. However, since 2014 inflation levels have been down with the economic slowdown and as demonetization and GST measures were implemented. In 2020, amidst the pandemic, inflation increased to 6.6%. For May 2021, CPI inflation was of 6.3% on the back of a sharp rise in food, transport and first prices.

Self-Check Exercise-1

Q1. What is inflation?

Q2. Describe the impact of inflation on the value of money.

Q3. Briefly explain the historical trends of inflation in India post-independence.

15.4. Causes of Inflation

Let us understand how inflation originates or what causes it. There are mainly three types of inflation.

1.   Demand-pull inflation

2.   Cost-push inflation

3.   Structuralist inflation

15.4.1 Demand-pull Inflation

Demand-pull inflation occurs when the overall demand for goods and services surpasses the economy's productive capacity, leading to rising prices. This excess demand can originate from households, businesses, or government spending. For instance, in a fully employed economy, an increase in government expenditure or private investment can create inflationary pressures. Keynes attributed inflation to an inflationary gap, which emerges when aggregate demand exceeds aggregate supply at full employment. Since inflation is a sustained rise in prices rather than a one-time increase, persistent inflation requires continuous growth in aggregate demand. Demand-pull inflation typically occurs when the economy is operating at full capacity, with minimal unemployment, and supply constraints prevent output from rising to meet demand.
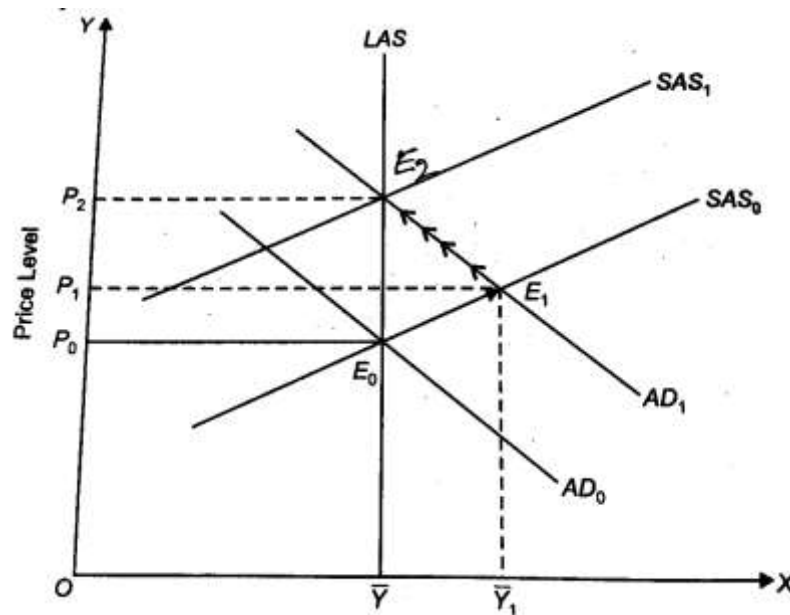
Fig. 15.1 Demand - Pull Inflation *(Ahuja, 2016, p.548)*

Demand-pull inflation can be illustrated using aggregate supply and demand curves. The long-run aggregate supply (LAS) curve is a vertical line representing the economy's full employment or maximum output capacity, also known as potential output.

The short-run aggregate supply (SAS) curve slopes upward, indicating that higher prices encourage increased production. This occurs because, as employment rises, diminishing

returns set in, increasing marginal production costs. Even beyond full employment, some additional labor can be absorbed due to frictional and structural unemployment adjustments.

In the initial equilibrium, the aggregate demand curve (AD_0) intersects both the SAS and LAS curves at point E_0, representing full-employment output at price level P_0. Now, if the government increases spending without raising taxes—perhaps financing it through central bank borrowing—aggregate demand shifts rightward to AD_1. This new equilibrium at point E_1 results in a higher price level (P_1) and an increase in real GDP (Y_1).

The key takeaway is that inflation occurs because aggregate demand grows faster than aggregate supply, causing prices to rise due to demand-supply imbalances. If the short-run aggregate supply were perfectly elastic (a horizontal line at E_0), output would expand proportionally to demand without causing inflation. However, since supply cannot keep pace with excess demand, prices increase, leading to demand-pull inflation.

15.4.2 Cost-Push Inflation

Cost-push inflation arises when production costs, such as wages and raw materials, increase, leading to higher overall prices even without rising demand. In such cases, inflation is driven by supply-side factors rather than demand-side pressures. Some key causes of cost-push inflation include:

1. **Oil Price Shock**; During the 1970s, sharp increases in crude oil prices, largely influenced by OPEC, significantly raised the cost of petroleum products. These supply shocks led to increased production costs across industries, contributing to cost-push inflation.

2. **Farm Price Shock**: Agricultural price fluctuations can also trigger inflation. Factors like insufficient rainfall, unfavorable weather conditions, and shortages of fertilisers can reduce food grain production, leading to price hikes. This type of food inflation is a classic example of supply-side inflation.

3. **Import Price Shock**: Exchange rate fluctuations can impact import prices. For instance, the depreciation of a national currency raises the cost of imported goods, leading to inflation. In June 2013, the Indian rupee depreciated significantly against the US dollar, causing import costs to rise and contributing to inflationary pressures.

4. **Wage-Push Inflation**: Trade unions and labor organizations often negotiate higher wages, which can increase production costs. If productivity gains do not match wage hikes, businesses pass these costs onto consumers through higher prices, leading to inflation. This phenomenon is particularly common in industrialized nations where strong labor unions influence wage policies.
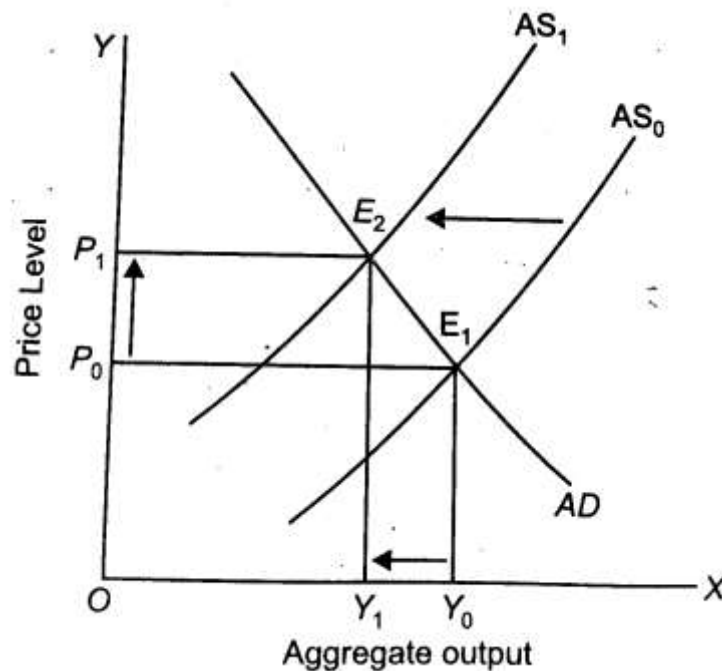
Fig. (15.2) Cost-Push Inflation *(Ahuja, 2016, p.552)*

Cost-push inflation can be understood using the aggregate demand and aggregate supply framework. In the given illustration (Fig. 15.2), price levels are represented on the Y-axis, while aggregate demand and supply are shown on the X-axis. When the aggregate supply curve (AS) shifts from AS_0 to AS_1 due to an increase in production costs, such as rising wages, the price level increases from OP_0 to OP_1. This shift in the supply curve to the left highlights how inflation is caused by rising costs. A key characteristic of cost-push inflation is that it leads not only to a rise in prices but also to a decline in aggregate output, affecting overall economic performance. An important feature of cost-push inflation is that this causes not only a rise in the price level, but also brings about a fall in aggregate output.

15.4.3 Structuralist Inflation

The structuralist perspective on inflation is particularly relevant for developing economies in Latin America. This theory, proposed by economists such as Gunnar Myrdal and Paul Streeten, argues that traditional aggregate demand and supply models cannot fully explain inflation in these economies. Myrdal and Streeten emphasise that developing economies often experience structural rigidities and imbalances, limiting the smooth flow of resources between sectors. Unlike developed economies, where inflation is typically analysed through overall demand and supply interactions, developing economies face sector-specific constraints that disrupt economic equilibrium. Due to these imbalances, certain sectors may experience supply shortages relative to demand, while others may suffer from resource underutilisation and excess capacity. Structuralists argue that to understand inflation in developing economies, it is

159

necessary to analyse these disaggregated, sectoral imbalances rather than relying solely on aggregate models.

Some key structural bottlenecks leading to inflation include:

1 **Agricultural Constraints:** Limited supply elasticity in agricultural production affects food prices.

2 **Resource and Budgetary Constraints:** Government spending limitations can influence inflation.

3 **Foreign Exchange Limitations:** Trade imbalances and currency fluctuations can restrict access to necessary imports, influencing price levels.

Self-Check Exercise-2

Q1.   What is demand-pull inflation and what causes it?

Q2.   Explain cost-push inflation with examples.

Q3.   What is structuralist inflation theory and how does it explain inflation in developing countries?

15.5. Deflation

Deflation is characterized by a persistent decrease in the overall price level of goods and services. It is often linked to a reduction in the money supply and a decline in credit availability, which can lead to lower consumer spending and investment. This phenomenon may result in reduced business revenues, wage declines, and an increased burden of debt, potentially slowing down economic growth. When the overall price level decreases, so that inflation rate becomes negative, it is called deflation. When the cost of goods and services rises, it is considered inflation, whereas when the cost of goods and services falls, it is considered deflation.

15.5.1 Causes of Deflation

Deflation can occur due to many reasons, but a few important reasons are

(i)   Decreased Consumption Demand

When the demand for a product falls, it happens either due to high prices or inefficient product supply. This leads a business to take decisions like decreasing the prices or reducing number of employees.

(ii)   Fall in Production Cost

For example, if cotton prices have decreased, the production cost of garments will eventually fall. Under such circumstances, a producer might increase production having an oversupply of the products. But if the demand remains unchanged, businesses will need to cut their prices to keep the commons buying their products.

(iii)   Supply of Money

If the central bank decides to put interest rates high in their monetary policies, the people intend to save their money instead of spending it. This causes a reduction in cash circulation in

the country. In another scenario, deflation can reach significant levels when the money supply does not rise by the same rate as economic output.

Thus, when the price level rises from OP0 to OP1, aggregate output falls from OY_0 to OY_1. This situation of higher inflation and lower output is generally described as stagflation. Therefore, cost-push inflation results in stagflation.

Self-Check Exercise-3

      Q1.   What is deflation and how is it characterized in terms of prices?

      Q2.   Identify causes of deflation and explain how they impact the economy.

15.6　Stagflation

John Maynard Keynes developed his theory of income and employment during the Great Depression of the 1930s when high unemployment plagued many developed capitalist economies like the United Kingdom and the United States. His ideas gained prominence in the 1950s and 1960s when inflation remained moderate, but unemployment was a significant concern. Keynesian economists advocated increasing aggregate demand and government expenditure to reduce unemployment. Conversely, during periods of high inflation, Keynesian policies recommended lowering aggregate expenditure to control price rises. These fiscal and monetary policies were effective in addressing either high inflation or high unemployment individually. However, stagflation—a condition where both high inflation and high unemployment occur simultaneously—posed a challenge to Keynesian demand-management strategies. This situation led to the emergence of an alternative economic approach known as Supply-Side Economics.

Stagflation was first identified in the 1970s when developed nations experienced a supply shock due to surging oil prices. In 1973, the Organization of the Petroleum Exporting Countries (OPEC) significantly raised oil prices, causing production costs to rise and triggering inflation. In the United States, between 1973 and 1975, rising fuel costs increased the prices of manufactured goods. Inflation soared to over 12% in 1974, while economic growth declined, causing a severe recession. During this period, the U.S. unemployment rate rose to nearly 9%, reflecting the simultaneous occurrence of inflation and economic stagnation.

India also faced oil price shocks in 1973 and 1979, leading to cost-push inflation. However, unlike in Western economies, India did not experience stagflation in the strictest sense during these years.

15.6.1 Causes of Stagflation

Economists attribute stagflation in developed capitalist economies during the 1970s and early 1980s to adverse supply shocks. The sharp rise in oil prices following the Arab-Israeli war in 1973 and the subsequent doubling of oil prices significantly increased energy costs. This led to higher production costs, reduced economic output, and persistent inflation, contributing to the stagflationary environment.
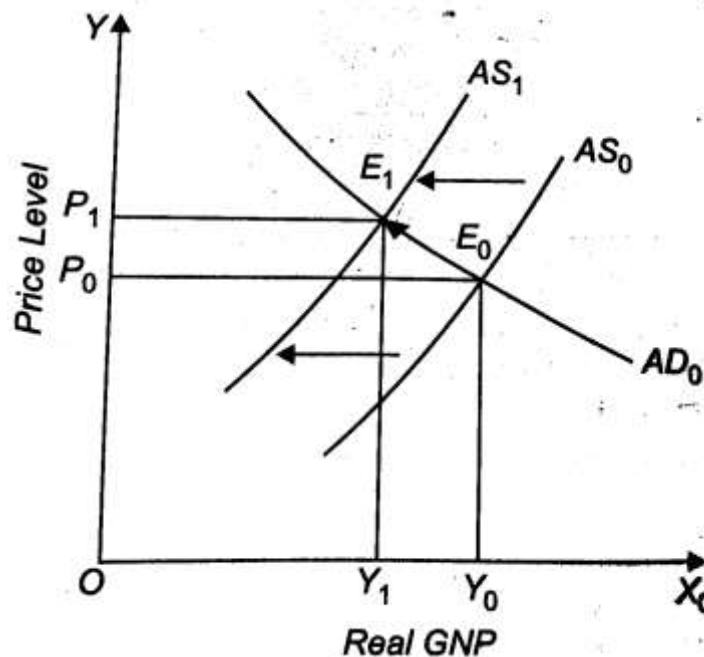
Figure (15.3) Stagflation Arising from an Adverse Supply Shock *(Ahuja, 2016, p.355)*

The impact of an adverse supply shock on the economy is illustrated in Fig. (15.3). Initially, aggregate demand (AD_0) and aggregate supply (AS_0) intersect at equilibrium point E_0, determining the price level at P_0. However, a sudden increase in oil prices raises production costs, causing the aggregate supply curve to shift leftward from AS_0 to AS_1, while aggregate demand remains unchanged. In the new equilibrium at E_1, the price level rises, and gross national product (GNP) declines to Y_1. This decline in GNP signifies an economic slowdown, leading to higher unemployment and a recession. Consequently, an adverse supply shock results in both rising inflation and increasing unemployment.

Self-Check Exercise-4

Q1. Define stagflation and explain why it is considered a challenging economic scenario.

Q2. What were the main causes of stagflation during the 1970s and early 1980s in developed economies?

15.7. Summary

This unit began with an overview of inflation, exploring its causes and different types, including demand-pull inflation, cost-push inflation, and structuralist inflation. Inflation is characterized by a general increase in prices, driven by excessive demand, rising production costs, or structural imbalances within the economy. In contrast, deflation refers to a widespread decline in the prices of goods and services, typically caused by reduced demand, lower production costs, or a contraction in the money supply. Additionally, the unit covered stagflation, a condition where high inflation and high unemployment coexist.

15.8. Glossary

- **Inflation:** Inflation refers to a general rise in price.

- **Demand-pull Inflation:** Demand-pull inflation is when growing demand for goods or services meets insufficient supply, which derives prices higher.

- **Cost-push Inflation:** Cost-push inflation occurs when we experience rising prices due to higher cost of production or higher cost of raw materials.

- **Structuralist Inflation:** Structuralist inflation accrues due to structural imbalance and rigidities in the economy.

- **Deflation:** Deflation refers to a general decline in prices for goods and services.

- **Stagflation:** Stagflation refers to a situation when a high rate of inflation occurs simultaneously with a high rate of unemployment.

15.9 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 15.3.

Answer to Q2. Refer to Section 15.3.

Answer to Q2. Refer to Section 15.3.1.

Self-Check Exercise-2

Answer to Q1. Refer to Section 14.4.1.

Answer to Q2. Refer to Section 15.4.2.

Answer to Q3. Refer to Section 15. 4.3.

Self-Check Exercise-3

Answer to Q1. Refer to Section 15.5.

Answer to Q2. Refer to Section 15.5.1.

Self-Check Exercise-4

Answer to Q1. Refer to Section 15.6.

Answer to Q2. Refer to Section 15.6.1.

15.10. References/Suggested Readings

- Ahuja, H.L. (2015), Macroeconomics: Theory and Policy. S. Chand.

- Branson, W.H. (1985). Macroeconomic: Theory and Policy. Universal Book Stall.

15.11. Terminal Questions

Q.1   Define Inflation. What are the types of Inflation?

Q.2   Explain Stagflation. What are the causes of stagflation?

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BUSINESS CYCLE

Structure

16.1.   Introduction

In this unit, we study the business cycle concept, which refers to the fluctuations in economic activity over time. These fluctuations are characterised by alternating periods of expansion and contraction in output, income, and employment. Business cycles are a common feature of free-market economies and influence economic stability and growth. Further, we examine the different phases of a business cycle, including expansion, peak, contraction, and trough. We also discuss the key features of business cycles and their impact on economic activity. Understanding business cycles helps analyse economic trends and formulate policies to manage economic fluctuations effectively.

Over the past two centuries, several free-market economies, such as the United States and Great Britain, have experienced significant economic growth. However, this growth has not followed a consistent or uninterrupted upward trajectory. While there has been a long-term increase in Gross National Product (GNP), short-term fluctuations in output, income, employment, and prices have occurred. Phases of rising income, output, and employment are known as expansion, upswing, or prosperity. In contrast, periods of declining income, output, and employment are referred to as contraction, recession, downswing, or depression. The economic history of capitalist economies demonstrates a recurring pattern of alternating expansion and contraction phases, commonly known as business cycles or trade cycles. The business cycle is also called the Trade Cycle. According to J.M. Keynes "A trade cycle is composed of periods of goods trade characterised by rising prices and low unemployment

percentages with periods of bad trade characterised by falling prices and high unemployment percentages".

16.2. Learning Objectives

After going through this lesson, you will be able to

- Define Business Cycle and its significance in economics.

- Identify the various phases of business Cycle.

16.3. Phases of Business Cycle

The business cycle consists of distinct phases that help in understanding economic fluctuations. Different economists have used various terms to describe these phases, but they generally include:

1. Expansion
2. Peak
3. Contraction
4. Trough

1. Expansion and Prosperity

During the expansion phase, economic activity increases as output and employment rise. Resources are utilized efficiently, and production reaches its highest potential. Unemployment is minimal, mainly limited to frictional and structural factors.
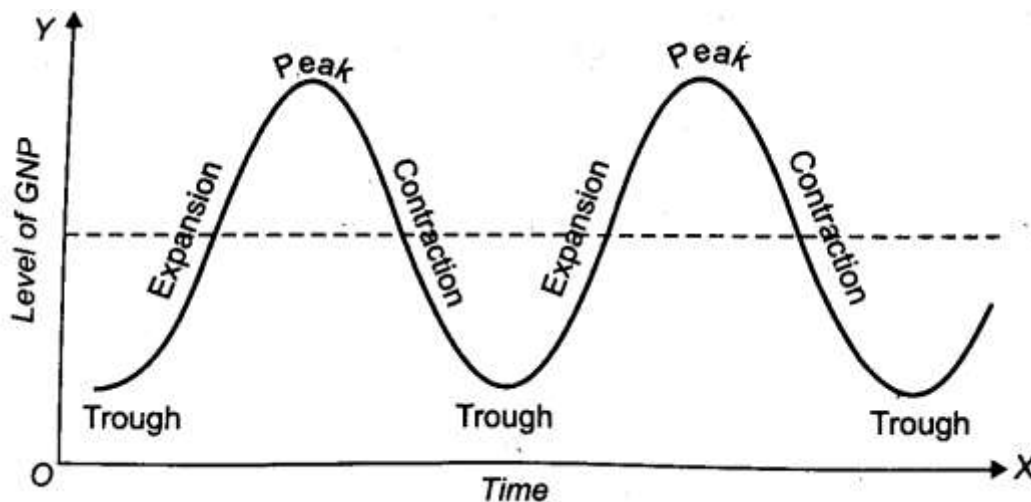
Fig (16.1). Phases of Business Cycle *(Ahuja, 2016, p.586)*

2. Peak

At this stage, economic growth reaches its highest point, marking the business cycle's peak. This phase represents the saturation point before a downturn begins.

3. Contraction and Recession

After the peak, economic activity starts to decline. This phase, known as contraction or recession, is characterised by a drop in GDP, rising unemployment, and reduced investment. Demand for goods and services decreases, often leading to falling prices. A notable aspect of this phase is the decline in interest rates due to lower demand for credit.

4. Trough and Recovery

The economy eventually reaches its lowest point, known as the trough. At this stage, capital stock depreciates, and outdated technology becomes obsolete. However, economic revival begins when investment increases, often driven by new technological advancements or supportive monetary policies. This marks the transition from recession back to expansion.

Self-Check Exercise-1

Q1.   What business cycle phase is characterised by maximum employment and production levels?

Q2.   During which phase does the economy experience a decline in both GNP and employment, often accompanied by falling prices?

Q3.   Which phase marks the lowest point of economic activity before the economy starts to recover?

16.4. Features of Business Cycle

1. **Recurring Nature**: Business cycles follow a repetitive pattern, occurring at regular intervals over time.

2. **Widespread Impact**: These cycles do not affect just one industry or sector but have a broad influence on the entire economy.

3. **Effect on Investment and Durable Goods**: Investments and purchases of durable goods, such as automobiles, houses, and appliances, tend to fluctuate significantly during different business cycle phases.

4. **Stability in Non-Durable Goods Consumption**: Unlike durable goods, the consumption of essential non-durable goods and services remains relatively steady across various business cycle phases.

5. **Changes in Inventory Levels**: One of the earliest signs of economic expansion or contraction is the change in business inventories, as companies adjust production based on demand.

6. **Profit Variability**: Business cycles significantly impact profits, which tend to experience greater fluctuations than other forms of income.

7. **Global Influence**: Economic fluctuations are not confined to a single country; business cycles often have international effects, influencing economies worldwide.

Exercise

Q.1   What do you mean by Business Cycle?

Q.2   Explain different phases of Business Cycle.

Self-Check Exercise-2

Q1.   What are the features of the business cycle?

16.5. Summary

In this unit, we explored the business cycle concept, which refers to the fluctuations in economic activity around its long-term equilibrium. We examined its phases—expansion, peak, contraction, and trough—and analysed how these fluctuations impact key financial variables such as output, income, employment, and prices. Additionally, we used diagrams to illustrate the cyclical nature of economic growth and decline.

16.6. Glossary

- **Business Cycle:** A recurring pattern of expansion and contraction in economic activity, measured by changes in employment, prices, and production.

- **Expansion:** Also known as an "economic boom," this phase is characterised by rising real GDP, increased employment, and growing business activity.

- **Peak:** The highest point of economic growth, where expansion reaches its maximum potential before slowing down.

- **Contraction:** Often referred to as a "recession," this phase involves a decline in real GDP, reduced employment, and lower economic activity.

- **Revival:** This is the stage when the economy begins recovering from a recession or depression, leading to renewed growth in production and employment.

16.7   Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 16.3.

Answer to Q2. Refer to Section 16.3.

Answer to Q3. Refer to Section 16.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 16.4.

16.8. References/Suggested Readings

- Ahuja, H.L. (2016), Macroeconomics: Theory and Policy. S. Chand.

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16.9. Terminal Questions

Q.1   What do you mean by Business Cycle? Explain its phases with the help of a diagram.

Q.2   Explain the Business Cycle? What are the features of Business Cycle?

*****

BALANCE OF PAYMENT

Structure

17.1. Introduction

In this lesson, we will discuss about Balance of Payment concerning to India's Balance of Payment. The Balance of Payment is the method by which countries measure all of the international monetary transactions within a certain period. The Balance of payment is divided into two major accounts, i.e., current account and capital account, which we will discuss further in this unit. With reference to Indian Balance of payment, we have divided India's BoP in two sections i.e., Pre-1991 BoP and Post 1991 BoP. Hence, in this unit, we will discuss about India's Balance of payment.

17.2. Learning Objectives

After going through this lesson, you will be able

*   Define Balance of Payment

*   To understand India's Balance of Payment

17.3. Balance of Payments

The balance of payments (BoP) is a comprehensive record of a country's economic transactions with the rest of the world over a specific period. It follows a double-entry system, documenting all receipts from exports of goods and services, capital inflows, and payments for imports, foreign services, and capital transfers. Unlike the balance of trade, which focuses solely

on merchandise imports and exports, the balance of payments encompasses all financial transactions between a country and other nations.

The BoP statement is divided into two main components: current account and capital account. The current account includes transactions related to goods, services, and income, while the capital account records financial transactions involving claims and liabilities that help finance current account deficits or absorb surpluses. The balance of these accounts is adjusted using (a) financial assistance from the International Monetary Fund (IMF), (b) allocation of Special Drawing Rights (SDRs) to supplement global reserves, and (c) the accumulation or depletion of a country's foreign exchange reserves. However, due to estimation errors, capital outflows, and other discrepancies, an item called "errors and omissions" is used to balance the statement. A negative value in this category indicates an overstatement of receipts or an understatement of payments, while a positive value suggests the opposite.

1. Current Account

The current account records trade in goods, services, and income flows. It is categorized into two broad segments:

- **Merchandise Trade:** Exports and imports of goods, typically recorded at free on board (FOB) value. However, in India's BoP, imports are reported on a cost, insurance, and freight (CIF) basis, while exports follow the FOB standard.

- **Invisibles:** This category includes services (such as transport, banking, and IT services), income (such as interest and dividends), and transfer payments (such as remittances), which are one-sided transactions without a repayment obligation.

2. Capital Account

The capital account in India is divided into three key sectors:

- **Private Capital:** Comprising long-term (foreign direct investment, portfolio investment, long-term loans, and foreign currency deposits) and short-term capital flows.

- **Banking Capital:** Reflecting changes in external financial assets and liabilities of banks authorised to deal in foreign exchange.

- **Official Capital:** Covering the Reserve Bank of India's holdings of foreign exchange reserves, monetary gold, and SDRs. It includes categories like loans, debt repayments (amortisation), and other government receipts and payments.

This classification helps in analysing a country's international financial position and its ability to manage external trade and capital flows effectively.

Self-Check Exercise-1

Q1. What is the primary difference between the balance of payments and the balance of trade?

Q2. Which accounts make up the balance of payments statement?

Q3. What is the purpose of the 'errors and omissions' item in the balance of payments?

17.4. India's Balance of Payments

17.4.1 The Pre-1991 Period

At the time of independence, India had a sterling balance of ₹1,733 crore. This surplus resulted from India's favorable trade balance with the United Kingdom during World War II, as Britain made extensive purchases from India to support its war efforts. Consequently, the country initially had a strong foreign exchange position. However, the post-independence years saw a surge in import demand due to previously suppressed wartime consumption, along with shortages of essential commodities such as food and raw materials. As a result, import expenditures increased significantly while export levels remained stagnant, leading to a trade deficit that was managed using the sterling reserves.

Economist Bimal Jalan classified the pre-1991 period into three distinct phases, based on the severity of the balance of payments situation, broader macroeconomic conditions, and foreign aid availability. He used two key indicators to assess the extent of the balance of payments challenge in any given year:

1. A current account deficit exceeding 1% of GDP.

2. Foreign exchange reserves falling below the equivalent of three months' worth of imports.

Based on these criteria, the pre-1991 period can be divided into the following three phases:

1. Phase I: 1956-57 to 1975-76

This phase, covering the Second, Third, and Fourth Five-Year Plans and the initial two years of the Fifth Plan, was marked by persistent balance of payments deficits and a severe shortage of foreign exchange. The country faced multiple economic shocks, including three wars (with China in 1962 and with Pakistan in 1965 and 1971), recurrent droughts (notably in 1965-66 and 1966-67), and the first global oil crisis of 1973. Despite strict import controls and stringent foreign exchange regulations, the current account deficit stood at 1.8% of GDP, while foreign exchange reserves remained inadequate, often below the minimum required for three months' worth of imports. However, India benefited significantly from concessional foreign aid, which helped finance nearly 92% of its current account deficit.

2. Phase II: 1976-77 to 1979-80

This short period is considered a relatively stable phase in India's balance of payments history. The country recorded a small current account surplus of 0.6% of GDP and maintained foreign exchange reserves sufficient to cover approximately seven months of imports.

3. Phase III: 1980-81 to 1990-91

This phase, which includes the Sixth (1980-85) and Seventh (1985-90) Five-Year Plans, saw increasing balance of payments challenges. The trade deficit remained high, averaging around ₹6,000 crore annually during the initial years of the Sixth Plan. By the final year of the plan (1984-85), the deficit had increased to ₹6,721 crore. The situation worsened further during the Seventh Plan, with trade deficits exceeding ₹9,000 crore per year in the first three years and rising above ₹12,000 crore in the last two years. By 1990-91, the trade deficit had reached a record ₹16,934 crore, putting immense pressure on India's external accounts.

While net invisible earnings helped offset part of the trade deficit—covering about 60% of the deficit during the Sixth Plan—this contribution declined to only 24% during the Seventh Plan. The Gulf crisis of 1990-91 exacerbated the balance of payments crisis, leading to a sharp drop in remittances and a rise in interest payments on external debt. This combination of factors

resulted in a current account deficit of ₹17,369 crore in 1990-91, highlighting the severity of India's external sector challenges before economic liberalization.

17.4.2 Balance of Payments Situation Since 1991

India's balance of payments (BoP) scenario after 1991 underwent significant changes compared to the previous periods. However, the years 1991-92 and 1992-93 were exceptions, with 1992-93 mirroring earlier trends. In that year, the current account deficit stood at 1.7% of GDP, similar to the 1.8% recorded between 1980-81 and 1990-91. Imports grew substantially at 15.4%, while export growth remained low at 3.3%. The foreign exchange reserves provided an import cover of only 4.9 months. A notable improvement in the BoP situation emerged in 1993-94. The current account deficit fell to just 0.4% of GDP, and foreign exchange reserves were sufficient to cover 8.5 months of imports. Additionally, external assistance exceeded the current account deficit, with net external aid amounting to $1,158 million. A significant boost came from export growth, which increased by 20.2% in dollar terms on a BoP basis, while imports rose by only 10%. Consequently, the current account deficit reduced from $3.5 billion in 1992-93 to $1.2 billion in 1993-94, signaling a turnaround in India's BoP position.

In 1994-95, the current account deficit remained low at 1.0% of GDP, and foreign exchange reserves covered 8.4 months of imports. However, industrial growth led to a sharp rise in imports, while export growth slowed slightly. The upward trend in imports persisted in 1995-96, driven by economic recovery, with imports increasing by 21.6%. Although exports grew by 20.3%, nearly matching imports, the current account deficit expanded from $3.4 billion in 1994-95 to $5.9 billion in 1995-96, reaching 1.7% of GDP. This was the only year in the post-reform period when foreign exchange reserves declined by $2.9 billion. The BoP situation improved in 1996-97, as the current account deficit reduced to $4.6 billion (1.2% of GDP), and reserves increased by $5.8 billion. However, 1997-98 saw the current account deficit widen to $5.5 billion (1.4% of GDP). Despite this, the BoP remained stable due to strong private capital inflows, resulting in reserve accumulation of $3.9 billion. In 1998-99, the current account deficit dropped to 1% of GDP, aided by a sharper decline in imports (7.1%). This year also saw reserve accumulation of $3.8 billion, ensuring a comfortable BoP position. In 1999-2000, the trade deficit increased to $17.8 billion, but higher earnings from invisibles reduced the current account deficit to $4.7 billion. Foreign exchange reserves rose by $6.14 billion. A similar trend continued in 2000-01, with reserves increasing by $5.84 billion.

A significant development occurred during 2001-02, 2002-03, and 2003-04, when India recorded a current account surplus for three consecutive years—an unprecedented event in the post-independence period. However, in 2004-05, the current account returned to a deficit of $2.47 billion (0.4% of GDP). Despite this, strong capital inflows, which surged from $17.34 billion in 2003-04 to $28.63 billion in 2004-05, led to a reserve buildup of $26.16 billion. In 2005-06, rising global oil prices contributed to a high trade deficit of $51.9 billion. Despite strong earnings of $42 billion from invisibles, the current account deficit increased to $9.9 billion (1.2% of GDP). The trend continued in 2006-07, with the trade deficit reaching $63.2 billion due to higher petroleum and non-petroleum imports. However, invisibles earnings of $53.4 billion kept the current account deficit at $9.77 billion. By 2007-08, the trade deficit widened further to $90.06 billion, driven by strong non-oil import demand and rising crude oil prices. Despite this, the invisibles sector, supported by private transfers and software exports, mitigated the impact. As a result, the current account deficit stood at $17.4 billion. This year also saw a surge in capital inflows, particularly from foreign direct investment (FDI), external commercial

borrowings, and portfolio investments. With capital inflows exceeding the current account deficit, foreign exchange reserves increased by $92.16 billion, providing an import cover of 15 months.

Self-Check Exercise-2

Q1. Discuss India's Balance of Payments pre-1991 period.

Q2. Write a short note on India's Balance of Payments since 1991.

17.5. Summary

This lesson explored the concept of the Balance of Payments (BoP) with a focus on India's BoP framework. The BoP is classified into two primary accounts: the Current Account and the Capital Account. The Current Account primarily tracks the export and import of goods, along with unilateral transfers made within a given year. In contrast, the Capital Account records transactions related to foreign assets and liabilities, reflecting the financial exchanges between a country and the rest of the world over the same period.

17.6. Glossary

- **Current Account:** The current account deals with country's short-term transactions. The current account consists of visible trade (export and import of goods), invisible trade export and import of services), unilateral transfers and investment income.

- **Capital Account:** The capital account is a record of the inflows and outflows of capital that directly affect a nation's foreign assets and liabilities. The capital account includes foreign investment and loans, banking and other forms of capital and changes in foreign exchange reserve.

- **Balance of Payment Deficit:** A balance of payment deficit in a country can arise if said country imports more capital goods and services than it exports. BoP deficit = (Current account + Capital account receipts) < (current account + capital account payment)

- **Balance of Payment Surplus:** Balance payment surplus occurs when a country's total exports are higher than it imports.

17.7 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 17.3.

Answer to Q2. Refer to Section 17.3.

Answer to Q3. Refer to Section 17.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 17.4.1.

Answer to Q2. Refer to Section 17.4.2.

17.8. References/Suggested Readings

- Misra, S.K., and Puri, V.K. (2020). Indian Economy. Himalaya Publishing House.

17.9. Terminal Questions

Q.1   Define BoP. Discuss its various accounts.

Q.2   Discuss the Indian Balance of Payment situation since 1991.

*****

RESERVE BANK OF INDIA

Structure

18.1. Introduction

This unit focuses on the Reserve Bank of India (RBI), which serves as the central bank of the country. The RBI plays a crucial role in overseeing the financial sector, including commercial banks, financial institutions, and non-banking financial companies. This unit will explore key functions of the RBI, its organizational structure, and its monetary policy framework. Additionally, we will examine the various monetary policy tools used by the RBI to regulate and supervise the financial system in India.

18.2. Learning Objective

After going through this lesson, you will be able to understand

- What are the major functions of RBI

- RBI: Monetary Policy

- Instruments of Monetary Policy

18.3. The Reserve Bank of India

The Reserve Bank of India (RBI) was founded as a shareholder-owned institution on April 1, 1935. It functioned in this capacity for nearly fourteen years. During this period, significant changes took place in the country. Following India's independence, the government aimed to implement planned economic development. As a result, the RBI was nationalized on January 1, 1949.

Q1. When was the Reserve Bank of India established?

Q2. What significant change occurred to the Reserve Bank of India on January 1, 1949?

18.4 Functions of RBI

Like other central banks, the Reserve Bank of India (RBI) carries out essential central banking functions. However, given the unique characteristics of India's developing economy, the RBI has also taken on developmental and promotional responsibilities. Below, we explore its primary functions.

(I) Core Functions of a Central Bank

The RBI was modeled after the Bank of England, and as a result, many of its core functions align with those of its British counterpart. These include:

1. Issuance of Currency

The RBI has the exclusive authority to issue currency in India. Initially, the issuance of currency followed the proportional reserve system, but this was later replaced by the Minimum Reserve System in 1956. Under this system, the RBI must maintain a minimum reserve of ₹200 crores, with at least ₹115 crores in gold and the remaining amount in foreign currency.

2. Government's Banker

Acting as the banker, agent, and advisor to both the central and state governments, the RBI manages government transactions, accepts deposits, and facilitates remittances and exchanges. It also provides short-term financial assistance, known as ways and means advances, which must be repaid within 90 days. Additionally, the RBI advises the government on economic policies, financial planning, and resource mobilization.

3. Banker to Banks

The RBI exercises regulatory control over commercial banks under the RBI Act, 1934, and the Banking Regulation Act, 1949. As per these regulations, banks included in the second schedule of the RBI are designated as scheduled banks. These banks must maintain a statutory minimum cash reserve with the RBI. Amendments in 1962 authorized the RBI to set the Cash Reserve Ratio (CRR) between 3% and 15% of total demand and time liabilities. The RBI also supports scheduled commercial and state cooperative banks by offering loans, advances, and bill discounting services.

4. Foreign Exchange Management

One of the RBI's responsibilities is to maintain stability in the external value of the Indian rupee. To achieve this, it manages the country's foreign exchange reserves and employs various monetary and fiscal strategies to regulate currency fluctuations.

5. Credit Regulation

Credit control is a fundamental function of the RBI, aimed at ensuring both exchange rate stability and price stability. The RBI has access to a range of quantitative and qualitative credit

control tools. However, due to structural constraints in India's financial markets, the impact of its monetary policies has been somewhat limited.

6. Agricultural Credit

Unlike central banks in developed nations, the RBI has played a direct role in supporting agricultural finance. Recognizing the importance of agriculture in India's economy, the RBI Act mandated the creation of a specialized Agricultural Credit Department. However, in 1982, the National Bank for Agriculture and Rural Development (NABARD) was established, taking over the majority of the RBI's agricultural credit responsibilities.

7. Data Collection and Reporting

The RBI is responsible for compiling and disseminating financial and economic data. Among its key publications are the RBI Bulletin and the Report on Currency and Finance, which provide insights into banking, monetary policy, and financial sector trends.

Self-Check Exercise-2

Q1.   What are the important functions of the Reserve Bank of India (RBI)?

Q2.   How does the RBI act as the "banker's bank" and what responsibilities does this entail?

Q3.   What is the RBI's role in exchange management and control, and why is it important?

18.5   Developmental and Promotional Functions

With the advent of planned economic development after independence, the role of the Reserve Bank of India (RBI) expanded significantly to support national economic growth. Over time, it has undertaken various developmental and promotional responsibilities, including:

1. **Encouraging Savings and Investments**: The RBI promotes savings by facilitating the growth of banking and financial institutions, ensuring that these resources are directed toward productive economic activities.

2. **Expanding Banking Services in Rural Areas**; To reduce reliance on informal moneylenders, the RBI has encouraged commercial banks to extend their operations into semi-urban and rural regions, making financial services more accessible to a broader population.

3. **Institutionalizing Agricultural Credit**; Recognizing agriculture's critical role in India's economy, the RBI has been actively involved in establishing structured credit facilities for farmers. A key milestone in this regard was the creation of the National Bank for Agriculture and Rural Development (NABARD) on July 12, 1982.

4. **Supporting Industrial Growth**: Industrialization is a key measure of economic development, and the RBI has played a central role in promoting specialized financial institutions. At the government's initiative, it contributed to setting up organizations such as the Industrial Development Bank of India (IDBI), which was initially a subsidiary of the RBI before becoming an independent entity.

Self-Check Exercise-3

Q1.   Discuss the developmental and promotional functions of RBI.

18.6   Monetary Policy of the Reserve Bank of India

"…..the primary objective of monetary policy is to maintain price stability while keeping in mind the objective of growth." Preamble to the Reserve Bank of India Act, 1934.

The Reserve Bank of India Act, 1934 (as amended in 2016) assigns the RBI the responsibility of formulating and implementing monetary policy. The fundamental goal of this policy is to ensure price stability while also supporting economic growth.

18.6.1 Instruments of Monetary Policy

To achieve its monetary policy objectives, the RBI employs a range of direct and indirect instruments, including:

1. **Repo Rate:** This is the interest rate at which the RBI provides liquidity to banks under the Liquidity Adjustment Facility (LAF), using government and other approved securities as collateral.

2. **Standing Deposit Facility (SDF) Rate:** This rate applies to uncollateralized overnight deposits accepted by the RBI from LAF participants. It also serves as a financial stability tool and liquidity management measure. Introduced in April 2022, the SDF rate is set 25 basis points below the repo rate, effectively replacing the fixed reverse repo rate as the lower bound of the LAF corridor.

3. **Marginal Standing Facility (MSF) Rate:** This is the rate at which banks can obtain overnight funds from the RBI by utilizing their Statutory Liquidity Ratio (SLR) holdings up to a specified limit (2%). It acts as a safeguard against sudden liquidity shortages and is positioned 25 basis points above the repo rate.

4. **Liquidity Adjustment Facility (LAF):** Through LAF operations, the RBI manages liquidity in the banking system via tools such as repo, reverse repo, SDF, and MSF, conducted at fixed or variable rates. Other liquidity management instruments include Open Market Operations (OMOs), forex swaps, and the Market Stabilization Scheme (MSS).

5. **LAF Corridor:** This framework consists of the MSF rate as the upper limit (ceiling), SDF rate as the lower limit (floor), and the repo rate at the center.

6. **Main Liquidity Management Tool:** The primary liquidity tool involves a 14-day variable rate repo/reverse repo auction aligned with the Cash Reserve Ratio (CRR) maintenance cycle to address short-term liquidity fluctuations.

7. **Fine-Tuning Operations:** In addition to main liquidity operations, fine-tuning measures—including overnight or longer-tenor liquidity adjustments—are used to handle unexpected liquidity shifts. If required, the RBI also conducts longer-term variable rate repo/reverse repo auctions beyond 14 days.

8. **Reverse Repo Rate:** The interest rate at which the RBI absorbs surplus liquidity from banks by securing government securities as collateral under LAF operations. With the introduction of SDF, reverse repo operations are now conducted at the RBI's discretion as per specific policy requirements.

9. **Bank Rate:** This is the rate at which the RBI rediscounts bills of exchange and other commercial papers. It also functions as a penalty rate for banks failing to meet reserve requirements (CRR and SLR). The Bank Rate is aligned with the MSF rate and adjusts automatically with changes in the MSF and repo rates.

10. **Cash Reserve Ratio (CRR):** Banks are required to maintain a minimum average balance with the RBI, expressed as a percentage of their Net Demand and Time Liabilities (NDTL), based on figures from the last Friday of the second preceding fortnight. This requirement is subject to periodic adjustments by the RBI via notifications in the Official Gazette.

11. **Statutory Liquidity Ratio (SLR):** Banks must hold a specific proportion of their demand and time liabilities in designated liquid assets such as unencumbered government securities, cash, or gold. The exact percentage is set by the RBI through official notifications.

12. **Open Market Operations (OMOs):** The RBI purchases or sells government securities outright to adjust long-term liquidity in the financial system.

18.6.2. Quantitative and Qualitative Methods of Monetary Policy

Quantitative methods focus on managing the total volume of credit extended by commercial banks across different sectors of the economy. In contrast, qualitative methods regulate both the amount of credit and the specific purposes for which banks provide loans to various sectors.

Table 18.1

Quantitative and Qualitative Methods

Parameter	Quantitative Methods	Qualitative Methods
Methods	1. Bank Rate 2. Statutory Liquidity Ratio (SLR) 3. Cash Reserve Ratio 4. Open Market Operation (OMO) 5. Repo rate 6. Reverse Repo Rate 7. Liquidity Adjustment Facility 8. Standing Deposit Facility (MSF) 9. Long Term Repo 10. Market Stabilisation Scheme (MSS)	1. Marginal requirements 2. Regulation of consumer credit 3. Rationing of Credit 4. Moral Suasion 5. Direct Action

We have discussed the quantitative methods of monetary policy above. Let us discuss the qualitative methods of monetary policy one by one.

- **Change in Marginal Requirement:** Marginal requirement represents the gap between the present market value of the collateral provided for a loan and the loan amount

sanctioned. It serves as a qualitative credit control measure implemented by the central bank to regulate economic fluctuations such as inflation and deflation.

- **Regulation of Consumer Credit**

  Consumer credit supply is regulated by the installment of sale and hire purchase of consumer goods. Features such as installment amount, down payment, loan period, and so on are all pre-determined, which aids in the control of credit and inflation in the country. For Instance, for a home loan, the RBI can set a minimum down payment limit of 15%. Therefore, for a home loan of 1 crore, Rs. 15 lakhs must be paid as a down payment and to avail 85 lakhs as a loan.

- **Rationing of Credit**

  Rationing of credit is a qualitative method by which the central bank of a country seeks to limit the maximum amount of loans and advance and in certain cases fix ceilings for specific categories of loans and advances.

- **Moral Suasion**

  Moral suasion is a qualitive method used by the central bank for moral influence on the commercial banks. It includes, advice, suggestions, and persuasion with the commercial banks to co-operate with the central bank. The success of this method depends on the co-operation between commercial banks and the central bank of a country.

- **Direct Action**

  Direct action is a qualitative method through which the central bank (RBI) can punish and impose sanctions on banks for not following guidelines issued under monetary policy.

Central Board Of Directors

Governor
↓
Deputy Governors
↓
Executive Directors
↓
Principal Chief General Manager
↓
Chief General Managers
↓
General Managers
↓
Deputy General Managers
↓
Asstt. General Managers
↓
Managers
↓
Asstt. Managers
↓
Support Staff
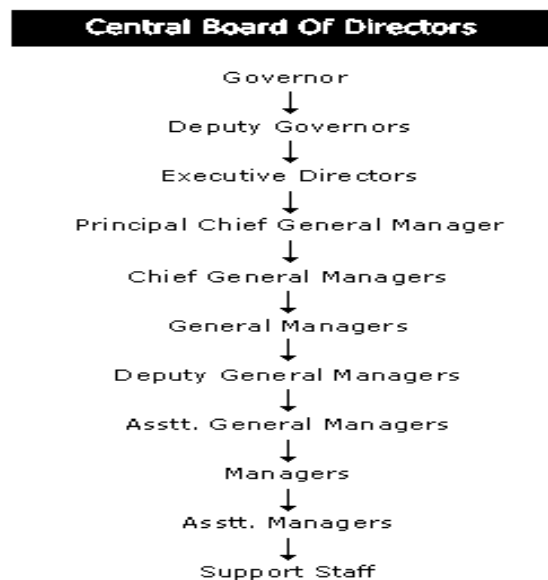
RBI Organization Chart

Self-Check Exercise-4

Q1. What is the primary objective of the monetary policy of the Reserve Bank of India? How does it aim to achieve this objective?

Q2. Explain the role of the following monetary policy instruments:

(a) Repo Rate

(b) Cash Reserve Ratio (CRR)

(c) Open Market Operations (OMOs)

Q3. Differentiate between quantitative and qualitative methods of monetary policy, providing examples of each.

18.7. Summary

This unit began with an introduction to the Reserve Bank of India (RBI), which serves as the central bank of the country. The RBI carries out key functions such as issuing currency, acting as a banker to both commercial banks and the government, managing foreign exchange, and regulating credit. Through various monetary policy tools—including the Repo Rate, Reverse Repo Rate, Marginal Standing Facility, Fine-Tuning Operations, Statutory Liquidity Ratio, and Open Market Operations—the RBI oversees and stabilizes the financial sector. As a central authority, it plays a crucial role in fostering economic growth and maintaining financial stability in the country.

18.8. Glossary

- **Minimum Reserve System:** This system requires the Reserve Bank of India (RBI) to maintain a minimum reserve of ₹200 crore at all times. Out of this, ₹115 crore must be held in gold or gold bullion, while ₹85 crore should be in foreign currencies.

- **Ways and Means Advance:** A temporary financial support mechanism provided by the RBI to the government to bridge short-term gaps between revenue inflows and expenditures.

- **Monetary Policy:** A macroeconomic strategy implemented by the central bank to regulate money supply and interest rates. It is a key tool for managing inflation, liquidity, economic growth, and overall financial stability in the country.

18.9. Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 18.3.

Answer to Q2. Refer to Section 18.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 18.4.

Answer to Q2. Refer to Section 18.4.

Answer to Q3. Refer to Section 18.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 18.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 18.6.

Answer to Q2. Refer to Section 18.6.1.

Answer to Q3. Refer to Section 18.6.2.

18.10. References/Suggested Readings

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18.11. Terminal Questions

Q.1   What are the significant functions of RBI?

Q.2   What are the instruments of RBI's monetary Policy? How do these instruments help RBI to supervise the country's financial system?

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GROWTH OF INDIAN ECONOMY SINCE 1950

Structure

19.1.   Introduction

19.2.   Learning Objectives

19.3.   Indian Economy: Pre-Independence Period

Self-Check Exercise-1

19.4.   Growth of Indian Economy: Post Independence Period

Self-Check Exercise-2

19.5.   Summary

19.6.   Glossary

19.7.   Answers to Self-Check Exercise

19.8.   References/Suggested Readings

18.9.   Terminal Questions

19.1.   Introduction

This unit explores the growth and structural transformations in the Indian economy since 1950. The study material is structured to provide you with a concise overview of these changes, offering a broad perspective on the evolving economic landscape of India. Since it is not possible to deal with every dimension of the economy in detail in the limited space available here, you are advised to go through the suggested books and other study material as given in the syllabus and at the end of each lesson. This lesson is, devoted to the study of the growth of Indian economy since 1950 and some other related issues.

19.2   Learning Objectives

After going through this unit, you will be able-

- To comprehend the significant milestones and challenges encountered by the Indian economy since, 1950.

- To study growth and structural changes in the Indian Economy since 1950.

19.3   Indian Economy: Pre Independence Period

During the colonial era, government's economic policies in India were concerned more with protecting and promoting British interests rather than with advancing the welfare of the Indian population. The administration's primary pre-occupation was with maintaining law and order, tax-collection and defence. These activities absorbed the bulk of meager public revenues. As for development, government adopted basically laissez-faire attitude. The government supported and encouraged large investment in building the railway network. Public investment in irrigation, roads, education and other development-oriented infrastructure was very limited.

There was no positive government policy to promote indigenous industry. Indeed it is believed that government policies, far from encouraging development, were responsible for decline and disappearance of much of India's traditional industry. There was some shift in atitudes especially since the 1930s signalling a more active interest in development problems; but this did not make any significant difference. The pre-independence era was marked by minimal economic growth and stagnation in India.

At the time of independence, the Indian economy was trapped in a persistent cycle of poverty, marked by extremely low per capita income and consumption compared to other nations. Insufficient income levels led to minimal savings and weak capital formation, resulting in low labor productivity. This, in turn, kept incomes stagnant, reinforcing the cycle of poverty across the country.

Independence for India meant its simultaneous partition. The country which had for long remained a single, unified economic unit and whose economy was based on inter-regional specialisations and dependence was divided along communal lines.

At the time of independence, India's economy was predominantly rural and agrarian. Around 85% of the population resided in villages, relying on agriculture and allied activities, primarily using traditional, low-efficiency methods. The adoption of modern inputs like fertilizers was minimal, and irrigation covered only a small fraction of cultivated land. The economic backwardness was evident in the imbalanced occupational structure, with nearly 70% of the workforce engaged in agriculture. Despite this, the nation struggled with food insecurity and lacked sufficient raw materials for industrial growth. At independence, India still had a traditional agriculture. For most farmers, techniques of production were on the whole those of many generations past. There were, in 1947, a few hundred tractors in all of India's agricultural operations involving about sixty five million rural households. The per-acre usage of fertilizers in India was significantly lower than in other countries, leading to reduced agricultural productivity.

The Indian economy experienced near stagnation during the pre-independence era. This period was marked by widespread indebtedness, stagnant national and per capita income, limited growth incentives, and a low standard of living for the majority of the population. As the First Five Year Plan 1951-56 document states, "This is primarily because the basic conditions under which the economy can continuously expand have been lacking. The impact of modern industrialism in the latter half of the 19th century was felt in this country initially through imports of machine-made goods, from abroad which reacted adversely on the traditional pattern of economic life, but did not create the impulse for development along new lines. The transition that followed was characterized not by expansion of industry and a diversification of economic structure but by a decay of India's traditional arts, crafts and industries and by an increasing pressure of population on the land. This retrogression led to a decline in productivity per person engaged in agriculture, the adverse effects of which were perhaps softened to some extent by the shock absorbing capacity of the old institution of the joint family. The result was a continuous increase in under-employment and the growth of an attitude of 'pathetic contentment on the part of the people. In such an environment there could be little economic or social progress."

The basic philosophy that guided the Indian economy during the post independence era was basically rooted in a mixed economic regime in which public sector had a primacy over private sector, centralized democratic economic planning wedded to the goals of a socialistic pattern of society. When the planning process was initiated in India, there was a legacy of pre-

independence debate on India's development problems. This debate centred around the Gandhian approach, an approach that always talked about the voluntary check of wants, the need for having self reproducing village communities, and about issues bearing on a better balance between man and nature, and the 'modernizing' approach of Nehru. The Gandhian approach has never been seriously discussed by either mainstream economists or by its left-wing critics. Thus the modernizing school under Nehru won the day as their 'scientisin' seemed more compatible with the ideological priorities involved in building up a post-colonial' nation-state, although some vestigial traces of the alternative approach remain in the attitude of certain small scale industries such as hand spinning, generally known as the 'tiny sector. (Development Planning by S. Chakravarty, pp. 7-9). The contemporary writers have called it as the Nehruvian model of planning. The first three five year plans bore the personal imprint of Nehru. These three plans, especially the Second Plan, reflected a major watershed in India's economic thinking.

Self-Check Exercise-1

Q1.   Explain the economic conditions of India at the time of independence. What were the major challenges faced by the Indian economy during this period?

Q2.   Explain the concept of the "vicious circle of poverty" as it applied to the Indian economy at the time of independence. What were the key factors perpetuating poverty according to this concept?

19.4. Growth of Indian Economy: Post Independence Period

An analysis of India's economic growth over the past six decades does not paint an entirely optimistic picture. During the early days after independence, the economy traversed through a centrally controlled path, guided by the Nehruvian model. The public sector played a pivotal role in guiding the economy through challenges and striving to achieve the nation's developmental goals. But the public sector did not prove itself up to the task. The country also had to face unforeseen difficulties like wars with neighbors and other natural calamities. Changes were effected in the strategies as well as a result of this in the policies and policy-instruments that decelerate the growth of the economy. (You shall read about different policies in subsequent lessons).

Rather than delving into the specifics of the planning process and growth strategies, we will first examine traditional indicators such as national income and per capita income to evaluate economic progress. In addition to national income growth, shifts in the industrial composition of the national product and changes in occupational income patterns are key measures of economic development.

Growth Performance:

As stated earlier, a very important indicator of the growth performance of an economy is the growth of the national income and per capita income over a period of time. Table 18.1. and Table 18.2 given below presents the growth of Gross National Product (GNP), Net National Product (NNP) and Per- Capita net national product of India from 1950-51 onwards.

In the year 1950-51 the gross national product of India was Rs. 9506 crores at current prices and Rs. 139912 crores at 1993-94 prices. The net national product at factor cost was Rs. 9142 crores and Rs. 132367 crores at current and 1993-94 prices respectively in the same year. The Gross National Product, (GNP) at current prices increased to Rs. 16148 crores in 1960-61,

Rs. 41936 crores in 1970-71, Rs. 130523 crores in 1980-81, Rs. 503409 crores in 1990-91 and to Rs. 1746407 crores in 1999- 2000. The estimates as per new series (base year 199-2000) put the GNP figures at Rs. 1902682 crores in 2000-01 and Rs. 3225963 crores in 2005-2006 (Quick estimates). The Per-capita income increased from Rs. 255 in 1950-51 to Rs. 15625 in 1999-2000. The new series estimates per capita income at Rs. 25716 in 2005-2006 (Q) at current price and RS. 20734 at 1999-2000 prices. The Index numbers of Net National Product (NNP) and per-capita Net National Product given in Table 1.1 also given you're an indication of the growth of NNP and Per capita income since 1951.

Table 19.1

Gross National Product and Net National Product

| | Gross National at factor cost (Rs. Crore) | | Net National product at factor cost (Rs. Crores | | Per capita net national producer (Rs.) | | Index number (1950-51 =100) | | | |
| | | | | | | | National Product | | Per capita net national product | |
	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices
1	2	3	4	5	6	7	8	9	10	11
1950-5!	9506	139912	9142	132367	255	2687	100.0	100.0	100.0	100.0
1051-52	10045	143399	9634	135551	264	3714	105.0	101.4	103.6	100.7
1952-53	9916	147544	9474	139379	255	3747	103.6	105.3	100.0	101.6
1953-54	10805	156590	10341	148159	273	3909	113 .1	111.9	107.1	106.0
1954-55	10139	163126	9628	154184	249	3994	105.3	116.5	98.0	108.3
1955-56	10322	167535	9776	158001	249	4020	106.9	119.4	97.7	109.0
1956-57	12317	177006	11706	166793	292	4150	128.0	1260	114.6	112.8
1957-58	12590	174756	11928	163902	292	4007	130.5	123.8	114 6	1087
1958-59	14071	187925	13299	176483	318	4222	145.5	I33J	124.9	114.5
1959-60	14759	191717	13916	179592	327	4216	152.2	135.7	128.3	114.3
1960-61	16148	205196	15204	192235	350	4429	166.3	145.2	137.6	120.1
1961-62	17018	211287	15900	197514	359	4449	174.6	149.2	141.1	120.7
1962-63	18194	215601	17029	200895	375	4425	186.3	1518	147.3	120.0
1963-64	20804	226577	19491	210946	420	4546	211.2	159.4	165.0	123.3

	Gross National at factor cost (Rs. Crore)		Net National product at factor cost (Rs. Crores		Per capita net national producer (Rs.)		Index number (1950-51 =100)			
							National Product		Per capita net national product	
	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices
1	2	3	4	5	6	7	8	9	10	11
1964-65	24291	243472	22814	226640	481	4781	249.5	1711	189.0	129.7
1965-66	25422	234394	23752	216244	490	4459	259.8	163.4	191.3	120.9
1966-67	28893	236946	26918	217427	544	4392	294.4	164.3	213.5	119.1
1967-68	33967	255843	31745	235418	627	4653	347.2	177.9	246.4	126.2
1968-69	35877	262687	33421	241234	645	4657	365 6	1822	253.4	126.3
1969-70	39420	279791	36742	257359	695	4865	401 9	194.4	271.7	131.9
1970-71	41938	293933	38968	270597	720	5002	426.2	104.4	282.8	135.7
1971-72	44632	296688	41340	272252	746	4914	452.2		293.0	133.3
1972-73	49113	295752	45392	270061	801	4765	496.5		314.4	129.2
1993-74	60235	309950	55896	283961	964	4880	611.4	213.5	378.4	131.4
1974-75	70992	314509	65432	280217	1102	4830	715.7	216.4	433.3	131.0
1975-76	75454	343173	f9005	313643	1137	5167	754.8	236.9	446.4	140.1
1976-77	81148	347530	74242	316358	1197	5103	312.1	239.0	470.2	138.4
1977-71	92648	373464	85151	340751	1343	5375	931.4	257.4	527.4	145.8
1978-79	99667	394335	91094	359732	1406	5551	996.4	271.8	552.0	150.6
1979-80	109080	374640	98631	338124	1485	5092	1078.8	255.4	583.3	138.1
1980-81	130523	401970	118236	363417	1741	5352	1293.3	274.6	683.8	145.2
1981-82	152096	425168	137388	334392	1985	5555	15028	290.4	779.6	150.7
1982-83	168891	436577	151716	393274	2143	5555	1659 5	297.1	841.5	150.7

	Gross National at factor cost (Rs. Crore)		Net National product at factor cost (Rs. Crores		Per capita net national producer (Rs.)		Index number (1950-51 =100)			
							National Product		Per capita net national product	
	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices	At Current Prices	At 1993-94 Prices
1	2	3	4	5	6	7	8	9	10	11
1983-84	197686	469293	178121	423265	2464	5864	1948.3	319.8	967.4	158.8
1984-85	221281	489206	198794	440119	2690	5956	2174.4	332.5	1056.3	161.5
1985-86	248118	511058	221401	459l85	2932	6082	2421.7	346.9	1151.5	165.0
1986-87	276453	532021	246064	477158	3191	6189	2691.5	260.5	1253.2	167.9
1987-88	313374	551409	279400	493312	3546	6260	3056.1	372.7	1392.3	169.8
1988-89	373995	607207	334302	545572	4153	6777	3656.6	412.2	1630.7	193.8
1989-90	432289	648108	385729	582518	4693	7087	4219.1	440.1	1842.7	192.2
1990-91	503409	683670	450145	614206	5365	7321	4923.7	464.0	2106.8	198.5
1991-92	579009	691143	514607	617372	6012	7212	5628.8	466.4	2360.7	105.6
1992-93	661576	726375	587064	648182	6732	7433	6421.4	489.7	2643.7	201.6
1993-94	769265	769265	685912	685912	7690	7690	7502.6	518.2	3019.5	208.6
1994-95	903975	824816	8059981	734358	8857	8070	8815.9	554.8	3477.9	218.9
1995-96	1059787	886961	941861	787809	10149	8489	10302.2	595.2	3985.4	230.2
1996-97	1230465	959359	1093962	8620B4	11564	9007	11965.9	643.7	4541.0	244.3
1997-98	1376943	1005946	1224946	891086	12707	9244	13398.6	673.2	4989.7	250.7
1998-99	1583159	1070773	1415093	948580	14396	9650	15478.5	716.6	5652.9	261.7
1999-00	1746407	113785	1564048	1008114	15625	10071	1707.7	761.6	6135.5	273.1

New Series base year 1999-2000										
	At Current Prices	At 1999-2000 Prices	At Current Prices	At 1999-2000 Prices	At Current Prices	At 1999-2000 Prices	At Current Prices	At 1999-2000 Prices	At Current Prices	At 1999-2000 Prices

1999-00	1771094	1771094	1585501	1585501	15839	15839	100.0	100.0	100.0	100.0
2000-01	1902682	1842228	1696387	1643098	16648	16133	107.0	103.7	105.1	101.9
2001-02	2080119	1952241	1847667	1739876	17800	16762	116.5	109.7	112.4	105.8
2002-03	2248614	2028928	1993846	1801130	18899	17075	125.8	113.6	119 3	107.8
2003-04	2531168	2204746	2246465	1959609	20936	18263	141.7	123.4	132.1	115.3
2004-05(P)	2833558	2367711	2601067	2103350	22946	19297	157.7	132.7	144.9	121.8
2005-06(Q)	3225963	2580761	2846762	2295243	25716	20734	179.5	144.8	162.4	130.9

19.2   Annual Growth Rate of Gross national Product and Net National Product

(Percent)

Year	Gross National Product at factor cost		Net National Product at factor cost		Per capita net national product	
	At current prices	At 1992-94 Prices	At current prices	At 1992-94 Prices	At current prices	At 1992-94 Prices
1	2	3	4	5	6	7
1951-52	5.7	2.5	5.4	2.4	3.6	0.7
1952-53	-13	2.9	-1.7	2.8	-3.5	0.9
1955-54	9.0	6.1	9.1	6.3	7.1	4.3
1954-55	-6.2	4.2	-6.9	4.1	-8.6	2.2
1955-56	1.8	2.7	1.5	2.5	-0.3	0.7
1956-57	19.3	5.7	19.7	5.6	17.4	3.5
1957-58	2.2	-1.3	1.9	-1.7	-0.1	-3.7
1958-59	11.8	7.5	11.5	7.7	9.1	5.4
1959-60	4.9	2.0	4.6	1.8	1.7	-0.1
1960-61	9.4	7.0	9.3	7.0	7.1	5.1
1961-62	5.4	3.0	5.0	17	1.6	0.4
1962-63	6.9	2.0	6.7	1.7	4.4	-0.5
1963-64	14.3	5.1	14.3	5.0	11.0	2.7
1964-65	16.8	7.51	17.0	7.4	14.6	5.2
1965-66	4.7	-3.7	4.1	-4.6	1.8	-6.6
1966-67	13.7	1.0	13.3	0.5	11.0	-1.5
1967-68	17.6	8.0	17.9	8.3	15.4	5.9
1968-69	5.5	2.7	5.3	1.5	2.8	0.1
I969-70	10.0	6.5	9.9	6.7	7.7	4.5

1970-71	6.4	5.1	6.1	5.1	3.7	1.8
1971-72	6.4	0.9	6.1	0.6	3.6	-1.7
1972-73	10.0	-0.3	9.8	-0.8	7.3	-3.1
1973-74	22.6	4.8	23.1	4.8	20.4	2.3
1974-75	17.9	1.5	17.1	1.2	14.5	-1.0
1975-76	6.3	9.1	5.5	9.5	3.0	7.0
1976-77	7.5	1.3	7.6	0.9	5.3	-1.2
1977-78	14.2	7.5	14.7	7.7	12.2	5.3
1978-79	7.6	5.3	7.0	5.4	4.7	3.3
1979-80	9.4	-5.0	8.3	-6.0	5.7	-8.3
1980-81	19.7	7.3	19.9	7.5	17.2	5.1
1981-82	16.5	5.8	16.2	5.8	14.0	3.8
1982-83	11.0	2.7	10.4	2.3	7.9	0.0
1983-84	17.0	7.5	17.4	7.6	15.0	5.4
1984-85	11.9	4.2	11.6	4.0	9.2	1.7
1985-86	12.1	4.5	11.4	4.3	9.0	2.1
1986-87	11.4	4.1	11.1	3.9	8.8	1.1
1987-88	13.4	3.6	13.5	3.4	11.1	1.2
1988-89	19.2	10.1	19.6	10.5	17.1	8.3
1989-90	15.6	6.7	15.4	6.8	13.0	4.6
1990-91	16.5	5.5	16.7	5.4	14.3	3.3
1991-92	15.0	1.1	14.3	0.5	12.0	-1.5
1992-93	14.3	5.1	14.1	5.0	12.0	3.1
1993-94	16.3	5.9	16.8	5.8	14.2	3.4
1994-95	17.5	7.2	17.5	7.1	15.2	4.9
1995-96	17.2	7.5	16.9	7.3	14.6	5.2
1996-97	16.1	8.2	16.1	8.2	1.39	6.1
1997-98	11.9	4.9	12.0	4.6	9.9	2.8
1998-99	15.0	6.4	15.5	6.5	13.3	4.4
1999-00	10.3	6.2	10.5	6.3	8.5	4.4

New Series base year 1999-2000						
	At current prices	At 1992-94 Prices	At current prices	At 1992-94 Prices	At current prices	At 1992-94 Prices

2000-01	7.4	4.0	7.0	3.7	5.1	1.9
2001-02	9.3	8.0	8.9	5.8	6.9	3.9
2002-03	8.1	3.9	7.9	3.5	6.2	1.9
2003-04	12.6	8.7	12.7	8.8	10.8	7.0
2004-05(P)	11.9	7.4	11.3	7.3	9.6	6.7
2005-06(Q)	113.8	9.0	13.8	9.1	12.1	7.4

Annual Average Growth Rates						
First Plan (1951-56)	1.8	3.7	1.5	3.6	-0.0	1.8
Second Plan (1956-61	9.5	4.2	9.4	4.1	7.3	2.0
Third Plan (1961-66)	9.6	2.8	9.5	2.5	7.1	0.2
Three Annual Plans (1966-69	12.2	3.9	12.2	3.8	9.8	1.5
Fourth Plan (1969-74)	11.1	3.4	11.0	3.3	8.5	1.0
Fifth Plan (1974-79)	10.7	5.0	10.4	5.0	7.9	2.7
Annual Plan (1979-80)	9.4	-5.0	8.3	-6.0	5.7	-8.3
Sixth Plan (1980-85)	15.2	5.5	15.1	5.4	12.7	3.2
Seventh Plan (1985-90)	14.4	5.8	14.2	5.8	11.8	3.6
Two Annual Plans (1990-92)	15.7	3.3	15.5	3.0	13.2	0.9
Eighth Plan (1992-97)	16.3	6.8	16.3	6.7	14.0	4.6
Ninth Plan (1997-2002)	10.7	5.5	10.8	5.5	8.8	3.5

P : Provisonal estimates.   Q : Quick Estimates

Note : Growth rate from 2000-01 based on new series with base year 1999-2000

An analysis of the annual growth rates of GNP, NNP, and per capita NNP (Table 1.2) reveals significant fluctuations. However, it can be observed that the growth rates of GNP and NNP remained relatively low during the initial three decades, particularly at base prices. The growth of per capita income was even slower due to the higher population growth rate. Despite occasional years of strong national income growth, this period was often described as being influenced by the 'Hindu Rate of Growth'. The subsequent phase witnessed the achievement of a higher growth trajectory by the economy.

Considering plan-wise national income trends, one would notice some interesting facts which remain concealed when only trend rate is used to gauge India's development performance up to the fifth FYP, Net National product at factor cost (1999-2000 Price) grew at less than 4.00 per cent, baring second FYP during which average annual growth rate was

marginally above 4.00 per cent. After Fifth FYP, the rate of growth was above 5.00 per cent. The annual average rate of growth of per-capita income also looked up after 1980. According to the national income data released by the Central Statistical Organization (CSO), the advance estimates for growth of GDP at factor cost at constant (1999-2000) prices in 2005-06 at 8.1 per cent was up 0.6 percentage points over the 7.5 per cent growth recorded in 2004-05. For 2004-05, the growth of GDP at factor cost at 1999-2000 prices was higher than the 6.9 per cent during the earlier year. The advanced estimates showed a growth of 9.2 per cent during 2006-07, initially estimated at 8.1 percent in Feb. 2006, was revised upward to 8.4 per cent in May 2006, and further to 9.0 per cent in quick estimates released by the CSO on Jan 31, 2007.

The increase in economic growth in recent years is evident in the Eleventh Five-Year Plan, which set an average annual growth target of 9.0%, compared to the Tenth Plan's target of 8.0%. This adjustment was influenced by the slow 3.8% growth in the Plan's first year, followed by a significant rise to an average of 8.6% over the next four years.

Sectoral Composition of National Income:

Historically, the economic development of advanced nations has followed a consistent pattern. The contribution of agriculture to national income and output has gradually declined, while the industrial sector expanded for a significant period before eventually decreasing. Meanwhile, the services sector has continuously grown, with its expansion accelerating in the latter half of the 20th century. This period, marked by a diminishing industrial share and an increasing dominance of services, is often associated with "deindustrialization" in developed economies. The rise of the services sector as the leading contributor to economic output has also been linked to the emergence of a "post-industrial society" (Papola, T.S.). However, the timing and pace of these structural transformations have varied across countries. In the pre-modern era, which ended at different times in the 19th century, agriculture accounted for a substantial portion of total output, ranging from 50% to 67%. In most European nations, it took between 75 and 100 years for agriculture's share to decline to about one-fourth of total output. By the mid-20th century, agriculture's contribution had fallen below 15% in most developed economies and continued to shrink to less than 5% by the end of the century.

At the onset of modern industrialization, the industrial sector typically accounted for about 25% of total output in developed nations. Its share steadily increased, peaking at nearly 50% by the 1950s. However, since then, the contribution of industry has declined, while the service sector has continued to expand. From the 1960s onwards, services have seen rapid growth, accounting for 65% to 75% of total output in developed economies by the 21st century. The highest share was recorded in the USA at 75%, followed by the UK at 73% and France at 72%.

A similar structural transformation has taken place in India since the introduction of planned economic development after independence. In 1950, India's economic structure resembled that of present-day developed countries at the beginning of their industrialization journey. Agriculture contributed around 60% of GDP, industry accounted for approximately 13%, and services made up about 27%. This economic composition was comparable to that of Great Britain in the late 18th century, Germany in the early 19th century, the USA and Italy in the mid-19th century, and Japan around 1900.

Since independence, India's economic development has mirrored the sectoral changes observed in advanced economies, albeit over a shorter timeframe. The share of agriculture in GDP declined from approximately 60% (specifically 59.2%) in 1950-51 to about 35% in 1990-91

and further to 21.74% in 2005-06. The manufacturing sector's contribution increased from 13% to over 24% during the same period. The most remarkable transformation occurred in the services sector, whose share rose from 27.5% in 1950-51 to nearly 50% in 2000 and further to 54.11% in 2005-06. While the industrial sector experienced growth, its expansion slowed and eventually stagnated after 1990-91.

19.3   GDP at Factor Cost by Industry of Origin

Year	Agriculture & Allied	Manufacturing etc.	Services (Trade, Finance, Pub. Admn. Etc.)	Total GDP
1950-51	83154 (59.20)	18670 (13.30)	38642 (27.50)	140466 (100.00)
1960-61	112848 (54.50)	34239 (16.61)	59016 (28.64)	206103 (100.00)
1970-71	142581 (48.13)	58997 (19.90)	94700 (31.97)	296378 (100.00)
1980-81	167770 (41.8)	88605 (22.09)	144753 (36.09)	401128 (100.00)
1990-91	242012 (34.93)	169703 (24.49)	281156 (40.58)	692871 (100.00)
1999-00	488109 (27.32)	410646 (22.99)	887770 (49.69)	1786525 (100.00)
2003-04	486489 (23.76)	481758 (23.53)	1079486 (52.71)	2047733 (100.00)
2005-06 (Q)	242012 (34.93)	628900 (24.15)	409357 (54.11)	2604532 (100.00)

Figures in brackets show percentages to total.

A notable aspect of India's economic transformation in recent decades has been the increasing dominance of the services sector, which has emerged as the primary driver of economic growth. This shift has led to a significant rise in its share of the national income. In contrast, the industrial sector, particularly manufacturing—historically regarded as the foundation of economic expansion in the early stages of development—has played a relatively smaller role in India's recent growth trajectory. While developed nations experienced a similar trend from the mid-20th century onwards, questions arise as to whether India has reached the stage where such a transition is sustainable. Unlike advanced economies, which witnessed a surge in services following a strong phase of industrialization—where industry accounted for nearly half of economic output—India appears to be moving towards a service-oriented economy without undergoing a substantial industrial phase.

Several explanations have been proposed for this rapid transition from an agricultural economy to a service-driven one, bypassing a strong industrial base. One argument suggests

that advancements in technology have fueled an increasing demand for services, even in economies with relatively low per capita income. Additionally, the distinction between goods and services has become less rigid. The expansion of communication technologies and increased global mobility have contributed to shifts in consumption patterns, leading to rising demand for services in developing economies, much like in developed nations. Consequently, the demand elasticity for services has exceeded unity, even in economies at lower income levels, thereby increasing their contribution to national income. Another perspective challenges the traditional model of economic transformation, which was derived from economies with rigid trade structures and minimal international exchanges. In an era of economic openness and global trade, domestic production no longer needs to mirror local consumption patterns. Instead, countries can specialize based on comparative advantages and fulfill demand through trade.

India's growth trajectory, therefore, differs not only from that of historically developed nations but also from economies at a similar stage of development in today's globalized environment. Unlike the conventional path led by industrial and manufacturing growth, India is witnessing a services-driven expansion, a trend that has become more pronounced over the last two decades as the economy transitioned to a higher growth phase. While many economists celebrate India's rapid economic progress and its emergence as a major global player, relatively little attention has been given to the unique and somewhat unconventional nature of this growth model. Some scholars have critically analyzed this pattern, raising concerns about its implications for price stability, employment generation, and income distribution. This has led to an important question: Is India pioneering a new development model where services, rather than manufacturing, take the lead? Some experts question whether the reported growth in services is entirely genuine. They argue that a portion of this growth may simply reflect the reclassification of activities previously undertaken by the manufacturing sector into the services domain. This phenomenon has been observed in advanced economies as well. For instance, technological advancements and market changes have encouraged industries to outsource tasks such as packaging, labeling, and distribution—functions once integrated into manufacturing—into independent service-oriented enterprises. Similarly, factory maintenance and security services are increasingly contracted out to specialized service providers. While such outsourcing may contribute to an increased share of services in the economy, it does not necessarily indicate an absolute rise in service production. However, at the same time, a genuine expansion of service-oriented activities due to industrial growth and changing consumer preferences cannot be overlooked.

Some Questions and concerns:

The following discussion raises key questions about the sustainability and broader implications of the emerging growth pattern. One major concern is macroeconomic balance—how well the current production structure aligns with consumption demand. In India, the majority of household expenditure still goes toward goods rather than services. Data from the National Sample Survey (NSS) for 1999-2000 indicate that food and manufactured goods accounted for 85% of rural and 74% of urban household spending, with services making up only 15% and 26%, respectively. Given that services now contribute around 51% of production while goods account for 49%, this imbalance between production and demand raises concerns. While income elasticity for services is high, at India's current per capita income level, demand for manufactured goods also remains strong. Estimates suggest that the income elasticity of demand for manufactured goods stands at 1.02 in rural areas and 1.05 in urban households, whereas for services, the figures are even higher at 1.7 and 1.6. As a result, demand for

industrial goods will continue to grow alongside services. However, with industrial output stagnating at around 25% of GDP and manufactured goods at 15%, a supply-demand gap could emerge, potentially leading to inflationary pressures. A possible way to maintain equilibrium between production and demand is through an uneven income distribution, where a large section of the population remains at lower income levels with minimal demand for industrial goods, while a wealthier segment primarily consumes services. The existing production structure already hints at income disparities, and further deepening of this inequality could have serious social and economic consequences.

This imbalance between production and consumption also has implications for the sustainability of economic growth. In a globalized economy, however, macroeconomic balance does not necessarily have to be maintained through domestic production alone—it can be addressed through trade. In India's case, this would mean increasing service exports while relying on imports to meet the demand for goods. The effectiveness of this "export services, import goods" approach is another critical question. While service exports have grown significantly in recent years, now constituting approximately 31% of India's total exports, they still account for only about 3% of GDP. In total, exports make up 10.8% of GDP (Economic Survey, 2004-2005), with services contributing around 6% of the total output of the service sector. Though more services—such as business processing, education, healthcare, and legal services—have become globally tradable, actual export volumes will depend on India's ability to maintain its competitive edge and withstand competition from other nations. Currently, the gap between consumption and production of goods stands at approximately 29% of GDP, with consumption accounting for 78% and production only 49%. Even if the share of services in consumption increases over time, service exports would need to expand at an exceptionally fast pace to bridge this gap.

One major issue is the imbalance between production and employment growth in different sectors. The services sector, while contributing significantly to GDP, has not generated employment at a proportionate rate. By 2002, services accounted for 51% of GDP but only 22% of total employment. Although the sector has seen an 8% growth in output, employment has only expanded at 3% between 1994 and 2000, indicating an employment elasticity of about 0.35. While this is higher than the overall economy's employment growth (1.02%) and elasticity (0.15%), the figures are skewed due to agriculture's dominance. With agriculture employing around 60% of the workforce but showing negligible employment growth and an elasticity of only 0.02, the employment scenario remains concerning. In contrast, the industrial sector performed relatively better, with a 2.5% rise in employment against a 6.5% GDP growth, yielding an elasticity of 0.38. Within this sector, manufacturing experienced slightly higher employment growth at 2.6%. Notably, employment elasticity in services declined from 0.62 (1988-1994) to 0.35 (1999-2000), whereas in the industrial sector, it rose from 0.23 to 0.37 during the same period (Papola, 2004). This indicates that the services sector is not only generating fewer jobs relative to its output growth but also becoming less labor-intensive over time. Given India's advantage in labor-intensive manufacturing, expanding its exports in this domain could help achieve trade balance and create more employment opportunities.

Another pressing issue is the widening income inequality resulting from the current economic growth trajectory. The disparity between GDP and employment shares among sectors has led to increasing income inequality among workers. With agriculture's share in GDP shrinking while still employing a significant portion of the workforce, the income gap between agricultural and non-agricultural workers has widened. In 1960, agricultural workers earned about one-third of what non-agricultural workers did (1:3 income ratio), whereas today, with agriculture accounting

for 60% of employment but only 21% of GDP, the ratio has worsened to approximately 1:6. The gap is even wider when comparing agriculture with services (1:7) and industry (1:4). As services continue to expand, these income disparities will likely become more pronounced.

Moreover, employment opportunities in the services sector are highly polarized. High-end jobs in corporate and technology-driven fields offer substantial salaries and benefits, while a large portion of employment remains in low-paying, informal-sector roles. Rapidly expanding industries, such as information technology, exemplify this trend, where a few benefit from high earnings while a large workforce remains in low-wage positions. Furthermore, these dynamic service industries are largely concentrated in select states and metropolitan areas, exacerbating regional inequalities in economic growth and development.

Given India's unique development trajectory—distinct from both historical and contemporary models—careful analysis is needed to ensure long-term sustainability. A more balanced sectoral growth pattern is essential. While agriculture remains crucial for improving rural incomes rather than employment expansion, the industrial sector, especially manufacturing, must grow at a faster pace. This is vital for maintaining macroeconomic stability, managing inflationary pressures, and balancing trade. Additionally, since manufacturing demonstrates higher employment intensity compared to services, strengthening this sector is key to job creation. Leveraging India's comparative advantage in labor-intensive manufacturing exports could play a pivotal role in fostering both trade equilibrium and employment growth. Ultimately, despite advancements in technology and globalization, India cannot bypass industrialization and transition into a post-industrial economy without first strengthening its manufacturing base.

Self-Check Exercise-2

Q1. Write a short note on the growth of Indian economy during post-independence period.

Q2. Discuss the sectoral composition of India's national income after post-independence period.

19.5 Summary

This unit examined the structural transformations and economic growth trends in India since 1950. Before independence, the Indian economy experienced prolonged stagnation, marked by widespread indebtedness, low and stagnant national and per capita income, weak growth incentives, and poor living standards for the majority of the population. However, in the post-independence years, India adopted a centrally planned economic approach, influenced by the Nehruvian model. The discussion in this unit covered India's economic growth through key indicators such as Gross National Product (GNP), Net National Product (NNP), and per capita net national product from 1950-51 onward. Over time, the agricultural sector's contribution to national income has gradually declined, while the industrial sector initially expanded before experiencing a downturn. In contrast, the services sector has steadily increased its share of national income, with its growth rate accelerating particularly in the latter half of the 20th century.

19.6 Glossary

- **Gross National Product (GNP):** Gross National Product refers to the total value of all the goods and services produced by the residents and businesses of a country, irrespective of the location of production.

- **Net National Product (NNP):** Net National Product is referred to the value that is obtained by subtracting depreciation from the Gross National Product.

- **Per Capita Income (PCI):** The per capita income of a geographical location (say, a country, state, city or others) measures the amount of money earned by every person in that area.

19.7 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 19.3.

Answer to Q2. Refer to Section 19.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 19.4.

Answer to Q2. Refer to Section 19.4.

19.8 References/Suggested Readings

1. Brahmanauda, P. R., & Panchmukhi, V. R. (1987). *The development process of the Indian economy*. Himalaya Publishing House.

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3. Datt, R., & Sundaram, K. P. M. (1990). *Indian economy*. S. Chand.

4. Misra, S. K., & Puri, V. K. (2020). *Indian economy: Its development experience*. Himalaya Publishing House.

5. Papola, T. S. (2006). Emerging structure of Indian economy. *Indian Economic Journal, 53*(1), 27-41.

6. Government of India. *Economic Survey (Various Issues)*.

19.9 Terminal Questions

Q. 1   What is meant by structural change in the context of Indian economy?

Q. 2   Discuss the growth of Indian economy since, 1950.

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NATURE AND MAGNITUDE OF POVERTY, INEQUALITY AND UNEMPLOYMENT

Prof: H.S. Parmar

Structure

20.1.   Introduction

It is rightly acknowledged that the true parameters of development are the removal of poverty, inequality, and unemployment. The ultimate objective of all human endeavour should be the attainment of happiness and welfare and hence the success of development efforemovingrts is expressed in terms of the capacity of a system 'to wipe out tears from the eyes of the poor' or to achieve economic development with "human face". It is therefore important to look into poverty, inequality and unemployment in India along with its growth performance as has been done in the unit. From the perspective of social welfare and the overall living standards of the population, the scope and severity of poverty hold greater significance than merely the economic growth rate. This lesson focuses on this crucial aspect of the economy. It is structured into two sections: Section I explores poverty and inequality, while Section II addresses the issue of unemployment.

20.2   Learning Objectives

After going through this unit, you will be able to

*   Understand the nature of poverty, inequality and unemployment in India.

- Examine the extent and magnitude of poverty, inequality and unemployment in India.

20.3. POVERTY AND INEQUALITY

The concept of Poverty:

Defining poverty has been a challenge, and no single universal definition exists. It is often understood as a social condition where a segment of the population struggles to meet even the most basic necessities of life or where a significant portion of society lacks access to a minimum standard of living. The definition of poverty is shaped by the perception of what constitutes a basic or acceptable standard of living within a given society. Additionally, definitions of poverty often highlight social inequalities and the extent to which different societies accept these disparities. In the Indian context, the commonly used definition focuses on ensuring a minimum standard of living rather than an ideal or comfortable level. It is generally agreed in India that only those who fail to reach a certain minimum consumption standard should be regarded as poor. This may be termed as the concept of absolute poverty. In the absolute concept of poverty, minimum physical quantities of cereals, pulses, milk, butter, etc. are determined for a subsistence level and then the price quotations convert into monetary terms the physical quantities. Aggregating all the quantities included, a figure expressing per capita consumption, expenditure is determined. The population whose level of income (or expenditure) is below this figure, is considered to be below the poverty line. But the experts who have examined the question of poverty quantitatively find it difficult to agree on the amount of income that will ensure the minimum consumption standards at a point of time. In July 1962, a study group established by the Planning Commission of India evaluated what should be considered the nationally acceptable minimum consumption expenditure. The group proposed a benchmark of Rs. 20 per capita per month at 1960-61 prices as the minimum private consumption expenditure. However, the study did not provide a clear rationale for this standard and did not account for differences in the cost of living between rural and urban areas. Despite these limitations, the Planning Commission adopted this criterion to define poverty in both regions. Several researchers have examined rural poverty using different poverty benchmarks. Scholars such as B.S. Minhas and A. Vaidyanathan incorporated the Planning Commission's poverty line in their studies, while others, including P.K. Bardhan, Dandekar and Rath, and M.S. Ahluwalia, developed their own poverty thresholds. Recognizing the need for a more refined methodology, the Planning Commission formed an expert group in September 1989, chaired by D.T. Lakdawala, to review poverty estimation methods. This expert group was tasked with assessing the methodology for measuring poverty at both national and state levels and recommending adjustments to the poverty line, if necessary. Their findings led to key recommendations for a more precise evaluation of poverty in India.

1. The task force defined the poverty line based on calorie intake, setting it at 2,400 calories per person per day in rural areas and 2,100 calories in urban areas. Corresponding to these nutritional requirements, the estimated expenditure threshold was Rs. 49 for rural areas and Rs. 57 for urban areas, calculated at 1973-74 prices. The

expert group recommended that these benchmarks be applied uniformly across all states.

2. To determine state-specific poverty lines, the standardized consumption basket used at the national level should be adjusted to reflect state-level prices from the base year 1973-74. To update these poverty lines to current prices, state-specific consumer price indices should be developed. For this, the Consumer Price Index for Agricultural Labourers (CPIAL) should be used for rural areas, while urban estimates should be adjusted using the Consumer Price Index for Industrial Workers (CPIIW) and the Consumer Price Index for Non-Manual Employees (CPINM). Given that prices fluctuate across regions and over time, adjustments must account for interstate variations and evolving price trends.

3. Regarding the selection of an appropriate deflator, the expert group suggested using disaggregated commodity indices of CPIAL for rural poverty estimations. For urban poverty, they recommended a weighted average of CPIIW and CPINM indices.

Over the years, various economists and research organizations have conducted independent studies to analyze and assess poverty trends in India. Table 19.1 gives a synoptic view of these estimates you can study more on individual estimations by referring to suggested readings given at the end of this lesson

Extent of Poverty:

There is an utter lack of appropriate and reliable data for direct estimation of the extent and magnitude of poverty in India. This is mainly because no attempt so far has been made in this country to collect statistical information in respect of distribution of income. The consumption expenditure data gathered through various National Sample Survey (NSS) rounds serve as a valuable resource for assessing poverty levels in both rural and urban India. Economists have extensively relied on NSS data to analyze poverty trends.Several studies conducted by researchers such as Dandekar and Rath, Minhas, Bardhan, and Ahluwalia offer poverty estimates for India. However, these studies, which date back to before 1970-71 (see Table I), present varying figures and do not fully align in their assessment of poverty magnitude. For instance, estimates for 1960-61 reveal significant differences: Bardhan reported that 38% of the rural population lived below the poverty line, while Dandekar and Rath estimated this figure at 40%, and Ahluwalia provided a higher estimate of 54.1% for 1963-64. Similar discrepancies exist for later years. In 1967-68, Minhas estimated rural poverty at 37.1%, whereas Ahluwalia and Bardhan reported much higher figures of 56.5% and 54%, respectively. For 1968-69, Dandekar and Rath estimated that 40% of the rural population lived below the poverty line. Ahluwalia Bardhan and Dandekar and Rath had deter-mined poverty line slightly lower than the one determined by Minhas, and yet incidence of poverty according to their estimates was greater than that was indicated by Minhas's estimates. This was mainly because of the use of different methodologies by these economists.

Another set of poverty estimates comes from the Planning Commission, which has been providing data since the early 1970s. According to these estimates, the poverty line for rural areas was set at Rs. 49 per capita per month (at 1973-74 prices). Based on this benchmark,

approximately 51.2% of the rural population was classified as poor in 1977-78, compared to 54.09% in 1972-73. For urban areas, the minimum threshold was also determined separately.

TABLE - 20.1

ALTERNATIVES ESTIMATES OF POVERTY IN INDIA

Author (1)	Year (2)	Rural (3)	Urban (4)	Total (5)	Criterion of Poverty Line
P.D. Ojha	1960-61	184 (51.8)	6 (44)	190 (44.0)	Rural Monthly per capita consumption of Rs. 15-18 (1960-61 Prices)
	1967-98			289 (70.0)	Urban Monthly per capita consumption of Rs.8.11 Monthly per capita consumption expenditure.
EPW Da Costa	1963-64			162 (34.5)	Rural Rs. 0-15 Urban Rs. 24
P.K. Bardhan	1960-61	131 (30.0)			Rs. 15 at 1960-61 prices using Agricultural Labour Prices Index
	1967-68	221 (53.0)			
B.S. Minhas	1956-57	181 (65.0)			Rs. 20 at 1960-61 prices
	1963-64	221 (57.8)			
	1969-70	210 (50.6)			
M. Ahluwalia	1956-57	181 (54.1)			Rs. 15 at 1960-61 prices for rural areas
	1963-64	171 (44.5)			
	1967-68	235 (56.5)			
	1973-74	241 (46.1)			
Dandekar & Rath	1960-61	135 (40.0)	42 (50.0)	177 (41.0)	Rs. 15 at 1960-61 prices for rural areas and Rs. 22.5 for urban areas.
	1969-70	166 (40.0)	49 (50.0)	215 (41.0)	

Author (1)	Year (2)	Rural (3)	Urban (4)	Total (5)	Criterion of Poverty Line
Seventh Finance Commission	1970-71	225 (53.0)	52 (51.0)	277 (52.0	Augmented poverty Line by adding to private consumer expenditure norm an estimate of public expenditure.
Sixth Plan (1980-85)	1979-80	260 (50.7)	*57 (40.0)	317 (48.4)	At 1979-80 Prices Rural Rs. 76 Urban Rs. 88
V.M. Dandekar	1971-72	238 (46.0)			Rs. 32.7 at 1971-72 Prices.
	1977-78	284 (49.5)			Rs. 54.4 at 1977-78 Prices.
	1983-84	286 (44.4)			Rs. 88.4 at 1983-84 Prices
World Bank	1983	252 (44.9)	65 (36.4)	317 (42.5)	Rs. 89.0 for rural areas and Rs. 111.2 for urban areas at current prices.
	1988	252 (41.7)	70 (33.6)	322 (39.6)	
Minhas Jain and Tendulkar	1987-88	284 (44.8)	77 (36.5)	361 (42.7)	Rs. 122.6 for rural areas and Rs. 158.3 for urban areas.
Planning Commission Experts Group (1993)	1987-88	229 (39.1)	83 (40.2)	312 (39.1)	Rs. 115.43 for rural areas Rs. 165.58 for urban areas
Planning Commission	1996-97	211 (30.6)	66 (25.6)	277 (29.2)	
NSSO	1999-00	195 (27.1)	65 (23.6)	260 (26.1)	Rs. 211.30 for rural areas Rs. 454.11 for urban areas

The figures in brackets represent the percentage of the total population within each respective category.

The urban poverty threshold was set at Rs. 57 per capita per month (at 1973-74 prices). Based on this benchmark, the Planning Commission estimated that 38.2% of the urban population lived below the poverty line in 1977-78, compared to 42.22% in 1972-73. When combining both rural and urban populations, the overall poverty rate stood at 48.3% in 1977-78.

Poverty estimates for 1983-84, presented in the Seventh Five-Year Plan, were based on quinquennial surveys conducted by the National Sample Survey Organization. The data indicated that 40.4% of the rural population and 25.1% of the urban population lived below the poverty line, resulting in an overall poverty rate of 37.4%. By 1987-88, there was a further decline in poverty levels, with rural poverty reducing to 33.3% and urban poverty dropping from 28.1% in 1983-84 to 20.1% in 1987-88. Consequently, the overall poverty rate fell from 37.4% to 29.9% over the same period.

The Planning Commission attributed this decline to economic growth, increased agricultural production, and government initiatives aimed at employment generation. Programs such as the Integrated Rural Development Program, the National Rural Employment Program, and the Rural Landless Labour Employment Program played a significant role in improving rural livelihoods. Additionally, efforts in health, education, and infrastructure, including access to clean drinking water and housing, contributed to reducing poverty levels.

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In addition to general poverty alleviation measures, targeted programs were implemented to support vulnerable groups such as women, children, and economically and socially disadvantaged sections of society. These initiatives contributed to a notable reduction in poverty levels. However, some economists, including Dandekar, have expressed skepticism regarding the Planning Commission's claims, arguing that the decline in poverty between 1977-78 and 1987-88 was relatively modest rather than significant, as stated by the government.

Due to concerns about the methodology used by the Planning Commission to estimate poverty levels, a need arose for a thorough reassessment. Consequently, an expert group was formed to review the methodology and computational aspects of poverty estimation. While retaining the concept of the poverty line as suggested by the Task Force, the expert group recommended modifications in the price deflator to update the poverty line over time. Similar to the approach of Minhas, Jain, and Tendulkar, state-specific price indices were used to better capture changes in the cost of living for those near the poverty line. The expert group relied solely on NSS data on consumption expenditure without adjusting it to National Accounts estimates. Interestingly, their estimates for poverty in 1983-84 and 1987-88 showed a lower proportion of people living below the poverty line in rural areas compared to the findings of Minhas, Jain, and Tendulkar, despite using the same methodological framework.

The Planning Commission primarily estimates poverty based on large-scale quinquennial household consumer expenditure surveys conducted by the NSSO. Economic Surveys of 2003-04 and 2004-05, analyzing data from the 55th NSS round, suggested a significant reduction in poverty during the 1990s. However, the period between 1993-94 and 1999-2000 sparked debate among scholars due to changes in data collection methodology in 1999-2000, which

may have led to inconsistencies with previous survey results. The most recent available data from the 61st NSS round for 2004-05 estimated the national poverty rate at 27.8% using the Uniform Recall Period (URP) method, where consumer expenditure data for all items are collected based on a 30-day recall period. The estimate dropped to approximately 22% under the Mixed Recall Period (MRP) method, which records expenditures for select non-food items such as clothing, footwear, durable goods, education, and institutional medical expenses over a 365-day recall period while retaining the 30-day recall period for other items. The URP-based estimate for 1993-94 was 36.0%, whereas the MRP-based estimate of 22% for 2004-05 is roughly, though not precisely, comparable to the 26.1% recorded in 1999-2000.

Poverty levels also vary widely across states. Despite an overall decline, certain states continued to experience high poverty rates. In 2004-05, Madhya Pradesh and Uttar Pradesh had poverty levels exceeding 40%, while Maharashtra, Tamil Nadu, Karnataka, and West Bengal recorded rates between 25% and 30%. Orissa had the highest poverty ratio among all states.

Table 20.2

Poverty Ratio : Head Ratio by Major States

States	Rural			Urban			All		
	1983	1993-94	2004-05	1983	1993-94	2004-05	1983	1993-94	2004-05
Andhra Pradesh	37.31	16.64	10.85	3749	37.63	25.41	29.75	22.30	14.80
Assam	41.92	44.43	23.05	23.07	10.19	3.83	40.03	40.46	20.46
Bihar	64.89	57.24	43.06	47.49	36.54	31.66	62.71	54.50	41.53
Gujrat	27.92	22.44	19.76	38	29.44	11.96	31.11	24.26	13.92
Haryana	21.77	26.62	13.41	25.47	17.54	15.06	22.59	24.26	13.92
Himachal Pradesh	17.77	29.27	12.50	16.01	8.26	3.87	17.63	27.37	11.61
Jammu & Kashmir	25.23	19.73	4.81	17.48	7.38	4.81	23.57	16.75	4.81
Karnataka	37.51	30.24	23.73	42.88	39.67	33.4	39.08	33.25	27.15
Kerla	38.46	26.49	12.27	45.11	25.45	20.86	39.81	26.22	14.48
Madhya Pradesh	48.21	40.43	38.17	53.11	48.29	34.44	49.23	42.30	37.21
Maharashtra	45.04	37.66	30.66	39.69	34.74	29.42	43.13	36.50	29.95
Orissa	67.52	50.11	47.76	49.19	41.02	43.34	65.31	48.85	47.07
Punjab	14.3	13.72	9.55	2352	11.83	5.57	16.88	13.14	8.12
Rajasthan	37.72	26.89	18.91	38.81	31.55	29.81	37.95	27.56	21.48

Tamil Nadu	56.22	32.99	22.96	47.94	38.92	34.06	53.48	35.20	28.31
Uttar Pradesh	46.38	42.33	34.06	49.47	36.15	30.19	46.94	41.08	33.25
West Bengal	61.56	37.35	28.49	3.15	23.24	18.5	53.60	33.45	25.67
All-India	45.76	37.26	29.18	42.27	32.56	26.02	44.93	36.02	28.27

Note: Bihar, Madhya Pradesh and Uttar Pradesh include the reorganized states of Jharkhand, Chhattisgarh and Uttaranchal respectively.

Source: S. Mahendra Dev & C. Ravi: Economic and Political Weekly, Feb 10,2007

Table 20.3

Absolute Number of Poor

States	Rural			Urban			All		
	1983	**1993-94**	**2004-05**	**1983**	**1993-94**	**2004-05**	**1983**	**1993-94**	**2004-05**
Andhra Pradesh	11.75	8.43	6.33	5.08	7.04	5.52	16.82	15.47	11.82
Assam	7.21	9.31	5.72	0.44	0.28	0.15	7.65	9.59	5.87
Bihar	42.00	46.39	45.31	4.39	4.51	5.18	46.39	50.89	50.49
Gujrat	6.82	6.39	6.70	4.31	4.60	2.55	11.12	10.99	9.25
Haryana	2.33	3.51	2.17	0.78	0.81	1.10	3.11	4.32	3.27
Himachal Pradesh	0.74	1.45	0.73	0.06	0.04	0.03	0.79	1.49	0.76
Jammu & Kashmir	1.27	1.26	0.40	0.24	0.15	0.14	1.51	1.41	0.54
Karnataka	10.36	9.75	8.67	4.88	5.99	6.67	15.24	15.74	15.34
Kerla	8.03	5.85	3.01	2.40	2.00	1.78	10.43	7.86	4.79
Madhya Pradesh	21.19	21.80	25.10	6.11	8.11	7.86	27.30	29.91	32.96
Maharashtra	19.26	19.08	17.97	9.40	11.68	13.68	28.65	30.76	31.65
Orissa	16.43	14.33	15.75	1.64	1.89	2.66	18.07	16.22	18.41
Punjab	1.82	2.04	1.61	1.16	0.79	0.53	2.97	2.82	2.14
Rajasthan	10.86	9.88	9.07	3.02	3.47	4.42	13.88	13.34	13.49
Tamil Nadu	18.89	11.93	7.83	7.96	8.34	10.80	26.85	20.26	18.62
Uttar Pradesh	44.62	50.57	51.39	10.60	10.95	12.54	55.22	61.51	63.92
West Bengal	26.15	19.40	17.58	4.82	4.62	4.50	30.98	24.02	22.18
All-India	252.02	247.18	232.16	72.29	77.38	83.31	324.34	324.55	215.48

Source : S. Mahendra Dev & C. Ravi. : Economic and Political Weekly, Feb. 10, 2017

Self-Check Exercise-1

Q1.   Define
            1)   Poverty
            2)   Extent of Poverty

Q2.   Compare the poverty estimates provided by Minhas, Jain, and Tendulkar with those of the Planning Commission

II

20.4   UNEMPLOYMENT: ITS NATURE AND MAGNITUDE

The study of employment and unemployment is essential for understanding the overall economic health of a nation. While some degree of unemployment exists in all economies, the situation in developing countries like India is particularly complex. A significant portion of the population faces unemployment, while many others are underemployed. This issue is not limited to unskilled workers; even skilled professionals and those with specialized training often struggle to find suitable employment for extended periods. The employment landscape is further complicated by substantial wage disparities between organized and unorganized sectors, industrial and agricultural workers, as well as rural and urban laborers. Additionally, trade unions predominantly represent industrial workers, leaving many in the informal sector without adequate support. The lack of social security, the persistence of child labor, and widespread underemployment make unemployment a major socio-economic challenge in labor-surplus economies like India. There is also a close link between unemployment and poverty, as regions with high joblessness often experience severe economic deprivation. Unemployment is generally understood as the state of being without productive work. However, for a more precise analysis, it is important to differentiate between voluntary and involuntary unemployment. In economic discussions, unemployment typically refers to involuntary joblessness, a definition that will also be followed in this analysis.

The nature of unemployment varies between developed and developing countries. In advanced economies, unemployment generally falls into two categories: Keynesian involuntary unemployment and temporary frictional unemployment. Keynes argued that involuntary unemployment arises due to insufficient demand in the economy, which can be addressed by boosting investment and public spending to stimulate economic activity. Additionally, frictional unemployment occurs when workers are in transition between jobs, but in developed economies, due to better adaptability, this phase is usually short-lived. In contrast, unemployment in developing economies is driven by structural factors such as agricultural stagnation, limited industrial growth, and a relatively small service sector. As a result, many individuals willing to work at prevailing wage rates remain jobless. While this form of unemployment is involuntary, it differs from Keynesian unemployment. In economies like India, unemployment is both visible (open) and hidden (disguised). Structural unemployment remains the dominant challenge, existing in both these forms.

Unemployment in India

A significant portion of unemployment in India is structural, stemming from the economy's inability to generate sufficient employment opportunities for individuals who are both willing and capable of working. In India not only is productive capacity much below the needed quantity, it is also found increasing at a very slow rate. As against this, additions to labour force are being made at a fast rate on account of the rapidly increasing population.

Over the past three decades, the country has witnessed a rapid population growth of approximately 2.2 percent per year. This has significantly increased the number of individuals entering the labor market in search of employment. However, job opportunities have not

expanded at the same pace due to sluggish economic growth, leading to a persistent rise in unemployment levels across different planning periods. Addressing this issue requires fundamental structural reforms within the economy. In addition to structural unemployment, some degree of cyclical unemployment has emerged, particularly in urban areas, due to industrial slowdowns. Before the mid-1960s, industrial growth was robust, keeping cyclical unemployment relatively low. This form of unemployment, characterized by a lack of demand, aligns with Keynesian involuntary unemployment and can be mitigated by boosting effective demand, as seen in developed nations. While Keynesian unemployment remains relevant, structural unemployment continues to be the more pressing concern.

For better analysis, unemployment in the country can be categorized into (i) urban unemployment and (ii) rural unemployment. Urban unemployment primarily includes (a) industrial unemployment and (b) educated unemployment, whereas rural unemployment consists of (a) open unemployment and (b) disguised unemployment. A specific form of open unemployment, known as seasonal unemployment, holds particular significance in India's rural economy. Accurate and precise estimates of unemployment in India remain scarce. However, it is widely acknowledged that a substantial segment of the workforce remains jobless in both rural and urban areas. Estimating unemployment is challenging due to conceptual and statistical limitations. The most commonly accepted figures come from various rounds of the National Sample Survey Organisation (NSSO), which provides unemployment rates based on different measurement approaches: Usual Status, Current Weekly Status, and Current Daily Status.

The Usual Status method assesses a person's employment status over an extended period, typically a year before the survey, making it suitable for identifying chronic unemployment. Meanwhile, the Current Weekly Status evaluates employment over the preceding seven days, where working at least one hour during the week qualifies a person as employed. The Current Daily Status offers a more detailed measure by considering employment on a day-to-day basis—if a person works at least one hour in a day, they are classified as employed for the entire day. This method is regarded as the most precise for measuring unemployment levels.

Below are the unemployment rates derived from NSS data:

Table 20.4 Unemployment Rates (Status-Wise)

	Rural		Urban	
1999-2000	Males	Females	Males	Females
Usual	2.1	1.5	4.8	7.1
CSW	3.9	3.7	5.6	7.3
CDS	7.2	7.0	7.3	9.4
2004-2005			2004-2005	
Usual	2.1	3.1	4.4	9.1
CSW	3.8	4.2	5.2	9.0
CDS	8.0	8.7	7.5	11.6

Usual: Usual Principal Status, CWS: Current Weekly Status, CDS: Current Daily Status.
Source: Economic Survey 2006-07; P.210.

Similar to poverty estimation, the most recent and seventh quinquennial National Sample Survey (NSS) – the 61st round conducted between July 2004 and June 2005 – serves as a key source of data on employment and unemployment. Findings from this survey indicate that employment growth accelerated between 1999-2000 and 2004-05 compared to the period from 1993-94 to 1999-2000.

Table 20.5 Employment and Unemployment (Usual Principal Status)

	1983	1993-94	1999-2000	2004-05
Labour Force	277.34	343.56	377.88	428.37
Work Force	369.36	334.54	367.37	415.27
No. of Unemployment	7.98	9.02	10.51	13.10
Unemployment rate	2.88	2.62	2.78	3.06

Source: Economic Survey 2006-07, P. 208.

The Tenth Five-Year Plan (2002-07) focused on generating productive and high-quality employment opportunities to exceed the growth of the labor force and significantly reduce unemployment by the end of the plan period. It emphasized enhancing the employment potential of economic growth by supporting sectors and activities that require more labor per unit of output. The plan targeted the creation of approximately 50 million jobs—30 million through the natural growth process and an additional 20 million through special initiatives over five years. Data from the 61st round of the NSSO survey indicates that over 45 million people found employment between 2000 and 2005. The net annual increase in employment, based on the Usual Principal Status (UPS), rose from 5.47 million between 1993-94 and 1999-2000 to 9.58 million between 1999-2000 and 2004-05. However, during the same period, the labor force expanded at an annual rate of 2.54 percent, slightly exceeding employment growth at 2.48 percent. Consequently, despite higher employment growth, unemployment on a UPS basis increased from 2.78 percent in 1999-2000 to 3.06 percent in 2004-05. Historically, unemployment rates had declined from 2.88 percent in 1983 (38th round) to 2.62 percent in 1993-94 (50th round).

It appears that the increase in unemployment between the 55th and 61th rounds of NSSO was primarily because of an increase in such unemployment incidence for females, both in the rural and urban areas. Furthermore, while unemployment among miles declined in terms of UPS (usual) and current weekly status (CWS), it increased by the current daily status (CDS) both in rural and urban areas. There are analytical differences (for example, chronic unemployment versus that of the intermittent and disguised variety) in the nature of unemployment according to the UPS, CWS and CDS status. More expert analysis of the recently released data from the 61 NSSO round will reveal the root causes as well as the probable remedies.

The reversal of the declining trend in employment growth-from an annual 2.1 per cent in the ten years ending in 1993-94 to 1.6 per cent in the five years ending in 1999-2000 to 2.5 per cent in the five years ending in 2004-05 is an encouraging development. There is a pressing need for accelerated employment growth to not only accommodate the expanding labor force, especially in light of demographic shifts, but also to lower the unemployment rate. The proportion of employment in agriculture has declined from 61.67 percent in 1993-94 to 58.54 percent in 1999-2000, and further to 54.19 percent in 2004-05. Given agriculture's shrinking contribution to GDP, its ability to absorb a significantly larger workforce remains limited. While sectors such as construction and services—particularly transport, storage, and communication—have supported overall employment growth, the manufacturing sector has not fully realized its potential in job creation.

Employment in the Organized Sector

Employment growth in the organized sector, encompassing both public and private establishments, witnessed a decline during the 1990s. Data from the Employment Market Information System of the Ministry of Labour indicates that the annual employment growth rate in these establishments slowed from 1.20 percent between 1983-1994 to 0.38 percent per annum during 1994-2004.

Table 20.6

Annual Growth of Employment in Organized Sector

(In per cent)

	1983-1994	1994-2004
Public Sector	1.53	0.80
Private Sector	0.44	0.61
Total Organized	1.20	0.38

Despite a rise in private sector employment growth from 0.44 percent to 0.61 percent during this period, it was insufficient to counterbalance the decline in public sector employment. The contraction in public sector jobs primarily resulted from workforce reductions in government establishments. While rationalizing the public sector is necessary since its primary role is delivering essential services like education, healthcare, infrastructure, and not direct employment generation, it remains crucial to enhance job opportunities in the organized private sector.

The Eleventh Plan's Approach Paper emphasizes boosting employment in sectors such as manufacturing and services, particularly labor-intensive industries like food processing, textiles, leather products, and footwear, alongside service industries like tourism and construction. It advocates for policy reforms, including removing fiscal distortions that encourage excessive capital intensity, improving infrastructure investment, reducing bureaucratic barriers, and enhancing vocational training to equip youth with better employability skills.

Since Village and Small Scale Enterprises (VSEs) are expected to absorb a significant portion of the workforce, addressing their challenges—such as inadequate credit, unreliable power

supply, bureaucratic hurdles, and excessive regulatory inspections—is essential. Additionally, employment opportunities are likely to grow in the social sectors like health and education, while wage employment initiatives such as the National Rural Employment Guarantee Scheme will also contribute to job creation.

Self-Check Exercise-2

Q1.   Discuss the nature and magnitude of poverty in India.

Q2.   Discuss the nature and magnitude of unemployment in India.

20.5   Summary

This lesson explored the extent and nature of poverty, inequality, and unemployment in India. Various scholars, along with institutions like the Planning Commission, Finance Commission, Expert Groups, and the National Sample Survey (NSS), have attempted to define poverty using different data sets. However, a universally accepted definition remains elusive. Over time, economic growth in India has contributed to a decline in poverty levels. The discussion also covered the characteristics and extent of unemployment in India, highlighting that a significant portion of it is structural. The country's rapidly growing population has led to an increasing number of individuals entering the labor market in search of jobs, contributing to rising unemployment from one plan period to another.

20.6   Glossary

- **Poverty:** A social condition in which a section of society is unable to meet even the most basic necessities of life, or a situation where a significant portion of the population lacks the minimum standard of living.

- **Incidence of Poverty:** The proportion of people living below the poverty line, calculated as a percentage of the total population, also referred to as the head-count ratio

- **Structural Unemployment:** A persistent form of unemployment caused by fundamental shifts in an economy, such as technological advancements or changes in industry demands.

20.7 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 20.3.

Answer to Q2. Refer to Section 20.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 20.3.

Answer to Q2. Refer to Section 20.4.

20.8   References/Suggested Readings

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20.9   Terminal Questions

Q. 1   What do you mean by Poverty? Discuss the nature and magnitude of Poverty in India.

Q. 2   What do you mean by structural unemployment? Discuss the nature and magnitude of unemployment in India.

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Trends in Agricultural Production and Productivity

Prof: K.K. Kaushik

Structure

21.1.   Introduction

Agriculture plays a crucial role in India's economy, serving as the primary source of livelihood for nearly two-thirds of the country's workforce. However, its contribution to the Gross Domestic Product (GDP) has seen a significant decline, dropping from over 50% in the early 1950s to approximately 18% by the financial year 2006-07. About 43 % of India's geographical area is used for agricultural activity. Agriculture, and especially a variety of crops produced under diverse climatic situations in different cropping systems, supports 115.5 million farm families. The distribution of farm holdings is dominated by small and marginal farmers. Rainfed agriculture constitutes about 60 per cent of the net sown area. These areas are the major domain of oilseeds, pulses and coarse cereals production. The intensity and distribution of rainfall determine the crop prospects in a majority of the areas.

Though the share of Indian agriculture in GDP has steadily declined, still it plays a vital role in the overall socio-economic development. Agricultural growth provides mainly four broad

types of growth linkages to the non-agricultural sectors, namely, production, demand, investment, and saving linkages. Production linkage of agriculture occurs through providing its outputs as inputs to the non-farm sector. Demand linkages arise when agriculture makes available markets for consumer non-durables and durables produced by the non-agricultural sectors. Saving linkage occurs when agriculture provides financial saving and demand for insurance services, while investment linkage arises when agriculture provides demand for intermediate inputs and capital goods from the non-agricultural sectors.

One of India's notable achievements since independence has been the remarkable progress in agriculture. Once reliant on food imports, the country has now attained self-sufficiency in grain production and maintains substantial reserves. The food shortages of the 1960s highlighted the need for self-reliance in agriculture to support the growing population and ensure national security and stability. This realization led to the adoption of the Green Revolution, which focused on expanding cultivated land, enhancing irrigation, using high-yielding seed varieties, and implementing advanced farming techniques, including efficient water management and the use of fertilizers and pesticides. These efforts significantly boosted wheat and rice production.

Over the past five and a half decades, Indian agriculture has undergone considerable transformation, influenced by various factors at different times. The 1950s and 1960s saw institutional reforms such as land redistribution and the expansion of irrigation and rural infrastructure, including roads and electricity. In the 1970s, technological advancements became the driving force behind agricultural growth, while the 1980s witnessed the widespread adoption of these innovations across regions and crop varieties.

During the 1960s and 1970s, public investments in agriculture surged, laying the foundation for future growth. Improved infrastructure and better farming practices contributed to increased productivity, making agricultural growth in the 1970s and 1980s more widespread across crops, allied sectors, and regions. This period also saw enhanced resilience to weather-related challenges. However, in recent years, the benefits of the Green Revolution have started to level off due to declining land and resource productivity. With limited scope for expanding cultivated land, the production growth of several crops has stagnated, posing challenges for future agricultural development.

21.2   Learning Objectives

After going through this unit, you will be able to

- Examine the trends in Agricultural Production and Productivity in India.

- Examine the diverse array of challenges hindering agricultural production and Productivity across different regions and sectors.

21.3   Trends in Agricultural Production and Productivity

Growth of crop output can be analyzed in four different periods. (1)1950-51 to 1964-65 is termed as The Pre-Green Revolution Period. (2) 1967-68 to 1979-1980: the beginning of green revolution. (3) 1980-81 to 1990-91: The Maturing of Green Revolution and (4)1990-91 to 2003-04: and 1994-95 to 2005-06: Economic Liberalization and Deceleration of Agricultural Growth.

(1)   1950-51 to 1964-65 is termed as The Pre-Green Revolution Period

During this time, agricultural output expanded at an annual rate of 3.15%, primarily driven by improvements in irrigation and rural infrastructure. However, the rate of yield growth remained relatively low. Despite setting a target of 62 million tonnes for foodgrain production, the actual output surpassed expectations, reaching approximately 67 million tonnes.

Table 21.1

All India Compound Growth Rates of Area Production and Yield of Major Crops

Crops		1950-51 to 1964-65	1967-68 to 1979-1980	1980-81 to 1990-91	1990-91 to 2003-04	Av. Growth 1994-95 to 2005-06
Rice	(Area)	1.21	0.77	0.40	0.15	0.25
	(Prod.)	3.50	2.22	3.56	1.14	1.53
	(Yield)	2.25	1.46	3.47	0.99	1.09
Wheat	(Area)	2.69	2.94	0.46	0.74	0.94
	(Prod.)	3.96	5.65	3.57	2.13	1.88
	(Yield)	1.27	2.62	3.10	1.35	0.85
Fdgn	(Area)	1.35	0.38	-0.23	-0.44	0.14
	(Prod.)	2.82	2.15	2.85	1.16	1.83
	(Yield)	1.36	1.32	2.74	1.11	1.49
Non Fdgn	(Area)	2.44	0.94	1.12	-0.09	0.86
	(Prod.)	3.74	2.26	3.77	1.20	2.36
	(Yield)	0.89	1.19	2.31	0.62	1.46
All Crops	(Area)	1.58	0.51	0.10	0.25	0.34
	(Prod.)	3.15	2.19	3.19	1.18	2.46
	(Yield)	1	1.28	2.56	0.90	1.96

(2)   1967 to 1979-1980: The Beginning of Green Revolution

It is noteworthy that during this time, the overall growth rate of crop production was lower compared to the earlier period, even though the Green Revolution had already made significant progress in wheat and rice cultivation, resulting in substantial yield improvements for these crops. This was possibly due to two reasons. Since new agricultural technology was limited to wheat and rice and not to coarse cereals as rice accounted for nearly 40% and coarse cereals 28.2% of total food grains output. Wheat accounted for only 22% of food grains output during 1970-71. This happened despite the fact that output of wheat almost more than doubled. Area contribution which was to the tune of 50.16% to the crop output declined to 23.29, whereas yield contribution registered a marked increase from 38.41 % to 58.45%.

(3)   1980-81 to 1990-91: The Maturing of Green Revolution

The decade of 1980s witnessed the spread of new agricultural technology to some coarse cereals and some commercial crops like sugarcane, oilseeds and cotton. Initially,

new agricultural technology was confined to north western States viz., Punjab, Haryana, and Western UP but later on it got spread almost to all regions of India. The major part of output increase was due to yield effect which stood at 80.25% as against area affect which was just 3.13%. Yield growth became the prime source of growth during the mid-sixties

(4) **1990-91 to 2003-04: and 1994-95 to 2005-06: Average Growth: Economic Liberalization and Deceleration of Agricultural Growth.**

The economic reforms introduced in India in 1991 set the economy on a higher growth trajectory. In agriculture, key reforms included liberalization of commodity markets, adjustments in commodity pricing policies, and a gradual reduction in input subsidies. Although agriculture was not directly targeted in the initial years, it was indirectly impacted by factors such as exchange rate adjustments, export liberalization, and changes in the terms of trade due to industrial policy shifts.

The annual GDP growth rate increased from below 6% in the early reform years to over 8% in later years. However, agriculture, which contributed over 30% to GDP at the start of the reforms, struggled to sustain its previous growth rate or match the expansion of the non-agricultural sector. Agricultural GDP growth declined from 3.08% per annum between 1980-81 and 1990-91 to 2.38% from 1992-93 to 2003-04. Similarly, crop output growth fell from 3.19% per annum in the 1980s to just 1.18% per annum in the post-reform period.

Between 1990-91 and 1996-97, the GDP growth rate in agriculture and allied sectors was 3.64%, which was 0.5 percentage points higher than the previous decade. Notably, in the early reform years, the gap between agricultural and non-agricultural growth rates showed a slight reduction.

Table 21.2: Growth Rate in GDP Agriculture and Non-Agriculture Before and After Reforms

Period	GDP total	GDP agr (&allied)	GDP Agri-	GDP non-A
1980-81 to 1989-90*	5.52	3.12	3.29	6.88
1990-91 to 1986-97*	6.01	3.64	3.69	7.04
1996-97 to 2004-05*	5.72	1.66	1.65	7.06
2000-01 to 2005-06#	6.34	1.97		7.65

Notes: At 1993-94 prices; # At 1999-2000 prices.

Source: National Accounts Statistics, various issues, Central Statistical Organisation, government of India, New Delhi.

Table 21.3: Growth Rate in Output of Various Sub-sectors of Agriculture at 1993-94 Prices

Period	Crops	Livestock	Fruits and vegetables	Cereals
1980-81 to 1989-90	2.71	4.84	2.42	3.15
1990-91 to 1986-97	3.22	4.12	5.92	2.23
1996-97 to 2004-05	0.79	3.67	3.28	0.02

Source : As in the table

The agricultural sector in India faced significant challenges starting in 1997-98, impacting all its sub-sectors. A breakdown of agricultural growth reveals that the output of fruits and vegetables slowed from 5.92% to 3.28%. The overall crop sector registered an annual growth of only 0.79%, while agriculture (excluding fisheries) grew at a modest 1.65% per annum. This decline in growth suggests a reduction in per capita or per worker income in agriculture, contributing to rising rural distress.

The inconsistent and slow growth in agriculture and allied sectors is evident in the declining average annual growth rate of value-added in the sector—from 4.7% during the Eighth Plan (1992-1997) to 2.1% in the Ninth Plan (1997-2002). Although the Tenth Plan (2002-2007) aimed for 4% annual growth, agricultural growth was negative (-6.9%) in 2002-03 due to a severe drought. A good monsoon in 2003-04 led to a strong recovery with 10% growth, but deficient rainfall in 2004-05 again caused a decline, reducing growth in agriculture and allied sectors to 0.7%. In 2006-07, agricultural growth further slowed to 2.7% compared to 6% in the previous year, even as the overall economy expanded at 9.4% (Economic Survey, 2006-07).

The growth rate of foodgrain output declined to an all-time low of 1.16%, which is lower than the population growth rate of 1.95% per annum. Despite the potential for increased agricultural productivity in several states, growth in agricultural output has slowed since the mid-1990s. Although India has set a target of over 4% growth in agriculture, the actual growth rate has consistently fallen short. This weak agricultural performance, in contrast to the robust expansion of the overall economy, has raised serious concerns about its long-term impact.

The pattern of growth of agriculture has, however, brought in its wake, uneven development, across regions and crops as also across different sections of farming communities and is characterized by low levels of productivity and degradation of natural resources in some areas. Capital inadequacy, lack of infrastructural support and demand side constraints such as controls on movement, storage and sale of agricultural products, etc., have continued to affect the economic viability of agriculture sector. Consequently, the growth of agriculture has also tended to slacken during the nineties.

First, the gap between agricultural and non-agricultural incomes is widening significantly. Second, with over half of the workforce and a similar proportion of the population relying on agriculture for their livelihood, sluggish growth in this sector is leading to economic distress. During the 1980s, agricultural GDP expanded at an annual rate exceeding 3%, which was regarded as a relatively acceptable level of performance for the sector.

Self-Check Exercise-1

Q1.   What characterized the pre-Green Revolution period (1950-51 to 1964-65) in terms of agricultural output growth? Mention one key factor contributing to this growth.

Q2.   What effect did economic liberalization have on agricultural growth from 1990-91 to 2003-04? Briefly explain one policy change and its impact on agricultural output.

21.4   Reasons for Deceleration of Agricultural Growth during the 1990's.

Both at the national and state level various factors can be made accountable for slowing down agricultural growth during the post-liberalization period. Decline in the public and overall investment is the single most important factor accountable for this slow down. The Gross Domestic Capital Formation (GDFC) experienced a substantial rise, more than doubling by the 1980s and growing over two and a half times in the 1990s. During this period, the fixed capital component also saw a notable increase, rising from approximately 8 percent of GDP to about 28.1 The inventories (change in stocks), the other component of capital formation, has been around 1 per cent of GDP in the beginning as also at present, with higher rates in between.

The Central government has an important role to play through macro-economic policies that affect agriculture by provision of adequate resource transfer to States, and in ensuring that State finances and options are not affected adversely by the macro-economic consequences of decisions taken at the centre. However, according to the Economic Survey, 2005-06, there is a rising trend in non-development expenditure while development expenditure as a percentage of GDP is declining. Although nominal public investments in agriculture have shown a consistent increase over the years, the share of gross capital formation in agriculture relative to total capital formation in the economy has been on a downward trend in both the public and private sectors, resulting in an overall decline. The total declined from 14.51 % on an average during the decade 1970 to 1980, to 10.40% during the next decade and has averaged only 8.04 during 1990s at 1993-94 prices.

The proportion of capital formation in the agricultural sector relative to GDP declined from 2.2% in the late 1990s to 1.9% in 2005-06. This decline can be attributed, in part, to stagnation or reductions in public investment in irrigation, especially from the mid-1990s onward. However, signs of a turnaround have emerged, with public sector investment in agriculture gaining momentum since 2002-03. Between 1999-2000 and 2005-06, the share of public investment in total agricultural investment rose by 6.5 percentage points, reaching 24.2%. Furthermore, compared to 1999-2000, public investment in the sector increased by over 11 percentage points, reaching 29.2% in 2004-05. Enhanced credit availability for agriculture and a more open trade policy for agricultural products are expected to stimulate private investment in the sector.

Given the above broad concerns, the growth-deceleration syndrome could be gauged from different angles. First, what have been the trends in agriculture GFCF vis-à-vis aggregate GFCF? Second, how different are the temporal shares of aggregate GFCF in GDP and of agriculture GFCF? The proportion of capital formation in the agricultural sector relative to GDP declined from 2.2% in the late 1990s to 1.9% in 2005-06. This decline can be attributed, in part, to stagnation or reductions in public investment in irrigation, especially from the mid-1990s onward. However, signs of a turnaround have emerged, with public sector investment in agriculture gaining momentum since 2002-03. Between 1999-2000 and 2005-06, the share of

public investment in total agricultural investment rose by 6.5 percentage points, reaching 24.2%. Furthermore, compared to 1999-2000, public investment in the sector increased by over 11 percentage points, reaching 29.2% in 2004-05. Enhanced credit availability for agriculture and a more open trade policy for agricultural products are expected to stimulate private investment in the sector.Fifth, whether the conclusions derived from CSO investment series analysis different from those of broad investment series analysis?

Table: 21.4

Gross capital formation in agriculture New series (at 1999-00 prices)

Year	Investment in Agriculture (Rs. crore)			Share in agriculture gross investment (percent)		Investment in Agr as a % of GDP at constant prices
	Total	**Public**	**Private**	**Public**	**Private**	
1999-00	43473	7754	35719	17.88	2.2	2.2
2000-01	38176	7018	31158	18.4	71.6	1.9
2001-02	46744	8529	38215	18.2	81.8	2.2
2002-03	45867	7849	38018	17.1	82.9	2.1
2003-04	47833	12809	35024	26.8	73.2	2.0
2004-05	43123	12591	30532	29.2	70.8	1.7
2005-06*	54539	13219	41320	24.2	75.8	1.9
Source : Economic Survey (2006-07)						

Quick Estimates.

Source: CSO

The sluggish growth in public investment in agriculture can be attributed to multiple factors, including the reallocation of funds from capital investments to subsidies, significant spending on maintaining existing projects, and prolonged delays in project completion. Additionally, insufficient budgetary provisions for irrigation, rural infrastructure, and agricultural research have contributed to the issue. The absence of a well-structured credit system and financial infrastructure in rural areas has further restricted investment. Moreover, private sector participation in agricultural investment has been slow to develop. The decline in rural capital formation is not solely due to lower investment or the redirection of rural savings toward urban lending but is also influenced by evolving consumption patterns in rural communities.

Owing to a higher propensity to consume, savings tend to be lower, and even the meager amounts saved are utilized for consumption purposes rather than channeled into investments.

It is argued more public investment in technology-infrastructure-institutional development by phasing out subsidies, removal of restraints on exports, reforms in institutional credit system, public investment support for management of canal irrigation, regulatory policy for containing the problems of negative externalities in private ground water exploitation, public investment for preventing land degradation as well as for rehabilitating degraded land, and institutional transformation and social capital are all intended to establish a supportive policy framework and development environment that encourages private sector participation.

Indian agriculture was able to reap the potentials of new agricultural technology because of favourable international research collaboration. Major breakthrough in frontier areas of research is lagging behind Lack of investment in research and technology has resulted in the non-availability of any new cost reducing technology in agriculture and has led to declining input use efficiency. Attributing the slow agricultural growth since the mid-1990s solely to "technology fatigue" is partially valid. The recent decline in wheat productivity in Punjab and Haryana cannot be entirely linked to this factor. Instead, continuous mono-cropping of the paddy-wheat cycle, combined with excessive chemical fertilizer use, may have degraded soil fertility, contributing to reduced yields. Additionally, the deregulation of phosphate and potash fertilizers in August 1992 disrupted the balanced use of nitrogen-phosphate-potash ratios in several agriculturally advanced states, potentially affecting soil health.

Agriculture's total factor productivity has shown a downward trend, with both technical and economic efficiency declining in the post-liberalization period. Increased nitrogen fertilizer application has not only escalated input subsidy costs but has also led to imbalanced fertilizer use. The structural challenges in agriculture, such as low public investment, stagnation in the yield potential of high-yielding wheat and rice varieties, unbalanced fertilizer application, low seed replacement rates, inadequate incentives, and limited post-harvest value addition, have contributed to sluggish growth in the sector during the new millennium.

The rising cost of crop cultivation, driven by increasing labor wages, higher input prices, and other managerial expenses, poses a significant challenge. When cultivation costs rise faster than the value of agricultural output, farmers may hesitate to adopt the recommended mix of inputs, leading to a potential decline in crop productivity.

To understand the reasons behind the slowdown in agricultural output growth, Ramesh Chand (2007) examined various influencing factors and analyzed their changes over different periods. The study identified rainfall, terms of trade, public sector capital stock, and institutional credit as key determinants of agricultural output. Compared to the 1980s, the early years of economic reforms witnessed a notable improvement in the terms of trade for agriculture, with agricultural prices rising annually by 0.95 percent relative to non-agricultural prices. Additionally, there was some progress in irrigation expansion during the initial reform period. However, the net sown area declined at an annual rate of 0.55 percent, and this reduction was not offset by an increase in cropping intensity.

A major setback for crop production stemmed from the deterioration in agricultural terms of trade and the slowdown in irrigation expansion. After 1996-97, the terms of trade for agriculture declined annually by 1.63 percent. Trade liberalization facilitated greater integration

between domestic and international markets, leading to a downward trend in global agricultural commodity prices after 1997-98, which negatively impacted domestic agricultural prices.

The irrigated area, which had grown annually by 2.62 percent between 1990-91 and 1996-97, saw a significant slowdown, with expansion reduced to just 0.51 percent per year in the subsequent period. While the net irrigated area had expanded from 20.58 million hectares in 1950-51 to 53 million hectares by 1994-95, further progress stagnated due to insufficient funding for ongoing projects and ineffective monitoring by state agencies. The primary reasons for the slowdown in irrigation include a decline in both public and private sector capital formation after 1996-97.

Key factors contributing to the nationwide slowdown in agriculture after 1996-97 include:

(a) Reduction in cultivated land due to urbanization and industrial expansion,

(b) Worsening terms of trade for agriculture,

(c) Stagnant cropping intensity,

(d) Limited progress in irrigation and fertilizer usage,

(e) Decline in electricity supply for agriculture, and

(f) Slower diversification of the agricultural sector.

Another crucial aspect affecting agriculture is risk, which has significantly increased over time. Measured as deviations from the GDP trend at current prices, agricultural risk surged by over 50 percent between 1985-86 and 1995-96 and further between 1995-96 and 2004-05.

The 1990s witnessed significant economic reforms, including changes in exchange rates and the liberalization of external trade. Efforts were made to integrate the domestic economy with global markets, which subsequently influenced the prices of various commodities. As a result, the terms of trade for agriculture experienced notable shifts during this period. Initially, agricultural activity in India primarily focused on food grain production and a few cash crops such as cotton, sugarcane, and jute. However, in recent years, the agricultural landscape has undergone substantial transformation. There has been a noticeable diversification in agricultural products, along with advancements in infrastructure, including cold storage facilities, refrigerated transportation, modern packaging, and quality control mechanisms. Percentage areas under different crops have exhibited changes over time. More remunerative crops are replaced by less remunerative ones. As a result, less remunerative crops are pushed to claim less fertile land, leading to an increase in the total area under cultivation. The pressure of population further accelerates this process.

Cereals and pulses account for a significant portion of the total cultivated land, while the area under cash crops has been expanding. Plantation crops, on the other hand, cover a minimal fraction, accounting for less than 1% of the total cropped area. Over time, the gross area dedicated to cereals and pulses has increased by around 52%, whereas the land allocated to cash crops has grown by nearly 92%. The expansion of food processing industries and evolving consumption patterns have contributed to rising demand for crops such as wheat, maize, oilseeds, sugarcane, and potatoes. However, the demand for raw materials like cotton, jute, and mesta has been affected due to the rise of synthetic fiber usage in the textile industry and the replacement of jute products with synthetic alternatives.

The Indian agricultural sector is on the verge of transformation with advancements in information technology and biotechnology. India has demonstrated its potential as a key global

player in agriculture, leading in the production of milk, fruits, pulses, cashew nuts, coconuts, and tea. It ranks second in rice and wheat production and fourth in coarse grains. Additionally, India is among the largest producers of cotton, sugar, sugarcane, peanuts, jute, tea, and various spices. Government initiatives and investment opportunities in agriculture are expected to strengthen India's position as a major food producer globally. With the increasing integration of the Indian economy into global trade, the agricultural sector faces multiple challenges. One of the major concerns is the stagnation in productivity growth for several crops, particularly in the past decade. Additionally, Indian farmers face intense competition from cheaper imported agricultural goods, posing a serious threat to their livelihoods. The impact of reducing tariffs on domestic agriculture is evident from trends in global commodity prices in the late 1990s. International prices saw a steep decline during this period, primarily due to subsidies provided by major agricultural producers such as the United States and the European Union, which distorted market competition.

Low agricultural productivity remains a persistent challenge in India. Comparative studies indicate that India's average crop yields are only 30% to 50% of the highest global levels. For example, although India accounted for 21.8% of global paddy production in 2004-05, its yield per hectare was significantly lower than that of Korea and Japan and only one-third of Egypt's, which had the highest yield. Similarly, while India contributed 12% of global wheat production, its average yield was slightly below the global average and only a third of the highest levels recorded in the UK during the same period. The yield of coarse grains and oilseeds in India stood at 33% and 46% of the global average, respectively, while cotton yields reached 63% of the global benchmark. Although variations in agro-climatic conditions contribute to these differences, there remains substantial potential for improving yields through technological advancements (Economic Survey 2006-07). Growth trends indicate that while the early years of economic reforms were relatively favorable for agriculture, a noticeable slowdown has been observed since 1995, affecting various sub-sectors and crop categories. A concerning aspect of this trend is the widening gap between the agricultural and non-agricultural sectors. At the state level, four out of the 20 major states have recorded negative growth rates, while six states report agricultural growth ranging between 0.10% and 0.95%. The primary reasons for the stagnation and decline in agricultural output after 1995-96 include reduced growth in fertiliser usage, irrigation, and energy supply (particularly electricity for agriculture). Additionally, cropping intensity and the area under cultivation have either shown minimal growth or declined over time.

Self-Check Exercise-2

> Q1. What was the primary factor contributing to the slowdown in agricultural growth post-liberalization?

> A2. How did the share of agriculture's capital formation in GDP change during the 1990s?

21.5 Constraints Facing Indian Agriculture

Indian agriculture has increasingly shifted towards small-scale farming, with nearly 40% of agricultural land now being cultivated by small and marginal farmers. Additionally, there has been a notable transition in the agricultural output mix, moving from food grains to non-food grains, and within food grains, from coarse cereals to finer varieties. The adoption of advanced agricultural inputs such as fertilizers, pesticides, high-yield seeds, and mechanized tools has significantly increased input costs. Despite substantial overall growth, the agricultural sector in

India remains inefficient and constrained by several challenges, leading to slow growth. This section explores some of the key limitations affecting Indian agriculture. As mentioned earlier, the contribution of agriculture to GDP has noticeably declined, while the service sector has become the primary driver of economic growth. This suggests that real income generation within the agricultural sector has stagnated. The technological advancements that fueled the Green Revolution in the 1970s and 1980s began to lose momentum in the 1990s. Agricultural production, which expanded at an average annual rate of 1.95% in the 1970s and accelerated to 3.82% in the 1980s, experienced a slowdown, growing at only 2.09% per year during the 1990s.

Natural resource degradation in rural areas is causing serious concern, Sustainable management of the resources is beset with two kinds of problems-managing the quantitative and qualitative dimensions of Land. The qualitative dimension relates to the issues such as increasing human and animal population pressure on land and changes in the land use pattern whereas the qualitative dimension is concerned with the loss of nutrients and the pollution of soil environment by agricultural or non-agricultural activities. Over the past decade, the net sown area (NSA) has consistently declined, while the total cultivated land, represented by the gross cropped area (GCA), has remained largely unchanged. Between 1995-96 and 1999-2000, the GCA saw a slight increase of 3.2%, whereas the NSA dropped by 6.09%. Additionally, there has been a notable reduction in common land resources (CMIE, 2004). This issue has been further exacerbated by the rapid rise in the number of small and marginal farmers, largely due to population growth. The resulting imbalance between land availability and population, coupled with continuous land fragmentation caused by family subdivisions, has made many holdings unviable and difficult to adopt modern agricultural technologies.

Land reform initiatives have not effectively addressed the problem of fragmentation. However, as landholdings became increasingly subdivided and concentrated ownership declined, the land lease market underwent significant changes in the late 1990s. Many land-poor cultivators turned to leasing land as a means of subsistence, given the lack of alternative livelihood options. Consequently, a large portion of leased land is now held by small and marginal farmers. Tenancy farming in India is characterized by limited capital investment, low-quality and scattered landholdings, monocropping practices, lack of diversification, minimal use of modern technology, and less access to institutional credit.

Technological stagnation is supported by an increasing evidence of stagnating levels of productivity growth of crops in many states as the growth rate of productivity is not consistently upward. The growth has been flat and has started declining in some of the progressive states and to reverse them is a daunting task. This is due to differential levels of adoptions of new techniques, varying degrees of water control, imbalances in infrastructural development and host of other factors. Ramasamy and Selvaraj's study (2001) revealed that the area under HYVs crops ranged between 2 per cent and 69 per cent across the states and the differential adoption rate accentuates the income distribution among the region. The estimated inequality measure (Gini coefficient) of 0.60 confirms the wide variations among the states in the adoption of HYV of crops. Despite significant technological advancements and adoption over the years, a substantial yield gap persists in many states. In the case of rice, more than half of the potential yield remains unrealized. The benefit-cost ratio for paddy has shown a downward trend, decreasing from 2.45 in 1974-75 to 1.41 in 2000-01, a pattern observed across most states.

This decline has contributed to a reduction in Total Factor Productivity (TFP). TFP, calculated as the difference between output growth and input growth using the Tornqvist-Theil index from the translog production function, saw an annual growth of 1.37% in the 1970s, rising to 1.99% before declining to 0.9% per year in the 1990s.

A decline in productivity can result from technological limitations, agro-climatic factors, or economic conditions. In recent years, the slowdown in agricultural productivity has been partially attributed to continuous mono-cropping, particularly the paddy-wheat cycle, combined with excessive use of chemical fertilizers. This practice may have negatively impacted soil fertility, contributing to reduced crop production growth. Use of fertilizer in improper ratio of N: PK is also a major problem for Indian agriculture. While the recommended ratio is 4:2:1 this ratio of N: P: K. has been around 8.5:2.6:1.The all-India average consumption of fertilizers per ha, was up at 104,50 kgs in 2005-06 from 94.52 kgs in 2004-05. This induces initial vegetative growth, susceptible to pests, diseases, lodging and causes poor floral induction and delayed maturity thereby reducing the yield. As the cropping pattern is becoming more intensive, consumption of insecticides has increased more than 100 per cent during 1971 to 1994-95. But in recent past, the consumption of chemical pesticides has come down from 66.36 thousand MT during 1994-95 to 43.59 thousand MT during 2001-02 registering a decline to the tune of 27.69 per cent. The use of pesticides has been decreasing in quantity due to a rise in bio-pesticide usage, the cultivation of more resistant crop varieties, and improved application techniques. However, excessive pesticide use has had negative health impacts, particularly on vulnerable groups like children.

According to FAO studies, small farms account for 60-70% of total farms in developing nations and contribute approximately 30-35% to total agricultural output. In India, economic liberalization began when over 40% of rural households were either landless or owned very little land. Among the remaining 60%, more than 96% had holdings categorized as marginal, small, or semi-medium. The period from 1971-72 to 1991-92 saw an acceleration in the fragmentation of land holdings. These small farms often suffer from excess labor, leading to disguised unemployment and low productivity. The adoption of modern agricultural techniques remains limited due to a lack of awareness, high costs, and challenges in implementing them on small plots of land. Irrigation facilities are inadequate, as revealed by the fact that only 53.6% of the land was irrigated in 2000-01 which resulted in farmers still being dependent on rainfall, specifically the Monsoon season., Large investments, public and private, are needed to improve seed varieties and improve irrigation and plant protection practices. Government agencies are promoting diversification in production, research, and farm extension. But successful diversification is likely to require shifting public resources away from subsidies and improving incentives for private investment.

Farmers have managed to sustain yields of modern crop varieties by increasing their use of non-land inputs. However, this has led to a decline in total factor productivity (TFP) and farming profitability. The cost of cultivating rabi crops has been rising faster than the prices of their output, suggesting that real net earnings from these crops may decrease in the future. Between 1975-76 and 1985-86, the increase in cultivation costs (both fixed and variable, referred to as C2) for most crops remained lower than the rise in the value of output, allowing farmers to recover their costs. However, from 1985-86 to 2001-02, this trend reversed, with a significant increase in C2 for key crops such as cotton, paddy, wheat, sugarcane, and

groundnut. In the case of cotton, cultivation costs rose nine times, while the value of output increased only 5.57 times during this period. Additionally, the output-to-cost ratio has not only declined but has also shown significant fluctuations since the mid-1980s.

The financial well-being of the rural population is closely linked to their purchasing power, which is largely determined by the profitability of their agricultural produce. However, in the past decade, there has been little improvement in the output-to-input ratio. One of the major challenges faced by farmers is the lack of timely and accessible agricultural inputs such as high-yielding variety (HYV) seeds, fertilizers, pesticides, and modern farm equipment. These constraints significantly hinder agricultural productivity. In addition to inputs, access to credit plays a crucial role in supporting farmers' working capital and investment needs. Despite the extensive presence of Rural Financial Institutions (RFIs), a substantial portion of the rural population still lacks access to formal banking services. This financial exclusion limits their ability to invest in better farming practices, further exacerbating economic difficulties in the agricultural sector.

It is widely recognized that fixed capital formation plays a crucial role in sustaining agricultural growth by lowering transaction costs for private farmers and reducing operational cultivation expenses. However, public sector investment in agricultural fixed capital has been on a continuous decline, both in absolute terms and as a proportion of agricultural GDP. Between 1990-91 and 2002-03, public investment in agriculture (at 1993-94 prices) remained largely stagnant, fluctuating between Rs. 4,000-5,500 crore. This decline in public investment is often cited as a key factor behind the sector's underperformance in recent years. Additionally, the share of government expenditure allocated to agriculture has not increased over time but has instead declined, currently accounting for only 5.2% of the total public outlay. The decreasing real public investment in agriculture remains a significant concern.

Self-Check Exercise-3

> Q1.   Describe the trend in India's agricultural GDP share.

> Q2.   What is a major challenge related to land holdings in Indian agriculture?

21.6   Convergence or Divergence of Agricultural growth

Regional Dispersion of Agriculture Growth and Regional Inequalities

A vast country of subcontinental size like India with market regional diversities in agro-climatic environment, resource endowment and population density is likely to be characterized by uneven economic and agricultural development among various regions. During the early seventies, the NAT which led to appreciable increases in the yield of wheat and rice was more or less confined only to Punjab, Haryana and Western Utter Pradesh in North-Western India. During the 70s, the Green Revolution spread to new areas like coastal Andhra Pradesh and Tamil Nadu, eastern U.P. and part of Rajasthan. A significant development in the 1980s was the expansion of NAT into the eastern states of India, including Bihar, Odisha, Assam, and West Bengal. For the first time, densely populated states have experienced growth in productivity and output level. As a consequence, the regional pattern of labour and land productivity has changed in various regions during the 1980s.

Another important change during the early 80s and the mid 90s is that a distinct change in cropping pattern from coarse cereals towards oilseed has been observed. This shift was

particularly noticeable in the control region but was also prominent, though to a lesser extent, in the southern regions.

It has been argued that Green Revolution has led to an increase in regional inequalities. A detailed study by Sawant and Achutan (1998) also reaches similar conclusions. The main findings of their study are.

(i)   All the states whether growing foodgrains of non-foodgrains have performed well during period II (1981-82 to 1990-91) as against period 1@ (1968-69) to 1981-82).

(ii)   West Bengal recorded the highest rate of growth of productivity 5.05 per cent in period II followed by Haryana (5.10) per cent per annum.

(iii)   In Madhya Pradesh output growth rate moved up steeply from 0.88 per cent in period 1 to 2.37 percent per cent in period II despite a significant negative rate of growth of area from 0.57 per cent to 0.58 per cent.

(iv)   The rate of a growth recorded in eastern region has attracted a good deal of attention. Absolute stagnation in production and productivity of foodgrains in period I has been replaced by growth rates closed to or higher than 3 per cent.

The horizontal spread of new agriculture technology can be attributed to many factors viz. expansion in irrigation and extension services, development of infrastructure required for distribution of inputs, etc. Out of the above mentioned factors, expansion of net irrigated area, which was just 2 per cent in 70s moved up to 24 per cent in the 80s has been identified as the major cause for growth in production and productivity in eastern states.

Another study by Rao and Servas has pointed out relatively successful agrarian reforms as the major force behind the significant growth rates of foodgrains in West Bengal.

However, there seems to be a general consensus that in the early period of the NAT, large farmers gained more in comparison to small and marginal farmers. In the later phase of NAT, there is a difference of opinion. Some studies indicated that new technology was scale neutral. Because of improved supply of inputs, especially credit and extension services, small farmers also benefitted.

There is a general consensus that the adoption of green revolution has reduced labour absorption in agriculture. A study by Sheila Bhalla indicates that the employment elasticity of crop output which stood 0.77 for 1968-69 to 1978-79 declined to 0.59 between 1971-72 to 1983-84. The uneven regional growth was mainly responsible for the low absorption of labour within agriculture.

In recent years a significant development in the pattern of rural labour absorption has been a shift away from crop production into rural non-farm activities like agro-processing industries and other rural industries. The growth of rural industries is positively related to faster agricultural growth displaying higher labour productivity and a higher incidence of wage labour.

The NSS data for nineties clearly shows up a mixture of gains and losses for rural and urban employment growth rates. the overall rate of growth of employment for rural workers declined form 1.75 per cent per annum during 1983/1993-94 to a low of 0.66 percent per annum during the post-reform years, for rural males, it declined from 1.94 per cent to 0.94 per cent and for rural females, it declined from 1.41 per cent to an abysmally low of 0.15 per cent. In sum, it is

pretty much clear that the rosy employment friendly picture that was believed by some reform protagonists to follow, has not come off; in fact it is the contrary that seems to have happened.

The post-green revolution period has witnessed impressive structural changes taking place in Indian agriculture. The persistent problem of wide regional disparities across states/regions continues to be a serious challenge. This is driven partly by the diversity in production potential and extensive cultivation in marginal areas, and partly by policy priority promoting food production regardless of technical or economic efficiency. There has been enough evidence on regional variations in agricultural performance. The earlier studies have shown that there are large disparities in agricultural performance across regions and this increased in the immediate post-green revolution period. A recent study by Chand (1999) observed that since 1980-81 regional divergences in agricultural productivity and income have grown and the gap between developed and under-developed states has further widened.

The slowdown in agricultural growth reignited discussions on convergence and divergence in the sector during the late 1990s, particularly in the post-Green Revolution era. Researchers have employed two main approaches to examine this issue: one relies on regression analysis, while the other utilizes an index based on inequality measures.The first approach is based on theoretical basis while the second is based on statistical measures. The study based on second approach shows that regional disparities in agricultural productivity which have shown an increasing trend during 1980s is not seen to have declined in new millennium. Instead, they persist and pose a challenge to attain a balanced regional development. Except, Andhra Pradesh, Gujarat, Jammu & Kashmir, Karnataka, Madhya Pradesh and Maharashtra, all other states have shown deceleration in growth of agricultural productivity. It is often contended that economic reforms did not significantly benefit the agricultural sector, as they primarily focused on price-related factors while neglecting necessary infrastructure and institutional changes. Additionally, the reduction in public investment in agriculture during the 1990s had an adverse effect on the sector's growth. However, Regional disparities in agricultural income have marginally declined, but still it is at a very high level.

Self-Check Exercise-4

Q1.   What are some factors contributing to regional disparities in agricultural development in India?

Q2.   What are two approaches used to analyze the issue of convergence and divergence in agricultural growth across regions?

21.7   Summary

This unit covered the patterns of agricultural production and productivity in India. It examined the growth trends across four key phases: the pre-Green Revolution era, the early Green Revolution period, the phase of its maturity, and the period of economic liberalization and subsequent slowdown in agricultural growth. Additionally, the lesson explored the factors contributing to the decline in agricultural growth and the challenges faced by Indian agriculture.

21.8   Glossary

- **Gross Capital Formation (GCF):** Represents the total investments in fixed assets within an economy, including net changes in inventory levels.
- **Crop Yield:** Refers to the amount of agricultural output obtained per unit of cultivated land.
- **Agricultural Productivity:** Measures the efficiency of agricultural production, expressed as the ratio of output to input.
- **Gross Fixed Capital Formation (GFCF):** Indicates the net increase in physical assets, accounting for investments while excluding depreciation.

21.9 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 21.3.

Answer to Q2. Refer to Section 21.3.

Self-Check Exercise-2

Answer to Q1. Refer to Section 21.4.

Answer to Q2. Refer to Section 21.4.

Self-Check Exercise-3

Answer to Q1. Refer to Section 21.5.

Answer to Q2. Refer to Section 21.5.

Self-Check Exercise-4

Answer to Q1. Refer to Section 21.6.

Answer to Q2. Refer to Section 21.6.

21.10 References/Suggested Readings

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21.11 Terminal Questions

Q1. Critically examine the trends in agricultural production and productivity in India.

Q2. Discuss the challenges faced by the Indian agriculture sector in detail.

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INDIA'S ENGAGEMENT WITH INTERNATIONAL INSTITUTIONS

Structure

22.1   Introduction

This unit explores India's involvement with major international financial institutions, including the International Monetary Fund (IMF), the World Bank, the Asian Development Bank (ADB), and the International Development Association (IDA). We will explore the objectives and functions of these institutions and examine India's involvement and benefits from these associations. This discussion will provide insights into how these international financial institutions have influenced India's economic policies and development.

22.2   Learning Objectives

After going through this lesson, you will be able to define :

- India's Engagement with IMF.

- India's Engagement with the World Bank.

- India's Engagement with ADB.

- India's Engagement with IDA.

22.3   International Monetary Fund (IMF)

The currency developments in the inter-war period pinpointed the need for international monetary co-operation and collaboration to promote exchange stability, to secure a balanced growth of international trade and while avoiding competitive exchange depreciation and exchange restrictions, to secure full employment in the countries. A great deal of thought to the future international currency system was given in a number of countries and a number of plans were put forward.

22.3.1 The Bretton woods conference

All the plan proposed by America, Britain and Canada were considered at the Bretton woods conference in July, 1994. The objectives of these proposals were to provide a system of stable exchanges which was less likely to cause unmercenary misery to the world and less likely to disrupt itself under the pressure of its own operations. If a country refused to act according to its suggestions, there was little or no coercion except expulsion. However, it was extremely doubtful whether these fines and other conditions stipulated would have been sufficient to restore equilibrium. As a consequence of the discussions held at this conference, two international organisations, viz., International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD) were set up.

The IMF was established in 1944 and come into existence on 27th Dec, 1945 in the aftermath of The Great Depression of 1930s, 44 founding member countries sought to build a framework for international economic cooperation. Today, its membership embraces 190 countries with staff drawn from 150 nations. The IMF is governed by and accountable to these 190 countries that make up its near global membership.

22.3.2 Objectives of the IMF

The objectives of the IMF are following

(i)   To promote international monetary cooperation through a permanent institution which provides the machinery for consultation and collaboration in international monetary problems.

(ii)   To ensure stability in foreign exchange rates

(iii) To eliminate exchange control

(iv)   To promote international trade.

(v)   To promote investment of capital in backward and underdeveloped countries.

(vi)   To eliminate or reduce the disequilibrium in the Balance of Payments (BoPs).

(vii) To achieve balanced economic growth, especially of the backward countries, by securing a rise in the level of employment.

22.3.3 Functions of the IMF

The main purposes for which the IMF has been set up are "to provide exchange stability, temporary assistance to countries falling short of foreign exchange and sponsoring of international measures for curing fundamental causes of disequilibrium through avoiding competitive exchange depreciation and through the conversion of national currencies into one another." To achieve these objectives, the functions of IMF are following.

(i)   It serves as a short term credit institution

The IMF guarantees a line of credit to every member country to enable it to tide over temporary deficits in its balance of payments. However, each country has to maintain its own monetary and foreign exchange reserves to meet its normal requirements. The IMF provides only a second line of defense in case of emergency.

(ii)   It permits adjustments of exchange rates

The IMF provides a mechanism for improving long term balance of payment position. For this purpose there is provision of orderly adjustment of exchange rates. Member countries are forbidden to indulge in irresponsible and competitive exchange depreciation. Exchange rates can be altered only in a manner as required to declare the par value of their currency US dollar. Those par values can be changed only to improve the long-term balance of payments positions.

(iii) It provides a machinery for international consultation

It brings together representatives of the principal countries of the world and affords an excellent opportunity for reconciling their conflicting claims. This sort of approach not only produces a stabilizing influence on world economy, but also leads to a balanced development and growth of world trade and world production. To achieve this the Fund is engaged in constant study and research relating to the important and urgent economic problems of the world.

India and IMF

India became a member of IMF since 1st March, 1947. The membership of the IMF has immensely benefited India. Before devaluation of the Rupee in September 1949, when India

suffered from balance of payments difficulties, obtained nearly $ 90 million from Fund. Again in 1952 India's deficit in the balance of trade considerably increased, India received further assistance from the Fund. From the very beginning of the second plan India started facing foreign exchange difficulties. During 1957 when the situation became extremely critical. India got a total credit amounting to Rs. 95.2 crore (i.e, $ 200 million) from the fund. In September 1978 when the intrim committee of the Fund decided on a new allocation of 12 billion SDR's at the rate of four billion SDRs a year, over the three your period 1979 to 1992, India's share of this allocation had been estimated to be 3.58 million SDRs.

India added 119 million SDRs to its foreign exchange reserves at the end of January 1979. In the beginning of January, 1979 India had in its reserves about 180 millions SDRs, which were the balance after transaction, out of the first allocation of 326 million SDRs in initial three year period of 1970-72. It may be useful to note that India's foreign exchange reserve rose from Rs. 732 crore at the end of March 1971 to over Rs. 900 crore in the beginning of May 1975 mainly due to the allocation of SDRs from the IMF. At the end of July 1975, the IMF approved a drawing of 201.3 million SDRs by India from the 1975 oil facility. Another drawing of nearly 200 million SDRs by India was allowed by the Fund from the 1976 oil facility and the same amount in 1977. Thus India with the help of the Fund, could meet the deficit on balance of payments due to increase in the cost of petroleum and petroleum products. India received allocations of SDR 19.08 million on January 1, 1979, SDR 19.08 million on January 1, 1980 and SDR 16.79 million on January 1, 1981.

India entered into an agreement with the IMF in 1979 for a loan of $ 5.6 billion under the extended fund facility. It received the first installment on 9th November, 1981 and upto April, 1984 it had drawn $ 3.9 billion. Thereafter, India did not take any help from IMF till December, 1990. But in December 1990, India had to face a very serious problem in its balance of payments due to the Gulf crisis. It, therefore, approached the Fund for excess to resources under its modified compensatory and contingency financing facility (CCFF). India received $ 0.79 billion as the first credit tranche of a stand by arrangement for three months in January, 1991. Simultaneously, India got the first credit of $ 1.09 billion under CCFF facility, $ 220 million in July, 1991 and $ 635 million in September, 1991. On 31st October, 1991, the Fund approved a stand by credit of $ 2.2 billion to be disbursed to India in 8 tranches over a 20 month period from November, 1991 to June, 1993. Normally the member countries got only 50 to 60 percent of their quotas in loans. But India received more than 100 percent of its quota. As against its quota of 3.01 billion drawings from the Fund from January, 1991 to June, 1993 to totalled $ 3.5 billion. Besides these loans, India has also been getting advisory services from the fund under Fund surveillance conditionally. Particularly on subjects relating to balance of payments and exchange rate problems. The fund has also been extending short form training facilities to Indian personnel on monetary, fiscal, banking, exchange and balance of payments policies. In short, India has benefited a lot from the membership of the Fund.

Self-Check Exercise-1

Q1. Briefly describe the main reasons for the establishment of the International Monetary Fund (IMF).

Q2. What were the key outcomes of the Bretton Woods Conference held in July 1944?

Q3. List three primary objectives of the IMF.

22.4   The World Bank

International Bank for Reconstruction and Development.

The Bretton Woods conference, which considered ways and means for central banking co-operation and resolved for the establishment of IMF, also recommended for the establishment of International Bank for Reconstruction and development. This monetary and Financial conference of the United Nations drew up the articles of Agreement of the bank and passed the final Act in July, 1944. The Bank along with the Fund scheme came into existence on December 27, 1944, when its article of agreement were signed by 28 Governments. It began operations on June 25, 1946.

While the IMF was established to promote international monetary co-operation, to facilitate the expansion and balanced growth of international trade, to promote exchange stability and to avoid competitive exchange depreciation; the IBRD was established to assist the reconstitution and development of territories of member countries by facilitating the investment of capital for productive purposes. Its object was to restore the economy of war-damaged countries and to encourage the development of productive resources in the less developed economies. It is, therefore, a complementary institution to the IMF.

The IBRD is a joint effort at international level to guide international investment into economically sound channels. It endeavours to facilitate the international flow of capital for purposes of increasing production, both in war-ravaged countries and economically backward areas of the world. Its objective is to help its members in attaining and maintaining balanced national economies. Where the export of goods and services can eventually pay for an adequate volume of imports and thus, to contribute to a healthy expansion of international trade. The Bank is the first venture of permanent international co-operation in long-term foreign holding. Its basic concept is that of an institution the capital of which is subscribed by all its members and on the board of which represented. Its unique feature is that it provides an opportunity for participation to lender and borrowers alike in drafting borrowing and lending policies.

22.4.1 Objectives of the IBRD

1. To offer long-term financial assistance to member nations for economic development and reconstruction.

2. To encourage sustained capital investment, ensuring balance of payments stability and fostering balanced international trade growth.

   i.   To facilitate capital investment in member nations through the following measures:

   a) Providing guarantees for private loans or investments.

   b) Offering loans on favorable terms for productive activities when private capital remains unavailable despite guarantees.

   ii.   To support the execution of development initiatives, aiding in the transition from wartime economies to peacetime stability.

   iii. To support the reconstruction and development of member nations by promoting capital investment for productive activities. This includes rebuilding economies affected by war, adapting industrial facilities for peacetime requirements, and fostering the growth of resources and industries in less developed regions.

3. To encourage private foreign investment, the institution offers guarantees on loans and other investments made by private entities. In cases where private capital is unavailable on reasonable terms, it provides financial support under appropriate conditions, using its own capital or other available resources.

4. To facilitate the long-term, balanced expansion of global trade and maintain balance of payments stability, the EU encourages international investments in developing member countries' productive resources, thereby improving productivity, living standards, and labor conditions.

22.4.2 India and the World Bank

During 1985-86 the bank approved loans of the value of SDR 1,743.2 million of these loans, SDR 506 million were for agriculture and rural development, SDR 485 million were for power project and SDR 75 million were for industry.

The bank has also extended technical assistance to India in the form of services of its technical experts. India has been the largest receiver of the world bank assistance since 1949. The total disbursement to India during fiscal year 1996 amounted to SDR 1,309 million. The bank has also been assisting India in its projects, aircrafts, coal, iron, aluminum, fertilizer. railway modernisation and providing technical assistance etc. The bank has also assisted India in solving its river water dispute with Pakistan. In sum, the bank has provided immense support to India in the development of agriculture industry and transport. The aid India consortium of 12 developed countries which has been providing aid to India for its development plans at the initiative of the world bank, has been replaced by India Development forum since 1995.

Self-Check Exercise-2

Q1. What was the primary purpose of establishing the International Bank for Reconstruction and Development (IBRD) during the Bretton Woods Conference in 1944?

Q2. List two ways the IBRD promotes capital investment in member countries.

22.5. The Asian Development Bank

The Asian Development Bank (ADB) is a financial institution setup for lending funds, encouraging investment and providing technical assistance to the developing member countries and generally for fostering economic cooperation in the Asian region. The ADB is the product of the First Ministerial conference on Asian Economic Co-operation held under the auspices of CEAFE in Manila in December 1963. The Initiative was taken by a working group whose recommendation were submitted to the ECAFE session in Willington in March 1965.

A consultative committee was setup to draft the charter which was adopted at the second Ministerial conference on Asian Economic Co-operation held in Manila in November-December 1965. Although the charter was formally signed on 4 December, it was left upon for additional signatures in Bangkok unitll 31st January, 1966. It finally come into force on the 22nd August 1966 with the ratification by 15 of the 31 signatories and by September 30 of that year, 30 nations has satisfied the conditions for membership and remitted the first installment of their paid-up capital Preliminary arrangements her the establishment of the Bank were made by a preparatory committee set up in December 1965. The inaugural meeting of the Bank's Board of Governers was held on 24-26 November, 1966 in Tokyo. At that meeting, Indonesia became the 31st member of the Bank and Swizerland's application for membership was approved.

Switzerland become a member of the Bank in December 1967 and Hongkong in March 1969. The Bank started its business formally on 19 December, 1966.

22.5.1 Objectives of the ADB

The objectives of the ADB are following :

1. To help the member countries in countering poverty.

2. To help the member countries to promote economic growth

3. To develop human resources

4. Improve the status of women

5. Protecting the environment.

22.5.2 Functions of Asian Development Bank

The functions of ADB are as follows:

1. Economic and Social Advancement

The Asian Development Bank (ADB) offers a membership program that grants various advantages to participating nations. It extends financial assistance to its member countries through concessional loans and investments. Additionally, ADB supports the economic and social progress of developing member nations by providing funding through loans and equity investments.

2. Technical Assistance

The ADB provides technical assistance for the preparation and implementation of development projects and advisory services.

3. Investment Promotion

The ADB also provides some specific sorts of investment facilities for development purposes.

4. Support in Policies and Plans

The ADB provides help to the member countries in framing policies and plans at the international level.

India and the ADB

India obtained the membership of the Bank in 1966. The Bank's involvement with India started in 1986 when it granted the first loan of $ 100 million to ICICI. Up to 1989, the Bank had provided loans amounting to $ 1.6 billion for 14 projects, all in the private sector.

The Bank had expressed serious concern about the under-utilization of the aid received under most of the external insistence programs out of a total of $ 4175.4 million loans approved for 20 ongoing projects in India till 1994, only $ 1435.9 million had been disbursed. It had approved loans amounting to $ 4.37 billion up to 1995, for energy, infrastructure, and the financial sector. The main reason for the under-utilization was the long delays in project implementation. According to the ADB authorities, the underutilization of foreign loans has not been because of a lack of absorption capacity, but because of deep-rooted structural impediments in the system of public administration/public sector units/line agencies.

Self-Check Exercise-3

       Q1.   When and why was the Asian Development Bank (ADB) established?

       Q2.   When did the ADB formally start its operations?

       Q3.   List three primary objectives of the ADB.

22.6. International Development Association (IDA)

The IDA was set up by a resolution of the IBRD adopted on 1st October 1959, which read "Resolved that with respect to the question of creating International Development Association as an affiliate of Bank, the Executive Directions, having regard to the views expressed by governors and considering the broad principles on which such an association for submission to the member governments of the Bank." The IDA formally started its operations on November 8, 1960. It grants development loans more generously to the developing countries and its terms are more flexible than the loans advanced by IBRD. It supplements the activities of the IBRD by granting loans on more liberal terms for projects which do not carry the guarantee of the government of the country concerned or they do not contribute directly and immediately to the productive capacity of the borrowing country. Not only that, the rate of interest charged by the IBRD being high and the period of repayment being short and urgent need was felt for setting up a new international financing agency and this need was fulfilled by setting up the IDA has been nicknamed as the 'Soft Loan Window.'

22.6.1 Objectives of IDA

The objectives of IDA are following:

       1.   To promote financial assistance to less developed countries on easy terms with a lower servicing charge than the one charged by the World Bank.

       2.   Promotion of economic development, increase in productivity and consequent improvement.

22.6.3 India and IDA

India has been the largest beneficiary of IDA. It had drawn the largest amount of IDA credits in 1980 which was 40 percent of IDA's global lending. After the entry of china the lending to India has constantly declined. From 40 percent in 1980, it declined to 28 percent in 1984, to 22 percent in 1985 to 19.9 percent in 1986 and 18 percent in 1987. Between 1981-85 India received 30.5 percent of the total assistance. From 1985 onwards it has ranged between 15 to 20 percent every year. During 1995-96 India received $ 1.3 billion interest free IDA loan for elementary education, health, nutrition, food safety, social safety programme, environment security and supervision.

Self-Check Exercise-4

       Q1.   When was the IDA formally established and what is its primary purpose?

       Q2.   Why is the IDA called the "Soft Loan Window"?

       Q3.   List two main objectives of the IDA.

22.7 Summary

This unit examined India's involvement with key international financial institutions, including the International Monetary Fund (IMF), the World Bank, the Asian Development Bank (ADB), and the International Development Association (IDA). It highlighted their objectives, roles, and

contributions toward economic stability and growth. Additionally, the discussion covered the advantages and challenges India has faced as a member of these organizations. Gaining insights into these partnerships provides a deeper understanding of India's economic progress and its engagement with the global financial system.

22.8 Glossary

- **International Monetary Fund (IMF):** A global organization that fosters monetary cooperation, ensures financial stability, facilitates international trade, and supports economic growth while working to alleviate poverty.

- **World Bank:** A financial institution that offers funding and grants to low- and middle-income nations, assisting them in infrastructure development and poverty reduction efforts.

- **Asian Development Bank (ADB):** A regional financial institution dedicated to promoting economic and social progress in Asia by providing financial assistance, technical support, and investments to its member countries.

- **International Development Association (IDA):** A segment of the World Bank focused on aiding the world's least-developed nations through grants and concessional loans to drive economic progress and social well-being.

- **Special Drawing Rights (SDR):** A reserve asset introduced by the IMF to supplement the official foreign exchange reserves of its member countries.

22.9 Answers to Self-Check Exercise

Self-Check Exercise-1

Answer to Q1. Refer to Section 22.3.

Answer to Q2. Refer to Section 22.3.1.

Answer to Q3. Refer to Section 22.3.2.

Self-Check Exercise-2

Answer to Q1. Refer to Section 22.4.

Answer to Q2. Refer to Section 22.4.

Answer to Q3. Refer to Section 22.4.1.

Self-Check Exercise-3

Answer to Q1. Refer to Section 22.5.

Answer to Q2. Refer to Section 22.5.

Answer to Q3. Refer to Section 22.5.1.

Self-Check Exercise-4

Answer to Q1. Refer to Section 22.6.

Answer to Q2. Refer to Section 22.6.

Answer to Q3. Refer to Section 22.6.1.

22.10 References/Suggested Readings

- Mishra, S.K., & Puri, V.K. (2020). Indian Economy. Himalayan Publishing House.

- Aggarwal, N. (1995). Indian Economy Problems of Development and Planning. Wishma Prakasha.

22.11 Terminal Questions

Q1. Explain the establishment, objectives, and key functions of the Asian Development Bank (ADB). Discuss how ADB has contributed to its member countries' economic and social advancement, particularly focusing on its role in technical assistance and investment promotion.

Q2. Discuss the role and importance of the International Development Association (IDA) in providing financial assistance to developing countries. How has India benefited from IDA's assistance over the years, and what challenges have been associated with this assistance?

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