GBA S1 02

BUSINESS ECONOMICS

SEMESTER – 1

BACHELOR IN BUSINESS ADMINISTRATION
BLOCK 1

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BACHELOR IN BUSINESS ADMINISTRATION

BUSINESS ECONOMICS

Block-I

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Introduction to Business Economics, Economic Principle, Economic Practices of Management, Role and Responsibilities of Business Economist.

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Concept of Supply, law of supply, factors affecting supply

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Concept of Production : Factors, Functions, Linear Homogeneous Production Function, Optimum input combinations, Laws of variable proportion, Returns to scale, Economies and diseconomies of scale.

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COURSE INTRODUCTION

This is the second course in BBA programme. This course introduces us to the subject- Economics. The study of Economics is very interesting as it enables us to explain some of the basic problems of our life– like the problem of making choices amongst our wants, that is– the problem of utilizing our limited resources to fulfil our unlimited wants. In doing this, it encompasses a wide array of subject matters which influences our basic day-to-day life.

This course consists of twelve units and is devided into two blocks.

Block 1 deals with the introductory concepts of Business economis, Demand, Supply, Production Function, cost and the concepts of market structure in perfect competition.

Block 2 concentrates on market structure in imperfect competition , distribution theory, concept of wage, diferent profit theories , economic enviornment of business and monetary and fiscal policies.concept of wage, diferent profit theories , economic enviornment of business and monetary and fiscal policies.

Each unit of these blocks includes some along-side boxes to help you know some of the difficult, unseen terms. Some “EXERCISES” have been included to help you apply your own thoughts. You may find some boxes marked with: “LET US KNOW”. These boxes will provide you with some additional interesting and relevant information. Again, you will get “CHECK YOUR PROGRESS” questions. These have been designed to self-check your progress of study. It will be helpful for you if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit. you in making your learning more active and efficient. And, at the end of each section, you will get “CHECK YOUR PROGRESS” questions. These have been designed to self-check your progress of study. It will be better if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit.

BLOCK INTRODUCTION

This is the *First Block* of the course '***Business Economics***'. After completing this block, which consists of six units, you will be able to get a fair idea on the different concepts in business economics.

This block comprises the following six units :

The first unit introduces us to the Business Economics, Economic Principle, Economic Practices of Management, Role and Responsibilities of Business Economist.

The second unit gives us a broad overview Concept of Demand , Types, Determinants, Demand Function, Demand Elasticity, Demand Forecasting

The third unit gives us an idea on concept of supply, law of supply and factors affecting supply.

The fourth unit will help us in understanding concept of Production , factors, Functions, Linear Homogeneous Production Function, Optimum input combinations, Laws of variable proportion, Returns to scale, Economies and diseconomies of scale.

The fifth unit is about cost function.

The sixth unit enlighten us with the concept of market structure under perfect competition.

The structure of Block 1 is as follows :

UNIT 1 : Introduction to Business Economics
UNIT 2 : Demand
UNIT 3 : Supply
UNIT 4 : Production
UNIT 5. Cost
UNIT 6. Market Structure: Perfect Competition

UNIT 1: INTRODUCTION TO BUSINESS ECONOMICS

UNIT STRUCTURE

1.1 Learning Objectives

1.2 Introduction

1.3 Introduction to Business Economics

1.4 Nature and scope of Business Economics

1.5 Economic Principle

1.6 Economic Practices of Management

1.7 Role and Responsibilities of Business Economist

1.8 Let Us Sum Up

1.9 Further Reading

1.10 Answers to Check Your Progress

1.11 Model Questions

1.1 LEARNING OBJECTIVES

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

- describe business economics
- explain the nature and scope of business economics
- discuss the basic principles in economics
- learn the economic practices of management
- learn the economic laws and principles
- learn about a business economist and his role and responsibilities.

1.2 INTRODUCTION

In this unit we will discuss the topic Business Economics. Business economics is mostly the application of that part of micro-economics which is of great interest and importance to managers. It has some application of macro economics as well.

Economics is the study of how society manages its scarce resources. It is a study of how people make decisions, how much they work , what they buy , how much they save and how they invest their savings and so on .In section 1.4 , we will nature and scope of business economics.

Economics has a great application in Management. The Manager of a business firm should have sound knowledge of Economics. The knowledge of economics helps the manager to take business decision efficiently resorting how to allocate the scarce resources, how to determine the price, how to plan the future project etc.

A business economist advises the manager of a business firm in taking various decisions pertaining to his firm.

1.3 INTRODUCTION TO BUSINESS ECONOMICS

Business economics can be seen as applied microeconomics. It is mostly application of micro-economics and some part of macro economics. The manager of a business enterprise has to make a lot of decisions. While making a business decision, he has to ensure the best use of the scarce resources.

The goal of a manager is either maximization of production with the available resources or minimization of cost for a given level of output. A study of the business or managerial economics helps managers in decision-making process. Since the resources of firms are scarce, they have to be used wisely. A greater degree of efficiency in their use will enable them to make either maximum profits or reasonably satisfactory profits. Now, the manager of a firm has a number of alternatives. Business economics helps in analyzing alternatives and the selecting the one which would achieve the optimal result. The following are some of the definitions of managerial or business economics.

E Mansfield defines managerial economics as-

'Managerial economics is concerned with the application of economic concepts and economic analysis to the problem of formulating material managerial decisions'.

Spencer and Siegelman defines Managerial economics as -

'The integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management'.

Prof. Evans J. Douglas defines managerial economics in these words:

'Managerial economics is concerned with the application of economic principles and methodologies to the decision making process within the firm or organization under condition of uncertainty. It seeks to establish rules and principles to facilitate the attainment of the desired economic goals of the management. These economic goals relating to costs, revenues and profits are important within both the business and non-business institutions'.

1.4 NATURE AND SCOPE OF BUSINESS ECONOMICS

Nature of Business Economics:

Business economic seeks to establish rules which help business firms attain their goals, which indeed is also the essence of the word normative. However, if the firms are to establish valid decision rules, they must thoroughly understand their environment. This requires the study of positive or descriptive theory. Thus, Business economics combines the essentials of the normative and positive economic theory, the emphasis being more on the former than the latter.

Scope of Business Economics:

As regards the scope of business economics, no uniformity of views exists among various authors. However, the following aspects are said to generally fall under business economics.

1. Demand Analysis and Forecasting
2. Cost and production Analysis.
3. Pricing Decisions, policies and practices.
4. Profit Management.
5. Capital Management.

The scope of business economics are discussed as follows:

1. Demand analysis and forecasting: The foremost aspect regarding scope is demand analysis and forecasting. A business firm is an economic unit which transforms productive resources into saleable goods. Since all output is meant to be sold, accurate estimates of demand help a firm in minimising its costs of production and storage. A firm must decide its total output before preparing its production schedule and deciding on the resources to be employed. Demand forecasts serves as a guide to the management for maintaining its market share in competition with its rivals, thereby securing its profit.

2. Cost and production analysis: A firm's profitability depends much on its costs of production. A wise manager would prepare cost estimates of a range of output, identify the factors causing variations in costs and choose the cost-minimising output level, taking also into consideration the degree of uncertainty in production and cost calculations. Production processes are under the charge of engineers but the business manager works to carry out the production function analysis in order to avoid wastages of materials and time. Sound pricing policies depend much on cost control. The main topics discussed under cost and production analysis are: Cost concepts, cost-output relationships, Economies and Diseconomies of scale and cost control.

3. Pricing decisions, policies and practices: Another task before a business manager is the pricing of a product. Since a firm's income and profit depend mainly on the price decision, the pricing policies and all such decisions are to be taken after careful analysis of the nature of the market in which the firm operates. The important issues studied in this topic are Market Structure Analysis, Pricing Practices and Price Forecasting.

4. Profit management: Each and every business firms are tended for earning profit; it is profit which provides the chief measure of success of a firm in the long period. Profits are the reward for uncertainity bearing and risk taking. A successful business manager is one who can form more or less correct estimates of costs and revenues at different levels of output. The more successful a manager is in reducing uncertainty, the higher are the profits earned by him. It is therefore, profit-planning and profit measurement constitutes the most challenging area of business economics.

5. Capital management: Still another most challenging problem for a modern business manager is of planning capital investment. Investments are made in the plant and machinery and buildings which are very high. Therefore, capital management requires top-level decisions. It means capital management i.e., planning and control of capital expenditure. It deals with Cost of capital, Rate of Return and Selection of projects.

6. Inventory management: A firm should always keep an ideal quantity of stock. If the stock is too much, the capital is unnecessarily locked up in inventories At the same time

if the level of inventory is low, production will be interrupted due to non-availability of materials. Hence, a firm always prefers to have an optimum quantity of stock. Therefore, business economics will use some methods such as ABC analysis, inventory models with a view to minimizing the inventory cost.

7. Environmental issues: There are certain issues of macroeconomics which also form a part of business economics. These issues relate to general business, social and political environment in which a business enterprise operates.

8. **Business cycles:** Business cycles affect business decisions. They refer to regular fluctuations in economic activities in the country. The different phases of business cycle are depression, recovery, prosperity, boom and recession. Thus, business economics comprises both micro and macro-economic theories.

The subject matter of business economics consists of all those economic concepts, theories and tools of analysis which can be used to analyze the business environment and to find out solution to practical business problems

1.5 ECONOMIC PRINCIPLE

Economics is the study of how society manages its scarce resources. It studies how people make decisions, how much they work, what they buy, how much they save, and how they invest their savings. It also studies how people interact with one another in ordinary business of life. Economist analyzes the forces and trends that affect the economy as a whole including the rate at which prices are changing, rate of unemployment, growth of international trade etc. Although the scope of economics is very vast, it can be summarized in terms of some basic principles:

Principle 1: People face trade off between alternatives:

When people are grouped into societies, they face different kinds of trade off between alternatives. The more we spend on one commodity, the less we spend on the other commodity. As for example, there is a trade off between national defence and welfare expenditure for the government. For an individual family, there is a trade off between family income and luxury commodity or essential commodity.

Principle 2: Opportunity cost:

In general, economists define the “opportunity cost” of any good or service as the value of all the other goods or services that we must give up in order to produce it. For instance, there can be a trade-off between machines and food. Whenever we increase the output of gadgets we must decrease the output of food. This is a cost: it is the “opportunity cost” of the increase in production of gadgets.

Principle 3: Scarcity of resources:

Resources of all kinds are scarce. That simply means that we do not have enough resources to produce all of the goods and services that

we might like to have. It means that we, as a society, must somehow answer some basic questions: What resources should be used to produce which goods and services. To answer these questions, and to get the resources to the users, is to "allocate" resources. We would, of course, like to organize things in a way that the resources are used for the most urgent and rewarding kinds of production -that is, we would like to allocate resources "efficiently."

Principle 4: People's response to incentives:

An incentive is something that induces a person to act. Because rational people make decision by comparing costs and benefits, they respond to incentives. Incentives are crucial for analyzing how market works. For example, when price of apple rises, consumers decide to buy less apples and at the same time apple orchard owners decide to hire more workers and harvest more apple because the benefit of selling an apple is more than before.

Principle 5: Trade can make everyone better off:

In the world of unlimited wants, no nation by itself can produce all goods and services which its people require for their consumption. The differences in production possibilities lead to a situation where some countries can produce some goods and services more efficiently than others. So there should be trading between the countries so that countries can specialize in those products where they have a comparative advantage and export the commodity. The country concerned can import the products where she suffers from comparative disadvantage from other countries.

Principle 6: Markets are usually a good way to organize economic activity:

Market provides an efficient mechanism of distribution of goods between the consumers. After the collapse of communism in the Soviet Union and Eastern Europe in the 1980s, market economy has gained supremacy in the world. The market principle determines the correct prices of the product.

Principle 7: Government can sometimes improve Market Outcomes:

Although market is the efficient way of distribution of resources and determining the price of goods and services, government intervention is necessary for smooth functioning of the market. We all rely on government provided police and courts to enforce our rights over the things we produce. Government enforces the rules and maintains the institutions that are key to a market economy. A farmer will not grow food if he expects his crop to be stolen; a restaurant will not serve meals unless it is assured that customers will pay for the same.

Principle 8: A country's Standard of living depends on its ability to produce goods and services.

The well being of the people depends on the ability of its nation to produce. There is a large difference in standard of living between countries because there is a difference in the production possibilities. The standard of living of the people in America is much higher than people in India. In 2006, the per-capita income of America was $39710 whereas in India it is only $ 3100.

Principle 9: Society faces a short-run trade-off between inflation and unemployment

There is always a trade off between inflation and unemployment i.e.; inflation is at the cost of more unemployment and less unemployment is at the cost of a higher rate of inflation. Increased amount of money in the economy stimulates overall level of spending and the demand for goods and services. Higher demand for goods encourages the rising of prices, but at the same time it also encourages producers for higher production. Producers will hire more workers for increased production.

Principle 10: Prices and Quantity of money positively related:

There is a positive relationship between supply of money and inflation. When government prints more currency at the time of deficit financing, there is an increase in general price level. In Germany in the early 1920s, when prices were on average tripling every month, the quantity of money was also tripling every month.



ACTIVITY: 1.1

Find out 5 situations where economics is important in Business economics.

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1.6 ECONOMIC PRACTICES OF MANAGEMENT

There is a close relation between economics and management. Both the micro and macro economic principles have applicability in business economics. The economic principles and methodology of business economics are derived largely from microeconomics. As the manager of a firm has to take decisions within his firms, it is microeconomics that comes to his aid.



CHECK YOUR PROGRESS

Q1. State True/ False

a) Business Economics can be called applied microeconomics. (True /False)

b) There is trade off between inflation and unemployment (true/ False)

Q2. Fill in the blanks:

a) There are**……..** principles in Economics.

b) A country's Standard of living depends on its ability to produce **……**

c) Prices and Quantity of money are **……..……** related.

Microeconomics relating to prices, demand and cost behavior, laws of return, elasticity concepts etc forms the major part of managerial decisions. Microeconomics goes a long way in helping managers to solve

complex problems of output decisions, profit maximization, optimal resource allocations, etc. Although microeconomics has more relevance in managerial economics, some aspects of the macro-economics also have their relevance in managerial economics.

Some problems of a firm are related to the national income variables, the aggregate level of employment, the aggregate price level etc. Future planning regarding expansion of projects or setting up of a new project has to be done in the context of the growth and development of the national economy. Theories regarding trade cycle, international trade and balance of payments have a great relevance to managerial economics for certain types of decision making problems.

Business economics is itself all about application of economic concepts and economic analysis to the problem of formulating managerial decisions. There are broadly four groups of such problems in both decision making and forward planning, which can be discussed as follows:

1. The first problem relates to the use of scarce resources with utmost efficiency to get the optimal results. This involves production programming and the problem of transportation.
2. The second problem relates to inventory and queuing problem. The knowledge of Economics is a must to solve inventory and queuing problem. In other words, the manager has to decide about holding of optimal level of output and raw materials to ensure smooth production. Queuing problems involve decision about installation of new production units, purchasing of new machines, equipment and hiring of new labour for smooth running of the production system, providing better services to the customers and expansion of the existing units.
3. The third problem is the pricing problem. The price of the product should be such that it covers all cost and a reasonable profit for the firm. There are various methods of pricing such as average cost pricing, the marginal cost pricing, the mark-up pricing. The manager has to adopt that price which will maximize his profits.
4. Before investment in new plants, going for new ventures or to continue with the existing production pattern, a manager usually confronts certain

economic problems. The solution of these problems is to be found in Economics.

In Business Economics, there is a wide spectrum of economic concepts. The following are the examples of topics that have great relevance in Business Economics.

1. Profit analysis
2. Cost considerations
3. Production possibilities charts
4. Pricing theory and policies
5. Demand analysis
6. Market penetration studies
7. Economic forecasting
8. Sales forecasting
9. Marginal analysis

1.7 ROLE AND RESPONSIBILITIES OF BUSINESS ECONOMIST

Before we discuss the role and responsibilities of a business economist, we have to know the definition of business economist. Business economist is an adviser who can give advice on different business related problems.

There is a distinction between a business manager and a business economist. The business manager is a decision making authority who has to take various crucial decisions such as what to produce, how to produce, how much to produce etc. On the other hand, a business economist gives advice in taking all those decisions.

The business economist is an adviser to a business manager. But now-a-days, the demarcation between the two is reduced. A business economist may gradually move from advisory role to a decision making one. A manager also acts as a decision maker and plays the advisory role. The main task of a business economist or the managerial economist is the application of economic concepts and economic analysis to the problem of formulating rational managerial decisions.

The following role and responsibilities should be performed by a managerial economist:

1) The managerial economist has to play a major role in the use of firm's scarce resources efficiently to get the optimal result. The business economist is responsible for maximization of production with available resources or ensures minimization of cost to produce a given amount of output.
2) Investing in new plants, how much to invest , expansion programme for the future sources of funds, whether to go for new ventures or to continue with existing product pattern are some crucial investment problems. Managerial economist should have the capability of solving these kinds of problem.
3) Fixing prices for the products of the firm is also an important decision-making problem. A managerial economist has to take decision on about pricing method –whether prices should be related to demand or cost or both and whether to follow marginal pricing, mark-up pricing, etc.
4) A managerial economist has to solve inventory problems efficiently. Inventory problem is about holding optimal level of stocks of raw materials semi-finished and finished goods over a period of time.
5) The business economist has to acquire full knowledge about the behavior of the economy as a whole. The macro economic policies such as monetary, fiscal and industrial have an impact on the firm's prospect of profit. The business economist should have the ability to gauge the changes and should take timely decisions. Along with that, he should have the knowledge of balance of payment, exchange rate, export and import policies.
6) These days the world economy has been changing at a very fast rate. There is a rapid change of technology and production techniques. To remain competitive with the changing technology, there should be innovation of new products, and improvement of quality of the product. Managerial economist should have the knowledge about the technological changes and keep himself up-to-date with the latest technology.

7) Business firms need finance from financial institutions. The profit of a firm depends on the ways of managing the financial matters such as financial needs and the alternative arrangement of business finance. The business economist has to ensure that there is proper arrangement of finance and that finance brings a fair return on capital employed.



ACTIVITY 1.2

Identify the role and responsibilities of business economist.

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CHECK YOUR PROGRESS

Q3: State True or False

a) Business economist give advice to manager on different matter (True / False)

b) Economics laws and theories have their application in management (True/False)

Q4: Fill in the Blanks

a) There is **……**between economics and management

b) There are various methods of pricing, they are **……..,** **……**



1.8 LET US SUM UP

In this unit unit we have discuused the following:

- § Business economics is the application of economic theories and principles in business management.
- § The knowledge of economics is necessary for a manager to take managerial decisions.
- § Like other subjects Economics has its principles. Each of the principles has its own implication.
- § There is inter-link between economics and management.
- § A business economist is one who gives advice to the manager in taking certain crucial decision regarding the firm. The business economist has its role and responsibilities.



1.9 FURTHER READING

1. H. L Ahuja, (2010), "*Business Economics* ", 11th Editon ,S. Chand & Company Ltd., India.
2. D. D. Chaturvedi, S. L. Gupta (2012), "*Business Economics*", 3rd Edition, International Book House, India.
3. Mankar V G, (1999), "*Business Economics*", 1st Edition,Macmillan India
4. Koutsoyiannis (2008), "*Modern Economics*", 2nd Edition, Macmillan Press Ltd



1.10 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: a) True b) True

Ans to Q2: a) 10 b) goods and services c) positively

Ans to Q3: a) True b) True

Ans to Q4: a) inter-linked b) average cost pricing, the marginal cost pricing, the mark-up pricing



1.11 MODEL QUESTIONS

1) Define Business Economics. Is there any inter-link between economics and management? Discuss

2) Discuss the principles of Economics and its application

3) What are the role and responsibilities of a business economist?

4) In what way economics helps a manager in a business firm?

*** ***** ***

UNIT 2: DEMAND ANALYSIS

UNIT STRUCTURE

2.1 Learning objectives

2.2 Introduction

2.3 Concept of Demand

- 2.3.1 Types of Demand
- 2.3.2 Determinants of Demand

2.4 Demand Function

- 2.4.1 Demand Elasticity

2.5 Income Elasticity of Demand

- 2.5.1 Types of Income Elasticity

2.6 Demand Forecasting

- 2.6.1 Significance of Demand Forecasting
- 2.6.2 Objectives of Demand Forecasting
- 2.6.3 Methods of Demand Forecasting

2.7 Law of Demand

- 2.7.1 Exception of Law of Demand

2.8 Let Us Sum Up

2.9 Further Reading

2.10 Answer to Check Your Progress

2.11 Model Questions

2.1 LEARNING OBJECTIVES

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

- discuss about the market behaviour
- discuss the pricing technique
- identify the factors affecting demand
- learn how to forecast about future demand
- discuss law of demand and exceptions of law of demand

2.2 INTRODUCTION

Demand and supply analysis is a fundamental and powerful tool that can be applied to a wide variety of interesting and important problems. A few of them are : understanding and predicting how changing world economic conditions affect market price and production; evaluating the impact of government price controls, minimum wages, price supports, and production incentives; and determining how taxes, subsidies, ***tariffs***, and ***import quota*** affect consumers and producers. Without government intervention supply and demand will come into equilibrium to determine the market price of a good and the total quantity produced. How price and quantity vary over time depends on how supply and demand respond to other economic variables. We, therefore, discuss the concept of demand, determinants of demand, elasticity of demand and demand forecasting. This unit will give the idea of market behaviour and future demand situation.



Tariff:
A government tax on imports or exports, e.g. custom duty, export duty etc.

Import quota: It is a type of protectionist trade restriction that sets a physical limit on the quantity of a good that can be imported into a country in a given period of time.

2.3 CONCEPT OF DEMAND

A large number of goods and services are required to satisfy human wants and desires. Some of these basic wants are **:** air to breathe to make life possible; food and water to sustain; clothing and housing to provide shelter from elements of nature; and a whole lot of things needed to make life comfortable. Some of these wants are satisfied without much efforts made to get the thing satisfying the wants. For instance oxygen is very important for life but it is freely available in nature and absolutely no conscious effort is required to obtain it. It is the gift of nature and there is no scarcity of it. Consequently, even though it is vital to make life possible, it is not the subject matter of Economics. But other things are not so easily available. An effort has to be made to get them, that is, they have to be consciously produced. This means that scarce resources have to be used in order to make them available, and those who wish to consume them have to pay a price which covers the cost of the resources used to produce them. The fact that something is available only on payment of its price makes it a commodity or economic good.

A mere desire for a commodity is not a demand for that commodity. It is the desire to consume a certain quantity of a particular commodity backed by the ability and willingness to pay the price for it that constitutes a demand for that commodity at that price. If a person is willing to pay, but has no ability to pay, there is only desire and no demand. Demand for a commodity thus implies three things

(a) Desire to acquire it
(b) Willingness to pay for it, and
(c) Ability to pay for it.

A person's demand for a commodity becomes effective only when he supports his desire with adequate purchasing power. The term 'demand' becomes meaningful only when it has reference to 'a price', 'a place', and 'a period'.

Demand is also expressed as a rate. For example, a household demand for rice may be expressed as 10 kg rice per week at a price of Rs.15 per kg rice. It will be meaningless if it is expressed as demand for rice is 10 kg at a price of Rs. 15 per kg. This is because such a statement does not tell us whether this household demand of 10 kg rice is for a day or a week or a month or a year or a decade. Therefore demand is always referred to particular time, particular price and particular place. "In Guwahati demand for rice in last month was 1000 quintals at Rs. 1500 per quintal" will be a meaningful sentence.

2.3.1 Types of demand

The different ways of classifying demand are as follows:

1. Individual demand and market demand

The quantity of a commodity that an individual demands at a particular price and time is known as individual demand of a commodity. The total quantity that all the consumers buy at a particular price during particular period is known as market demand of the commodity.

In other words, the sum total of the individual demands is the market demand of a commodity. Say, there are three buyers of a commodity namely- A, B and C. Their individual demand at different prices is given in Table- 2.1. The last column represents the market demand.

Table 2.1: Price and quantity demanded

Price of the commodity (Rs. Per unit)	Quantity demanded by			Market demand
	A	B	C	
10	5	1	2	8
9	7	3	4	14
8	8	4	6	18
7	9	5	7	21
6	11	7	9	27

2. Demand for consumer goods and producer goods:

Consumer goods are meant for final consumption e.g. food items. Producer goods are those which are used for production of other goods. The demand for consumer good is also known as **direct demand**, for they are used for final consumption. The demand for producer goods (labour, raw material, machinery etc) is a **derived demand** as the demand of the same depends on the demand for consumer good. If the demand for bread increases the demand for labour to be used in making bread will also increase.

3. Demand for durables and perishable goods

Durable goods are those which can be used over a period of time and can be stored. The utility is not destroyed in single use. For example cloth, furniture, electronic gadgets etc.

Perishable goods can not be stored for a long time. They get spoilt. Examples of perishable goods are milk, green vegetables, fruits etc.

2.3.2 Determinants of Demand

There are various determinants or factors on which demand for a commodity depends. These determinants may be economic and non-economic. Some of the important determinants of demand are follows:

a) Price of the commodity

Price of the commodity is the main determinant of demand for a commodity. The law of demand states that if other variables remain constant or unchanged, there is a definite relationship between the price of the commodity and its demand. The relation is inverse. When price of the commodity falls demand for it increases and when the price of the commodity rises demand for it decreases.

b) Consumer's income

There is a positive relationship between consumer's income and the demand for a commodity. When income of the consumer increases the demand for the commodity also increases. When income increases capacity of the consumer to purchase the commodity increases and therefore the demand also increases.

c) Price of the related commodity

The demand for a commodity is also affected by the price of its related commodity. For example, if the price of coffee falls demand for tea will be affected, if the price of petrol increases the demand for the car will be affected.

d) Consumer's tastes and preferences

Consumer's tastes and preferences are important determinants of demand for a commodity. The demand for a commodity changes when the taste and preference of the consumer changes. If the taste for a particular commodity changes positively, the demand for that commodity will increase. Advertisement, improved knowledge etc. cause a change in the taste and preference.

e) Consumer expectations

If consumers expect a fall in the future price, demand for the commodity will be affected. If the commodity is durable in nature, now consumers will

postpone their purchasing. On the other hand if the consumers hear that the price of a particular commodity is going to rise and the commodity is essential, then the consumers will try to purchase more at the going price. Similar is the case of expectation about future income. If a consumer is certain about rise in future income, he will try to purchase more even at a high price and vice versa.

f) Population of the country

When population of the country increases, demand for cloth, house, rice, medicine, school, college etc increases.

g) Credit facility

When the credit facility is available, demand for commodities particularly of durable commodities and commodities of status symbol increases. If banks offer easy credit facility on installment basis, demand for two wheelers and four wheelers will definitely increase.

h) Weather

Weather is another determinant which affects the demand for a commodity. Demand for cold drinks increases when it is very hot. Similarly, demand for tea and coffee will increase in a cold rainy day.



CHECK YOUR PROGRESS

Q1. What do you mean by Demand?

.....

.....

.....

Q2. Write the Determinants of Demand?

.....

.....



CHECK YOUR PROGRESS

Q3. Fill in the blanks

a) The quantity of a commodity that an individual demands at a particular**……** is known as individual demand of a commodity.

b) Producer goods are those which are used for……

c) Durable goods can be used ……

2.4 DEMAND FUNCTION

The demand function describes the relationship between demand for a commodity and its determinants. In mathematical term the demand function for a commodity can be expressed as follows:

$$D_x = f(P_x, Y, Pr, T, E, D, C, W \ldots\ldots Z)$$

where, D_x =demand for commodity X

Y = income of the consumer

P_x = price of the commodity X

P_r = price of related goods

T = taste and preference of the consumer

E = expectation about future price and income

D = demography

C =credit facility

W = weather

Z = all other determinants not discussed

The popular form of demand function is

$$D_x = f(P_x)$$

Here, other variables are assumed to be constant.

The demand function postulates the law of demand. The law of demand explains the inverse relationship between demand and price. According to the law of demand if price falls, demand increases and if price rises, demand decreases, other thing remaining constant.



Postulate: It is a proposition that is not proved or demonstrated but considered to be self-evident.

2.4.1 Demand Elasticity

The degree of responsiveness in the demand for a commodity to a variation in its determinants is measured by what is termed as elasticity of demand. There are three types of elasticity of demand, namely:

1 Price elasticity of demand,

2 Income elasticity of demand and

3 Cross elasticity of demand.

1) PRICE ELASTICITY OF DEMAND

Price elasticity of demand for a commodity is the measure of responsiveness in quantity demanded with respect to the variation in its price. Price elasticity of demand thus measures the degree at which demand responds to price. It can be defined as:

Expressing elasticity in percentage terms makes it '**unit free**.' This also enables to compare the elasticities of two or more commodities.

Symbolically, the definition of price elasticity of demand can be given as:

$$Ed = \frac{\text{Change in quantity/ original quantity}}{\text{Change in price/ original price}}$$

$$= \frac{\Delta Q / Q}{\Delta P / P}$$

Q: Quantity

P÷ P

P: Price

Δ : Change

Measurement of price elasticity

There are three methods of measurement of price elasticity. They are:

a. Mathematical method

b. Graphical method and

c. Total outlay method

a) Mathematical method:

There are two ways of measuring elasticity in this method. In one way, the percentage change in quantity demanded is divided by the percentage change in price.

So, E = Percentage change in demand ***/*** percentage change in price

In another way, the proportionate change in quantity demanded is divided by the proportionate change in price.

So,

$$E = \frac{\text{Proportionate change in quality demand}}{\text{Proportionate change in price}}$$

Proportionate change in quantity demanded = change in quantity/ original quantity

Proportionate change in price= change in price/ original price.

If Q_1 is the original quantity and Q_2 is the quantity after change in price, then,

$Q_2 - Q_1$= change in quantity

If P_1 is the original price and P_2 is the price after change, then,

$P_2 - P_1$= change in price.

b) Graphical method:

Graphic method also known as *point method* or *geometric* method is a method elasticity of demand is measured on different points on a straight line demand curve. The price elasticity of demand at a point on a straight

line is equal to the lower segment of the demand curve divided by upper segment of the demand curve.

Thus at mid point on a straight-line demand curve, elasticity will be equal to unity; at higher points on the same demand curve, but to the left of the mid-point, elasticity will be greater than unity, at lower points on the demand curve, but to the right of the midpoint, elasticity will be less than unity.

Prof. Marshall devised a geometrical method for measuring elasticity at a point on the demand curve. Let RS be a straight line demand curve in Figure 2.1. If the price falls from PB(=OA) to MD(=OC). the quantity demanded increases from OB to OD. Elasticity at point P on the RS demand curve according to the formula is: $E_p = \Delta q/\Delta p \times p/q$

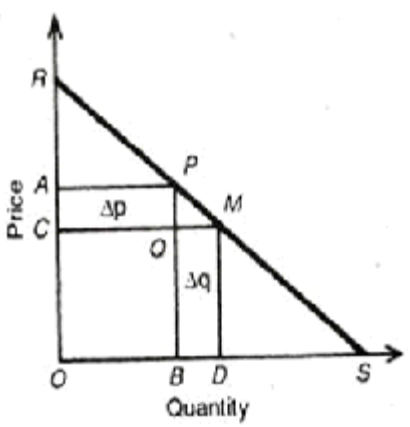


Fig: 2.1 Graphic method of measuring elasticity

Where Δq represents changes in quantity demanded, Δp changes in price level while p and q are initial price and quantity levels.

From Figure 2.1

$\Delta q = BD = QM$
$\Delta p = PQ$
$p = PB$
$q = OB$

Substituting these values in the elasticity formula:

$$E_p = \frac{QM}{PQ} \times \frac{PB}{OB}$$

Moreover,

$$\frac{QM}{PQ} = \frac{BS}{PB}$$ [$\angle PQM = \angle PBS$ being right angles and PQM and PBS are similar Δ s]

$$\therefore \frac{BS}{PB} \times \frac{PB}{OB} = \frac{BS}{OB}$$

Since ΔPBS and ΔROS are similar,

E_p at point P =

$$\frac{BS}{OS} = \frac{OA}{AR} = \frac{PS}{PR} = \frac{\text{Lower Segment}}{\text{Upper Segment}}$$

With the help of the point method, it is easy to point out the elasticity at any point along a demand curve. Suppose that the straight line demand curve DC in Figure 2.2 is 6 centimetres. Five points L, M, N, P and Q are taken oh this demand curve. The elasticity of demand at each point can be known with the help of the above method. Let point N be in the middle of the demand curve. So elasticity of demand at point.

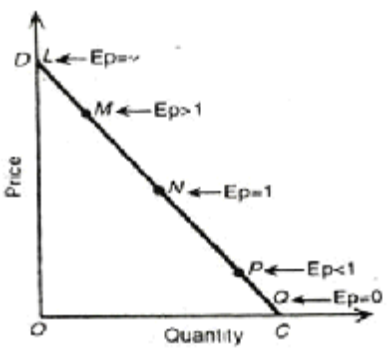


Fig: 2.2

$$N = \frac{\text{CN (Lower Segment)}}{\text{ND (Upper Segment)}} = \frac{3}{3} = 1 \text{ (Unity)}$$

Elasticity of demand at point $M = \frac{CM}{MD} = \frac{5}{1} = 5 \text{ or } > 1$

Elasticity of demand at point $L = \frac{CL}{LD} = \frac{6}{0} = \infty$ (Infinity).

Elasticity of demand at point $P = \frac{CP}{PD} = \frac{1}{5} =$ (Less than Unity).

Elasticity of demand at point $Q = \frac{CQ}{QD} = \frac{0}{6} = 0$ (Zero)

Thus we arrive at the conclusion that at the mid-point on the demand curve the elasticity of demand is unity. Moving up the demand curve from the mid-point, elasticity becomes greater. When the demand curve touches the Y-axis, elasticity is infinity. Any point below the mid-point towards the X-axis will show elastic demand.

Elasticity becomes zero when the demand curve touches the X-axis.

c) Total outlay method

In this method by observing the total outlay (price x quantity) elasticity is measured. If the total outlay increases after a fall in price it will be a case of elastic demand. If the total outlay falls after a fall in price it will be inelastic demand. If total out lay remains same after a fall in price it is unit elastic demand. The Table-2.2 explains the situations.

Table 2.2:Measurement of elasticity through total outlay method

Price(in Rs)	Quantity	Total Outlay	Nature of Elasticity
8	250	500	Unit Elastic (e=1)
10	200	500 (unchanged)	
8	250	500	More Elastic (e<1)
10	240	600 (increasing)	
8	250	500	Less Elastic (e>1)
10	180	450 (decreasing)	

DEGREE OF PRICE ELASTICITY OF DEMAND

In terms of degree, price elasticity of demand is classified into five categories:

a) Perfectly elastic demand: If the demand for a commodity is such that unlimited amount of the commodity can be sold at the given price, it is a case of perfectly elastic demand. In other words, to increase the demand for the commodity, a reduction in price is not necessary. Here, the elasticity of demand is said to be equal to infinity ($e = \infty$).

$$e = \frac{\Delta Q/Q}{\Delta P/P} = \frac{\Delta Q/Q}{0} \qquad \mathbf{Q}\Delta P = 0$$

$$= \infty$$

The perfectly elastic demand curve is parallel to the output axis as shown in the Fig:2.3. The figure says that at price OP, the quantity demanded may be OQ, OQ_1, and OQ_2. This is a hypothetical situation.

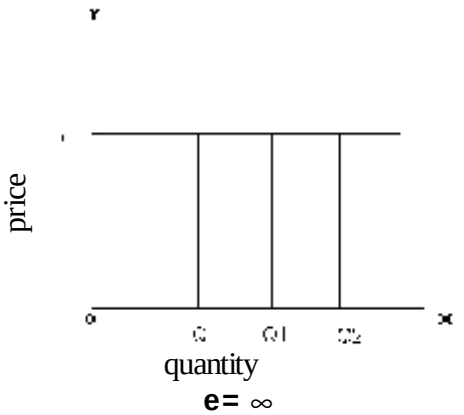


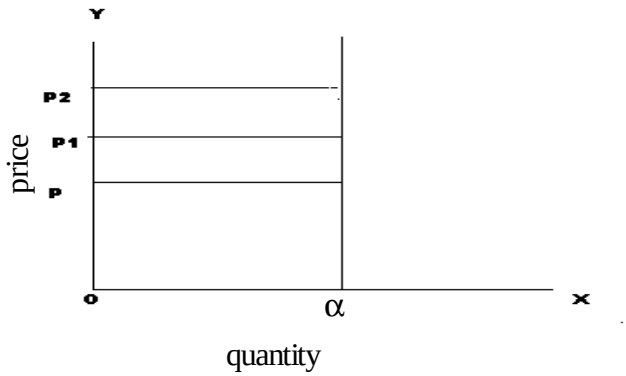
Fig: 2.3 Perfectly elastic demand

b) Perfectly inelastic demand: If the demand for a commodity does not change in spite of an increase or decrease in its price, we have a case of perfectly inelastic demand. This implies a situation where demand is totally unresponsive to changes in the price of the commodity. Thus elasticity of demand is zero (e=0).

$$e = \frac{\Delta Q/Q}{\Delta P/P} = \frac{0}{\Delta P/P} \qquad \mathbf{Q}\ \Delta Q = 0$$

e= 0

The perfectly inelastic demand curve is parallel to the Price axis as shown in the fig-2.4. As the figure shows, the demand for the commodity remains same (=OQ) whatever the price is. Perfectly inelastic demand is also a hypothetical situation.



e = 0

Fig:2.4 Perfectly inelastic demand

c) Unitary elastic demand: If percentage change in price and percentage change in demand is equal, the demand will be unitary elastic demand. For example if a 20 percent increase in price is accompanied by 20 percent decrease in quantity demanded, the price elasticity is unity (e=1).

A demand curve representing unitary elastic demand has been shown in the fig-2.5.

Here, $PP_1=QQ_1$

PP_1=change in price

QQ_1= change in quantity

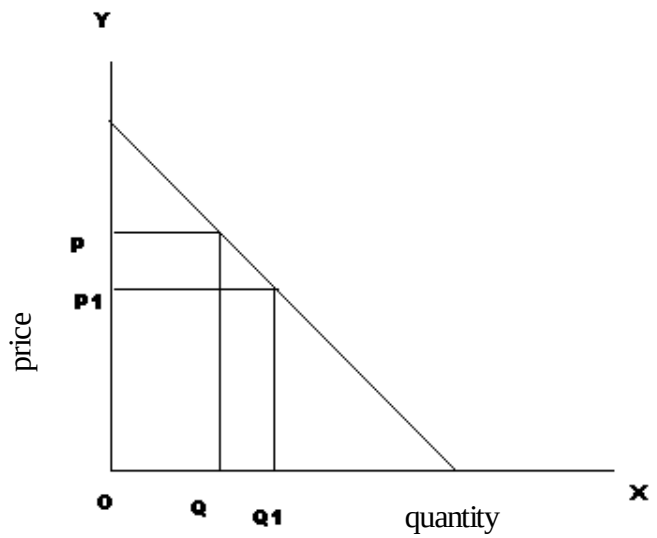


Fig:2.5 Unitary elastic demand

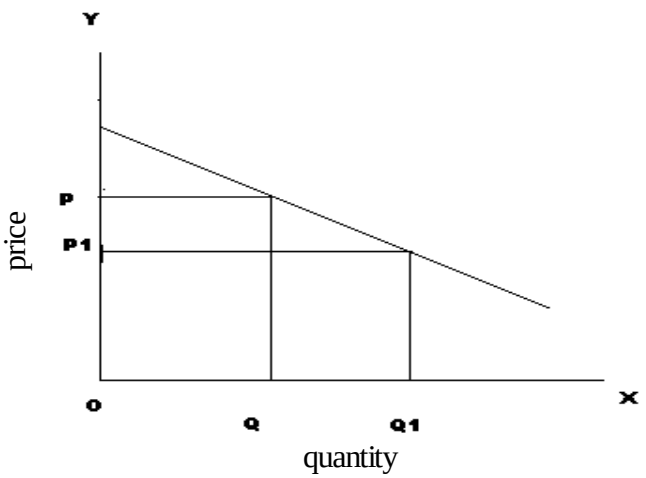
d) Elastic demand: In certain cases the responsiveness of demand measured in terms of percentage change is far greater than the percentage change in the price of the commodity. This implies that if the price of a commodity rises by 10 percent, then in response to it the demand falls by higher percentage. This is known as elastic demand. Generally the demand for the luxury goods is elastic. Numerically, elastic demand is greater than one but less than infinity (1<e<“).

An elastic demand curve will be linear, slopping downward from left to right as shown in the fig: 2.6.

Here, $PP_1 < QQ_1$

PP_1=change in price

QQ_1= change in quantity



1 < e <∞

Fig: 2.6 Elastic demand

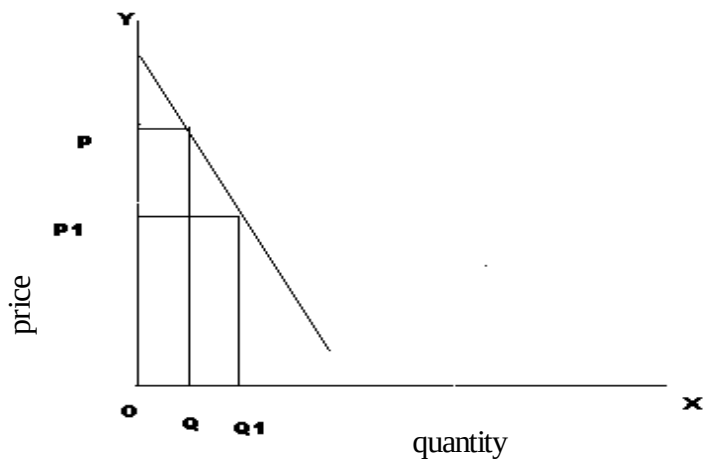
e) Inelastic demand: If the demand is not much responsive to the price change, that is, a considerable increase or decrease in the price does not result in much change in quantity demanded, the demand is inelastic. To be more precise, if the quantity demanded changes by a smaller percentage than does price, we have the case of inelastic demand. Demand for commodities which fall in the category of necessities displays such in elasticity.

For example, salt is a necessity and its demand does not change much in response to change in price. Therefore, it exhibits inelastic demand. Numerically elasticity of demand for necessities is greater than zero but less than unity ((0<e<1). An inelastic demand curve will be also linear, slopping downward from left to right as shown in the fig-2.7. Here the slope is smaller than that of the elastic demand curve.

Here, $PP_1 > QQ_1$

PP_1=change in price

QQ_1= change in quantity



0 < e < 1

Fig 2.7: Inelastic demand

Determinants of Price Elasticity

Elasticity of demand for a commodity depends upon a number of factors operating simultaneously. Some of these determinants/factors are as follows:

a) Nature of the commodity: Elasticity of demand depends on the nature of the commodity. Demand for necessities is invariably inelastic. Consumers find it difficult to reduce their consumption of necessities like food grains, salt etc. even if their prices increase. On the other hand, demand for luxury commodities like diamond ornaments, high priced sofa set etc. is elastic as in their case, quantity demanded changes by a higher percentage than does price.

b) **Availability of substitutes:** If good substitutes of the commodity are available, then demand will be elastic. This happens because in case of availability of substitutes, a rise in the price of commodity concerned will divert the consumers to the substitute commodity available at lower price. If the price of tea increases consumer will try to get other substitute beverage. As a result demand for tea will fall.

c) **Different uses of the commodity:** If a commodity is used for different purposes its demand becomes elastic. If the price of the commodity is becoming very high, consumers will put the few units they buy only to the most important uses. If the price of milk increases very high, consumers will stop its use in making tea rather it will be used only as baby food.

d) **Importance of the commodity:** If consumers spend a very small proportion of their income on a commodity its demand will be inelastic. Consumers spend very small amount in match boxes. If the price of match boxes increases by 20 percent its demand will not be affected more. If the example is of cloth and meat or fruits, its demand will fall as and when the price increases.

e) **Possibility of postponing the consumption:** There are certain commodities of which consumption can be postponed. In their case demand will be elastic. If price of fridge or colour TV increases consumers will not purchase these at high price but will wait till price comes down. So, demand will fall when price of such commodities increase. On the other hand, consumption of certain commodities can not be postponed and its demand will be inelastic. If the price of essential medicines increases, its consumption can not be postponed by the patients.

Importance of Elasticity of Demand

The concept of elasticity of demand has various practical uses:

a) All the business firms want to get maximum profit. So, one firm will fix the price of its product in such a way so that the total profit becomes maximum. This requires the knowledge of elasticity of demand. The

firm can maximizes the profit by keeping prices low for goods having elastic demand and prices high for goods having inelastic demand.

b) Price elasticity also plays an important role in the theory of distribution. The returns of each factor of production depend upon the elasticity of demand for its services. If the demand for a factor is inelastic the producer will be ready to pay a higher price for it.

c) At the time of levying taxes the concept of elasticity is helpful. The government of a country needs to be certain about the collection of taxes. If the finance ministry out of ignorance levies heavy taxes on goods having high price elasticity the demand for the good is expected to fall considerably because the consumer will cut the consumption of such commodities as price will rise because of taxes.

d) The concept is also useful for international trade. For example, if the exports have elastic demand, lowering the price of the exported goods will lead to more exports.

2. INCOME ELASTICITY OF DEMAND

Income of the consumer is another determinant of demand. When the income of the consumer changes, demand for the commodity also changes. Income elasticity of demand measures the degree of responsiveness in quantity demanded with respect to the changes in income. To measure income elasticity the percentage change in quantity demanded has to be divided by the percentage changes in income.

$$e_y = \frac{\Delta Q / Q}{\Delta Y / Y}$$

e_y = income elasticity of demand

Q = quantity demanded

Y = income

Δ : Change

If 15 percent income change brings 30 percent change in demand the income elasticity will be equal to 2.

3. CROSS ELASTICITY OF DEMAND

Demand for commodity may be effected because of the changes in price of the related (substitute or complementary) commodities. For example change in price of tea may affect the demand for coffee. The extent of this responsiveness is called cross elasticity.

$$e_{xy} = \frac{\Delta Q_x / Q}{\Delta P_y / P}$$

e_{xy} = cross - elasticity of demand

Q_x = quantity of X demanded

P_y = price of the commodity Y

Δ : Change

Income elasticity and cross elasticity have also practical uses.

According to Ferugson, "the cross-elasticity of demand is the proportional change in the quantity of good-X demanded resulting from a given relative change in the price of the related good-Y."

It should be noted that the cross-elasticity of demand would be positive, when two goods are substitute of each other. This is because the increase in the price of one good increases the demand for the other. On the other hand, in case of complementary goods, the cross-elasticity of demand would be negative as increase in the price of one good decreases the demand for the other. For example, increase in the price of tea would result in the increase in the demand for coffee, whereas increase in the price of petrol would cause decrease in the demand for cars.

The various types of cross-elasticity of demand are as follows:

i. Positive Cross Elasticity of Demand: The cross elasticity of demand would be positive when increase in the price of one good (X) causes increase in the demand for the other good (Y). In simple terms, cross elasticity would be positive for substitutes. For example, the quantity demanded for coffee has increased from 500 units to 550 units with increase in the price of tea from Rs. 8 to Rs. 10.

ii. Negative Cross Elasticity of Demand: It refers to a situation when the rise in the price of one good (X) reduces the demand for the other good (Y). The cross elasticity of demand would be negative for complementary goods. For example, the quantity demanded for X decreases from 220 to 200 units with the rise in prices of Y from Rs. 10 to 12.

iii. Zero Cross Elasticity of Demand: It implies that the cross elasticity of demand would be zero when two goods X and Y are not related to each other. In other words, the increase or decrease in the price of one good (X) would not affect the demand of other good (Y).

2.5 INCOME ELASTICITY OF DEMAND

We have already discussed about the Income elasticity of demand in the previous section. Let us now discuss in detail about Income elasticity of demand .

Income elasticity of demand means the ratio of the percentage change in the quantity demand to the percentage change in income - D.S. Waston

Income elasticity of demand can be measured through mathematics. Proportionate change in demand is divided by proportionate change in income. It can be written as:

EY= Proportionate change in demand / proportionate change in income

= ÄQ/Q ÷ ÄY/Y

= Y/Q × ÄQ/ÄY

EY means income elasticity of demand. Äq is the change in demand. Q is original demand. Y is original income and ÄY change in income. Suppose the income of a person is Rs. 2000 and he purchases 20 liter of milk. If his income increases to Rs. 2500 he purchases 30 liter of milk. Therefore income elasticity of demand is 2000 divided by 500 multiplied by 10 divided by 20 and result is 2. It means demand for milk is income elastic.

2.5.1 Types of Income Elasticity of Demand

There are five possible income demand curves:

1. Unitary income elasticity of demand: There is unity income elasticity of demand when percentage change in demand is equal to the percentage change in price. The demand curve for this income elasticity has upward slope. The increase in quantity demanded is equal to increase in income. The demand for commodity increases by 20% while increase in income is 20%. The diagram shows that increase in demand is equal to increase in income. It is a case of unitary income elasticity of demand or EY= 1. It takes the shape of 45 degrees.

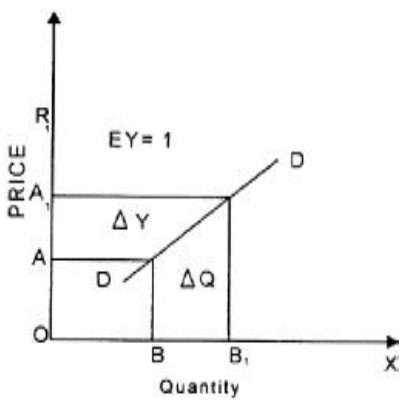


Fig: 2.8: Unitary income elasticity of demand

2. High income elasticity of demand: The income elasticity is greater than unity when percentage change in demand is greater than percentage change in price. The income of a consumer increases by 20% and demand for commodity increases by 40%. The diagram shows that quantity demanded is more than rise in income of consumer. It is a case of income elasticity of demand is greater than unity or EY >1. The demand curve in this case is flatter.

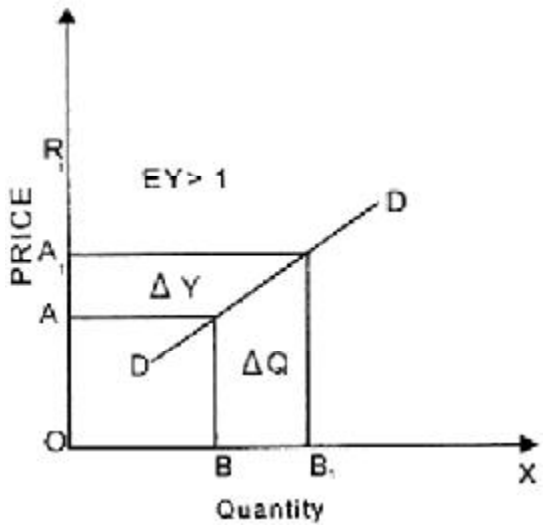


Fig: 2.9: High income elasticity of demand

3. Low income elasticity of demand: The income elasticity is less than unity when percentage change in demand is less than percentage change in price. The income of consumer increases by 20% the demand for commodity increases by 8%. The diagram shows that increase in demand is less than increase in income. The income elasticity of demand for commodity is less than unity or EY< 1. The income elasticity is less than one. The demand curve for this case is steeper.

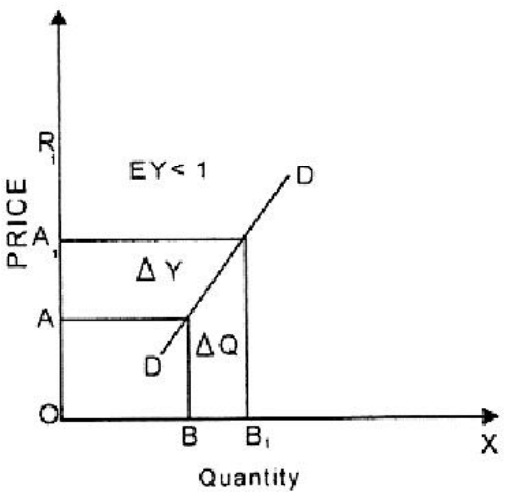


Fig: 2.10: Law income elasticity of demand

4. Zero income elasticity of demand: There is zero income elasticity when demand remains unchanged due to change in income in any direction. The income of a consumer increases (say) 20% but there is no change in demand for commodity. The diagram shows that quantity bought remains

constant regardless of the rise in income of consumer. The demand curve for zero income elasticity is vertical straight line. It is a case of zero income elasticity of demand or EY = 0.

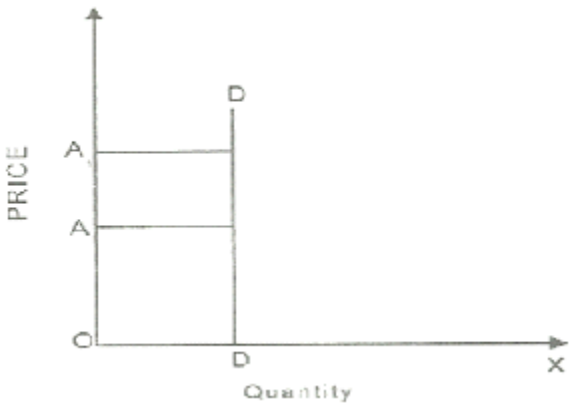


Fig: 2.11: Zero income elasticity of demand

5. Negative income elasticity of demand: There is negative income elasticity when increase in income brings decrease in demand. The consumer can reduce his purchase of inferior commodity when there is increase in income. The demand for commodity decreases by 8% while there is increase in income by 20%. The diagram shows that less is purchased at higher income. It is a case of negative income elasticity of demand or EY < 0. The demand curve in this case has downward slope.

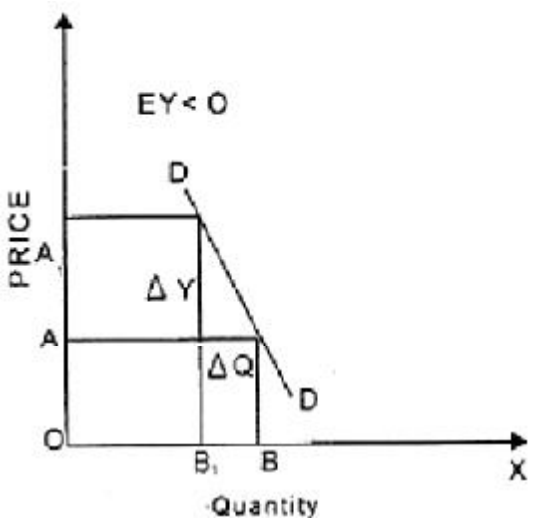


Fig: 2.12: Negative income elasticity of demand

2.6 DEMAND FORECASTING

Demand for the commodity determines its production volume. If the consumers want to purchase a particular commodity, that will be produced by the firms. More is the demand, more will be the production. In order to plan about production, future demand for the commodity must be anticipated. Future is uncertain. It is difficult to predict about the future. Forecasting about the future demand is called demand forecasting. Demand forecasting helps the managers to assess future demand and to plan production accordingly. A forecast is estimation about future situation. Demand forecasting is thus the estimation about the future demand. It is necessary to take steps for the acquisition of different factors of production. Demand forecasting may be defined as the process of finding values for demand in future time periods. Demand forecasting is for a long period. It is also called business forecasting.

2.6.1 Significance of Demand Forecasting

Demand plays a crucial role in the management of every business. It helps an organization to reduce risks involved in business activities and make important business decisions. Apart from this, demand forecasting provides an insight into the organization's capital investment and expansion decisions.The significance of demand forecasting is discussed in the following points:

1. **Fulfilling objectives:** Implies that every business unit starts with certain pre-decided objectives. Demand forecasting helps in fulfilling these objectives. An organization estimates the current demand for its products and services in the market and move forward to achieve the set goals.

2. **Preparing the budget:** Demand forecasting plays an important role in making budget by estimating costs and expected revenues. For instance, an organization has forecasted that the demand for

its product, which is priced at Rs. 10, would be 10, 00, 00 units. In such a case, the total expected revenue would be 10* 100000 = Rs. 10, 00, 000. In this way, demand forecasting enables organizations to prepare their budget.

3. **Stabilizing employment and production:** Demand forecasting helps an organization to control its production and recruitment activities. Producing according to the forecasted demand of products helps in avoiding the wastage of the resources of an organization. This further helps an organization to hire human resource according to requirement. For example, if an organization expects a rise in the demand for its products, it may opt for extra labor to fulfill the increased demand.

4. **Expanding organizations:** demand forecasting helps in deciding about the expansion of the business of the organization. If the expected demand for products is higher, then the organization may plan to expand further. On the other hand, if the demand for products is expected to fall, the organization may cut down the investment in the business.

5. **Taking Management Decisions:** Demand forecasting helps in making critical decisions, such as deciding the plant capacity, determining the requirement of raw material, and ensuring the availability of labor and capital.

6. **Evaluating Performance:** Demand forecasting helps in making corrections. For example, if the demand for an organization's products is less, it may take corrective actions and improve the level of demand by enhancing the quality of its products or spending more on advertisements.

7. **Helping Government:** Demand forecasting Enables the government to coordinate import and export activities and plan international trade.

2.6.2 Objectives of Demand Forecasting

Demand forecasting has the following objectives:

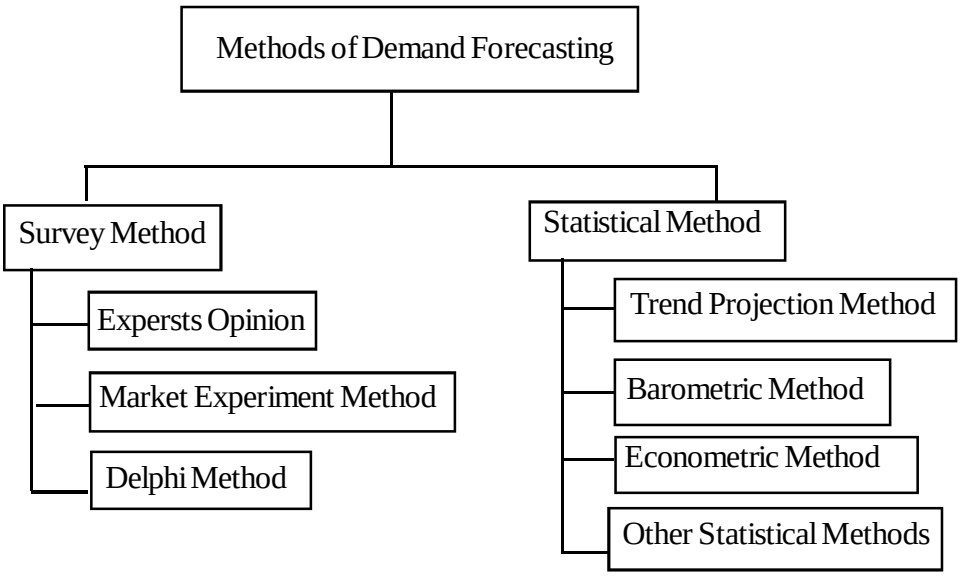
1. Demand forecasting is necessary to ascertain the future demand for the commodity so that the firm can plan for new units, new projects, new plants, expansion of existing scale of operation.
2. Demand forecasting will be advantageous for finding out the lines of probable investment before taking the risk of new investment.
3. It will also be necessary to prepare plans for long term financial requirements.
4. It helps the firm in planning for trained manpower.

2.6.3 Methods of Demand Forecasting

Generally, there are two approaches to demand forecasting. The first approach involves forecasting demand by collecting information regarding the buying behavior of consumers from experts or through conducting surveys. On the other hand, the second method is to forecast demand by using the past data through statistical techniques.

Thus, we can say that the techniques of demand forecasting are divided into survey methods and statistical methods. The survey method is generally for short-term forecasting, whereas statistical methods are used to forecast demand in the long run.

There are two approaches to demand forecasting. The demand forecasting methods are illustrated below:



Following are the methods of demand forecasting:

A. Survey method: In this method surveys are conducted to collect information about the future plans of the potential consumers.

a) Experts' Opinion Poll: In this method the experts are requested to provide their opinion about the product. Generally, in an organization, sales representatives act as experts who can assess the demand for the product in different areas, regions, or cities. This method is quite simple and less expensive.

b) **Market Experiment Method:** Market Experiment Method collecting necessary information regarding the current and future demand for a product. This method carries out the studies and experiments on consumer behavior under actual market conditions. In this method, some areas of markets are selected with similar features, such as population, income levels, cultural background, and tastes of consumers.

b) Delphi method: In this method some experts in an area will be contacted with questionnaires. A co-coordinator will collect the opinions of the experts. Each of the experts will be supplied with the responses of other experts without revealing their identity. The experts may revise their opinions if needed. This process will be repeated so that all the experts come to a single agreement or the issues causing disagreements are clearly defined.

B. Statistical Methods: Statistical methods are complex set of methods of demand forecasting. These methods are used to forecast demand in the long term. In this method, demand is forecasted on the basis of historical data and cross-sectional data. Historical data refers to the past data obtained from various sources, such as previous years' balance sheets and market survey reports. On the other hand, cross-sectional data is collected by conducting interviews with individuals and performing market surveys. Unlike survey methods, statistical methods are cost effective and reliable as the element of subjectivity is minimum in these methods.The different statistical methods are discussed as follows:

a. Trend Projection Method/least Square Method: Trend projection or least square method is the classical method of business forecasting. In this method, a large amount of reliable data is required for forecasting demand. In addition, this method assumes that the factors, such as sales and demand, responsible for past trends would remain the same in future. In this method, sales forecasts are made through analysis of past data taken from previous year's books of accounts. In case of new organizations, sales data is taken from organizations already existing in the same industry. This method uses time-series data on sales for forecasting the demand of a product.The trend projection method has three types which are as follows:

i. Graphical Method: This method helps in forecasting the future sales of an organization with the help of a graph. The sales data is plotted on a graph and a line is drawn on plotted points. This method is very simple and less expensive; however, the projections made by this method may be based on the personal bias of the forecaster.

ii. **Fitting Trend Method:** This method implies a least square method in which a trend line (curve) is fitted to the time-series data of sales with the help of statistical techniques.

iii. Box-Jenkins Method: This method Refers to a method that is used only for short-term predictions. This method forecasts demand only with stationary time-series data that does not reveal the long-term trend. It is used in those situations where time series data depicts monthly or seasonal variations with some degrees of regularity. For instance, this method can be used for estimating the sales forecasts of woolen clothes during the winter season.

b. Barometric Method: In barometric method, demand is predicted on the basis of past events or key variables occurring in the present. This method is also used to predict various economic indicators, such as saving, investment, and income. This method was introduced by Harvard Economic Service in 1920 and further revised by National Bureau of Economic Research (NBER) in 1930s. This technique helps in determining the general trend of business activities. For example, suppose government allots land to the XYZ society for constructing buildings. This indicates that there would be high demand for cement, bricks, and steel. The main advantage of this method is that it is applicable even in the absence of past data. However, this method is not applicable in case of new products. In addition, it loses its applicability when there is no time lag between economic indicator and demand.

c. Econometric Methods: Econometric methods combine statistical tools with economic theories for forecasting. The forecasts made by this method are very reliable than any other method. An econometric model consists of two types of methods namely, regression model and simultaneous equations model.

d. Other Statistical Measures: Apart from statistical methods discussed above, there are other methods for demand forecasting. These measures are very specific and used for only particular datasets. The following are some of the other statistical measures

i. Index Number: It refers to the measures used to study the fluctuations in a variable or group of related variables with respect to time period/base period. They are most commonly used in economics and financial research to study various factors, such as price and quantity of a product. The factors that are responsible for the problem are identified and calculated. There are mainly four types of index numbers, which are Simple index number, Composite index number, Price index number, Quantity index number.

ii. Time Series Analysis: It refers to the analysis of a series of observations over a period of equally spaced time intervals. For example analyzing the growth of a company from its incorporation to the present situation. Time series analysis is applicable in various fields, such as public sector, economics, and research. There are various components of time series analysis are Secular Trend, Short Time Oscillation, Decision Tree Analysis.

2.6 LAW OF DEMAND

There is an inverse relationship between quantity demanded and its price. The people know that when price of a commodity goes up its demand comes down. When there is decrease in price the demand for a commodity goes up. There is inverse relation between price and demand . The law refers to the direction in which quantity demanded changes due to change in price.

A consumer may demand one dozen oranges at Rs. 5 per dozen. He may demand two dozens when the price is Rs. 4 per dozen. A person

generally buys more at a lower price. He buys less at higher price. It is not the case with one person but all people liken to buy more due to fall in price and vice versa. This is true for all commodities and under all conditions. The economists call it as **law of demand**. In simple words the law of demand states that other things being equal more will be demanded at lower price and lower will be demanded at higher price.

The following are some of the Definition of Law of Demand:

1. "The amount demanded increase with a fall in price, diminishes with a rise in price". -Alfred Marshal
2. "The quantity demanded varies inversely with price". -C.E. Ferguson
3. "People will buy more at lower prices and buy less at higher prices, other things remaining the same".- Paul A. Samuelson

For better understanding let us discuss the concept with an example.The table shows the prices per unit of commodity and amount demanded per period of time. The demand of one person is called individual demand. The demand of many persons is known as market demand. The experts are concerned with market demand schedule. The market demand schedule means 'quantities of given commodity which all consumers want to buy at all possible prices at a given moment of time'. The demand schedules of all individuals can be added up to find out market demand schedule.

Demand schedule

Price in Rupees	Demand in Kg.
5	100
4	200
3	300
2	400

The table shows the demand of all the consumers in a market. When the price decreases there is increase in demand for goods and vice

versa. When price is Rs. 5 demand is 100 kilograms. When the price is Rs. 4 demand is 200 kilograms. Thus the table shows the total amount demanded by all consumers various price levels.

The following are Assumptions of the law of Demand

1. There is no change in income of consumers.
2. There is no change in the price of product.
3. There is no change in quality of product.
4. There is no substitute of the commodity.
5. The prices of related commodities remain the same.
6. There is no change in customs.
7. There is no change in taste and preference of consumers.
8. The size of population remains the same.
9. The climate and weather conditions are same.
10. The tax rates and other fiscal measures remain the same.

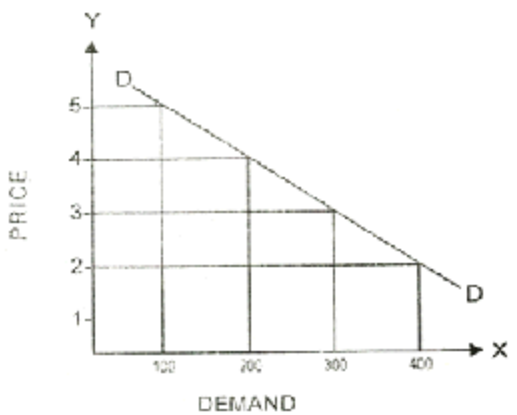


Fig: 2.14: Law of demand

There is same price in the market. All consumers purchase commodity according to their needs. The market demand curve is the total amount demanded by all consumers at different prices. The market demand curve slopes from left down to the right.

The following are the reasons downward demand curve :

1. Marginal utility decreases: When a consumer buys more units of a commodity, the marginal utility of such commodity continue to decline. The consumer can buy more units of commodity when its price falls and vice versa. The demand curve falls because demand is more at lower price.

2. **Price effect:** When there is increase in price of commodity, the consumers reduce the consumption of such commodity. The result is that there is decrease in demand for that commodity. The consumers consume mo0re or less of a commodity due to price effect. The demand curve slopes downward.

3. **Income effect:** Real income of consumer rises due to fall in prices. The consumer can buy more quantity of same commodity. When there is increase in price, real income of consumer falls. This is income effect that the consumer can spend increased income on other commodities. The demand curve slopes downward due to positive income effect.

4. **Same price of substitutes :** When the price of a commodity falls, the prices of substitutes remaining the same, consumer can buy more of the commodity and vice versa. The demand curve slopes downward due to substitution effect.

5. **Demand of poor people:** The income of people is not the same, The rich people have money to buy same commodity at high prices. Large majority of people are poor, They buy more when price fall and vice versa. The demand curve slopes due to poor people.

6. **Different uses of goods:** There are different uses of many goods. When prices of such goods increase these goods are put into uses that are more important and their demand falls. The demand curve slopes downward due to such goods.

2.6.1 Exception of Law of Demand

Often we find that with a fall in the price demand also falls and with a rise in price demand also rises. These cases are referred to as exceptions to the general law of demand. The demand curve in these cases will be an upward sloping. Let us discuss exceptions to the Law of Demand in detail in the following:

1. **Inferior goods:** The law of demand does not apply in case of inferior goods. When price of inferior commodity decreases and its demand also decrease and amount so saved in spent on superior commodity. The wheat and rice are superior food grains while maize is inferior food grain.

2. **Demonstration effect:** The law of demand does not apply in case of diamond and jewelry. There is more demand when prices are high. There is less demand due to low prices. The rich people like to demonstrate such items that only they have such commodities.

3. **Ignorance of consumers:** The consumer usually judges the quality of a commodity from its price. A low priced commodity is considered as inferior and less quantity is purchased. A high priced commodity is treated as superior and more quantity is purchased. The law of demand does not apply in this case.

4. **Less supply:** The law of demand does not work when there is less supply of commodity. The people buy more for stock purpose even at high price. They think that commodity will become short.

5. **Depression:** The law of demand does not work during period of depression. The prices of commodities are low but there is increase in demand. it is due to low purchasing power of people.

6. **Speculation:** The law does not apply in case of speculation. The speculators start buying share just to raise the price. Then they start selling large quantity of shares to avoid losses.

7. **Out of fashion:** The law of demand is not applicable in case of goods out of fashion. The decrease in prices cannot raise the demand of such goods. The quantity purchased is less even though there is falls in prices.

In the above exceptional cases, the demand graph curve slopes upward showing a positive relationship between price and demand.



CHECK YOUR PROGRESS

Q4. What do you mean by the term demand function?

.....

.....

.....

Q5. What are the types of elasticity of demand?

.....

.....

.....

Q6. In terms of degree, price elasticity of demand can be classified as:

a)..... b)……..

c)…….. d)……..……

e)……



2.8 LET US SUM UP

Demand analysis is a basic tool of micro economics. In a competitive market, supply and demand curves tell us how much will be produced by the firms and how much will be demanded by the consumers. The market mechanism is the tendency for supply and demand to become equal, so that there is neither excess demand nor excess supply.

Elasticity of demand describes the responsiveness in quantity to the changes in price and other variables. Knowledge of demand determinants and demand forecasting will help the managers to plan for future.

As all the business houses are interested to maximize their profit volume it is important to understand the pricing technique of the market. If pricing is accurate the firms can maximize profit. Future is uncertain. So estimation of future demand is also very important for the firms. A good theoretical background can help the managers to understand the market situation and to plan accordingly. The concepts of demand will definitely help the managers to take proper decisions.



2.9 FURTHER READING

1. V.G. Mankar (1999), *'Business Economics'*, Macmillan Indian Limited
2. P.L. Mehta (2013), *'Managerial Economics'*, S.Chand & Sons, Indian
3. D.M. Mithani (2016) '*Managerial Economics'*, Himalaya Publishing House, New Delhi, India.



2.10 ANSWER TO CHECK YOUR PROGRESS

Ans to Q1: The ability and desire to purchase goods and services is called Demand.

Ans to Q2: (1) Price of commodity, (2) Consumers income, (3) Price of related commodity, (4) Consumers taste and preferences, (5) consumers expectations, (6) Population of the country, (7) Credit facility.

Ans to Q3: a) price & time b) production of other goods
c) more than once.

Ans to Q4: The demand function describes the relationship between demand for a commodity and its determinants.

Ans to Q5: (1) Price elasticity of demand, (2) income elasticity of demand and (3) cross elasticity of demand.

Ans to Q6: a) perfectly elastic demand b) perfectly inelastic demand c) unitary elastic demand d) elastic demand e) inelastic demand



2.11 MODEL QUESTIONS

1. Distinguish between demand and desire.
2. Mention the determinants of demand.
3. Define price elasticity of demand.
4. Discuss any one method of measuring price elasticity.
5. What are the factors which affect price elasticity of demand?
6. What are the types of elasticity of demand?
7. What is demand forecasting and what are its objectives?
8. Discuss any one method of forecasting demand.

*** ***** ***

UNIT 3: SUPPLY

UNIT STRUCTURE

3.1 Learning Objectives

3.2 Introduction

3.3 Supply: Its Meaning and Types

3.4 Law of Supply, Supply Schedule and the Supply Curve

3.5 Factors affecting Supply

3.6 Increase and Decrease in Supply

3.7 Elasticity of Supply

3.8 Exceptions to the Law of Supply

3.9 Let Us Sum Up

3.10 Further Reading

3.11 Answers to Check Your Progress

3.12 Model Questions

3.1 LEARNING OBJECTIVES

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

- put forward the concept of supply
- derive a supply schedule and draw a supply curve
- discuss the determinants of supply
- outline the different exceptions to the law of supply.

3.2 INTRODUCTION

Dear learners, by now, you have known that demand and supply are two fundamental concepts in Economics. In fact, the famous saying goes: “Demand and supply are the two words that can make an economist out of a parrot”. The market mechanism in particular has to depend a lot on these two concepts. In fact, ‘demand’ and ‘supply’ are like two Siamese twins or tools, together which determine equilibrium in the market. The interaction between demand and supply are very important in guiding the

market in general and in guiding the behaviour of the consumers and suppliers of the market in particular.

Before we go on discussing the concept of supply in detail, let us pause for a moment to consider what happens to us, to ourselves when we go to the market. We find that sometimes, market is abundant in supply. In a busy market place, we often see the street vendors shouting and attraction customers to sell their products. We also see consumers often gent into bargaining with the vendors. Contrary to this, for certain high-priced products like cars, there is no such shouting and pulling of customers. Of course, they also try to attract customers through other means, e.g., advertising, campaigning etc. This means that with respect to the type of market, or the type of product, the behaviour of the consumers and sellers differ. While all sellers try to sell their products, it is the interaction of demand and supply in the marketplace that basically sets the behaviour of the consumers and also the sellers.

This unit lays its primary focus on discussing the concept of supply from the theoretical underpinnings of Economics. We shall begin with defining the concept supply and its different types and deriving its diagrammatic representation. Then we shall derive the law of supply, the graphical shape of a supply curve and also discuss how we can derive at the market supply. Then we shall examine the factors that determine supply, followed by the concepts of increase and decrease in supply. Finally, we shall discuss the different exceptions to the law of supply.

3.3 SUPPLY: ITS MEANING AND TYPES

Supply refers to quantity of a product offered for sale at a given price at a given point of time. In this statement, three issues are very important. First, supply refers to *the quantity of a product offered for sale*. This means that all the quantity produced by a firm does not necessarily mean supply. The seller/producer may have huge quantity of a produces kept in his warehouse. But only the amount released to the market for sale constitutes supply. Thus, a firm may have 1000 tonnes of rice is his

warehouse. But he has released only 10 tonnes of rice for sale in the market. Thus, only 10 tonnes of rice will be considered as supply. The rest constitutes stock. Secondly, *supply has a given price* tag attached to it. Everything brought to the market has a price tag, which serves as one of the issues of interaction with its prospective buyer, i.e., the consumers. Third, supply has a reference to a *given point of time*. Whenever we talk about supply, we must remember, we are talking in reference to a particular point of time. This also means that supply is a ***stock concept***, rather than a ***flow concept***.

We may distinguish supply into different categories basically as individual supply and market supply and fixed and flexible supply. *Individual supply* refers to the quantity of a product made available by an individual firm for sale at the market at a given price at a given point of time. *Market supply* refers to aggregate of quantities of the product offered by all the suppliers of the product at a given price at a particular point of time. Thus, market supply is the lateral summation of the supplies of all the individual sellers in the market.

Supply may also be categorised as fixed supply and flexible supply. Supply of certain goods cannot be changed i.e., they cannot be increased. For example, we cannot increase the supply of the antique items. Can we increase the supply of the picture *Monailsha* painted by Leonardo da Vinci, or can we increase the supply the pictures drawn by Van Gough? Similarly, can we increase the supply of the hand-written letters of the Father of the Nation, Mahatma Gandhi? We cannot. And that is why, the supply of such items remain fixed. Flexible supply on the other hand refers to the case of generally traded goods and commodities, whose supply are flexible. The supply of the general commodities is, on the other hand, prone to react to the general price mechanism. That means, like demand that we have discussed in the previous unit, supply of a commodity also reacts to price movement in the market. Now, the question remains: how does supply of a commodity react to the change in prices in the market? Does supply increase with increase in the price of the product in the market; or does it decrease with fall in its prices? The law of supply explains this phenomenon

of movement of price of a commodity and the quantity of its supply in the market.

Concept of market supply: Market supply is the summation of the individual supply curves within a specific market where the market is characterized as being perfectly competitive. The **Market Supply** is the total amount of a good or service all producers are willing to provide at the prevailing set of relative prices during a defined period of time. The market supply is the total of all individual producer supplies. The market supply curve is found by horizontally adding all individual supply curves, that is, sum up the quantities supplied by all sellers at each and every price. For higher prices the quantity supplied by all sellers in the market combined is greater than the quantity supplied for lower prices.

3.4 LAW OF SUPPLY, SUPPLY SCHEDULE AND THE SUPPLY CURVE

As we have already mentioned, Supply refers to the quantity of a commodity that producers/sellers are willing and able to offer for sale in the market at a certain price at a particular point of time. Again, we have also mentioned that the entire amount of the commodity produced, though marketable, may not be brought to the market for sale at a particular point of time. Thus, supply means the total amount of a commodity that are brought to the market for sale at a particular price at a particular point of time. Hence, we can not say that increased production will essentially lead to increased supply, as the entire addition to output may not be brought to the market, part of it may be hoarded. Given the total production of a commodity, the smaller is the amount hoarded, the larger will be the supply of the commodity and vice versa. Therefore, it follows that there are differences between total output, supply, stocks (also called as inventories) and hoarding.

Now, let us discuss the law of supply. The law of supply states that, other things remaining the same, as price of a commodity rises, the supply of the commodity rises and as price of the commodity falls, the supply of the commodity also falls. Thus, the main idea behind law of supply is that

higher the price greater the supply, and lower the price, lower the supply. We can express this statement In a symbolic form as follows:

$S_X = S (Px, P_S, P_C, F_j, C, T, G)$.

In the above statement, S_X is quantity of the commodity supplied, P_X is its price, P_S represents prices of ***substitute goods***, P_C represents prices of ***complementary goods***, F_j represents prices of ***factors of production***, C is total expenditure of the producer, T represents the state of technology, G represents goal of the producer.

When we mentioned 'other things remaining the same', we assumed that the variables other than price remains constant/unchanged during the concerned period of our discussion. It also implies that the supply of commodity X (S_X) and price of X (P_X) is directly related. The concept of law of supply will be easy to understand if we relate it with supply schedule and supply curve as have been shown in the next section.

Supply Schedule: Supply schedule exhibits the functional relationship between quantities of a commodity that the producers/sellers are willing to produce/sell and its different prices at a particular point of time. Thus, the list showing the quantities of the commodity that the producers or sellers are willing to sell in the market at different prices is known as supply schedule. The law of supply as discussed in the previous section can be explained with the help of the supply schedule and supply curve. The table 3.1 shown below represents a hypothetical supply schedule, showing the various price combinations of a commodity (rice I per kg) and quantity supplied (in tonnes of kg) at the corresponding prices.

Table 3.1: Supply Schedule of a Commodity

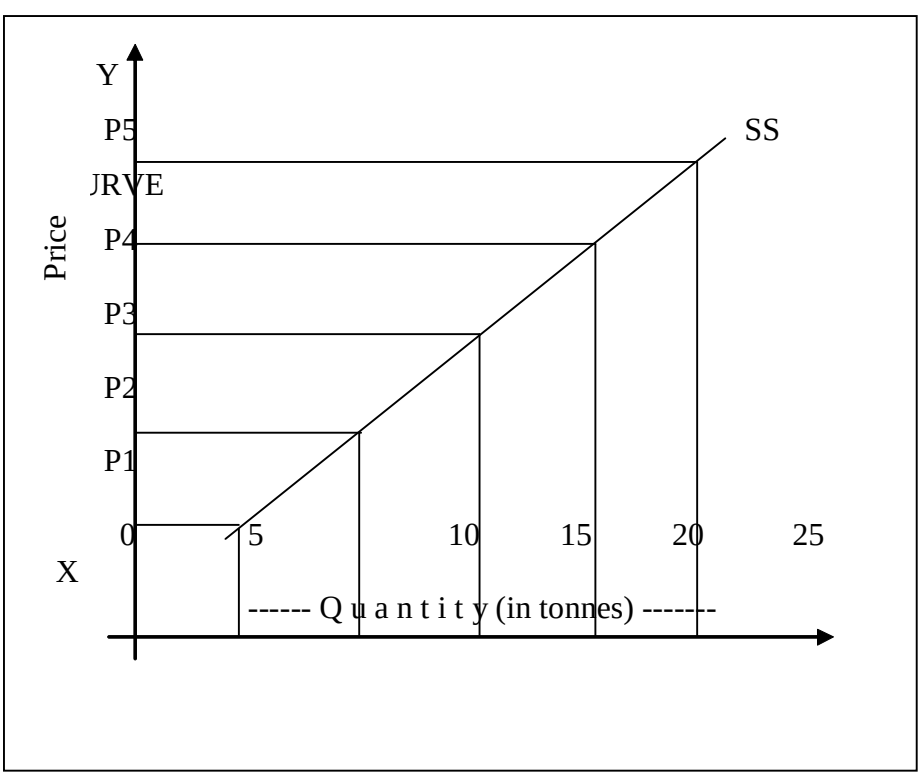
Price per kg of rice (in Rs.)	Number of Units Supplied (in tonnes)
22 (P1)	5 (Q1)
24 (P2)	10 (Q2)
26 (P3)	15 (Q3)
28 (P4)	20 (Q4)
30 (P5)	25 (Q5)

In table 3.1: P = Price, Q = Quantity

From Table 3.1 it can be seen that when price of rice per kg has increased from Rs. 22 (P1) to 24 (P2), the quantity supplied has increased from 5 tonnes (Q1) to 10 tonnes (Q2). Similarly, when the price of rice per kg increases from 24 (P2) to 26 (P3), the quantity supplied also increases from 10 tonnes (Q2) to 15 tonnes (Q3), and so on. This means that with the rise in prices, there is a corresponding increase in the quantity supplied. To make our discussion more meaningful, a supply curve is drawn on the basis of the above schedule.

Supply Curve: In figure 3.1, SS represents the supply curve. As may be seen from the figure, the SS curve is rising upward from left to right. This means that as prices of the commodity increases, volume of supply also increases. This implies that price and supply of a commodity are directly and positively related. As the suppliers of a commodity are guided by the profit motive, they are willing to offer more units of a commodity for sale in the market at a higher price.

Figure 3.1: Supply Curve





CHECK YOUR PROGRESS

Q 1: State the law of supply.

.....

.....

Q 2: Why does the supply curve rise upward from left to right?

.....

.....

3.5 FACTORS AFFECTING SUPPLY

In this section we shall discuss the various factors that determine the of supply of commodity in the market. The various factors that determine supply are:

- **Price of the commodity:** We have already discussed the role price plays in determining the volume of supply of the commodity. As the price of the commodity increases, its supply also increases and vice versa.
- **Prices of related commodities:** While deriving the supply schedule, and drawing the supply curve, we assume that the prices of other related commodities remains unchanged. If the prices of the related commodities change, the supply of the commodity may also change. For example, when there is a rise in the market price of rice, farmers will be encouraged to produce more amount of rice. As such, the farmers may reduce the cultivation of other crops and make more and more lands available for rice. Thus, this would affect the supply of rice, its prices as well as of other crops in the market.
- **Prices of factors of production:** Any price changes in the factors of production affects the production cost of the commodity. This would further affect the price of the commodity and its supply. For example, if the wages of labour increase, this would increase the cost of production. Ultimately, this would affect the cost of production and the volume of supply would be lower, making it shift towards left.

- **State of production technology:** The business firms always try to bring in new technologies to the production process with an attempt to improve quality and/or reduce the production cost. Thus, with changes in technology, the firms may be able to bring down the production cost. This would help the firms to increase the volume of supply. Consequently, this would shift the supply curve towards the right.
- **Objective of the firm:** The objective of the firm also affects the volume of supply of the commodity. If the firm aims to increase the sales volume, the firm would offer more volume of the product for sale.
- **Future price expectations:** Expectations regarding the future prices of the product also affects its supply. During inflation, the business firms expect to increase prices in the near future. This may encourage the firms to reduce the supply of the product with an aim to earn larger profit as price increases. The opposite happens during deflation. During deflation there is the tendency to decrease the price of the product in the near future. As such, farmers want to sell more and more volume of the product at the current price. Thus, supply increases during deflation.

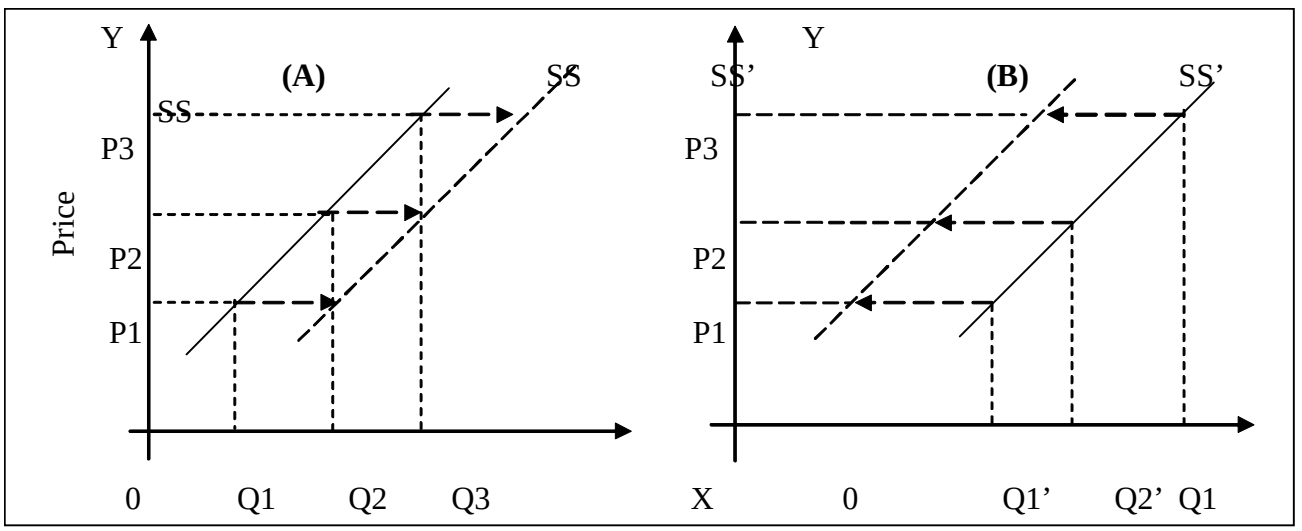
3.6 INCREASE AND DECREASE IN SUPPLY

While explaining the law of supply, we mentioned that, other things remaining the same, as price of a commodity rises, the supply of the commodity rises and as price of the commodity falls, the supply of the commodity also falls. The other things, that we assumed to remain constant included prices of substitute goods, prices of complementary goods, prices of factors of production, total expenditure of the producer, state of technology and the goal of the producer. On the basis of this assumption, we had discussed the supply schedule and the supply curve as shown in Figure 3.1.

Now, let us suppose, the price of the commodity remains constant, but there occurs a change in the 'other factors', say, the cost of labour and raw materials (factors of production). Now if the cost of labour and raw materials decline, the cost of production will also decline. This will enable

the supplier to produce more and also to increase supply in the market at each of the price points. This has been shown in panel (A) of the Figure 3.2.

Figure 3.2: Increase and Decrease in Supply



In panel (A) of Figure 3.2, it has been seen that as a result of decline in the prices of labour and raw materials, the entire SS curve shifts right to SS' exhibiting a higher level of supply in each of the price points. For example, at price P1, the quantity supplied in case of the new supply curve SS' is higher: 0Q2 > 0Q1 of SS curve. Similarly, at price P2, the quantity supplied in SS/ is higher than SS: 0Q3>0Q2. Such increase in supply may also be the result of change in the state of technology used in production, or any other such factors as have been already mentioned.

Panel (B) of Figure 3.2 shows decrease in supply. If the cost of labour and raw materials increases, this would result in lowering the production volume, and subsequently leading to less supply than before. As a result of increased cost of production, the supply curve SS moves to the left SS' showing lower levels of supply at each price point. For example, at P1 price, the quantity supplied in the new SS/ curve 0Q1' < 0Q1 of the SS curve. Similarly, at P2 price, the quantity supplied in the new SS/ curve 0Q2/ < 0Q2 of the SS curve. Another factor that may result in decrease in supply is the increase in the prices of other commodities. For example, if the price of rice increases, the farmer would be interested to engage more

factors in the production of rice by withdrawing the factors from the production of other commodities.

3.7 ELASTICITY OF SUPPLY

The elasticity of supply is the degree of responsiveness of supply to changes in the price of a good. More precisely, the elasticity of supply can be defined as a proportionate change in quantity supplied of a good in response to a given proportionate change in price of the good.

It can be expressed as follows–

$$e_s = \frac{\text{Proportionati change in quantity supplied}}{\text{Proportionati change in price}}$$

E_s

As demand for a good or product increases, the price will rise and the quantity supplied will increase in response.

The elasticity of supply can be shown to have five cases:

i. **Perfectly Elastic Supply:** When there is an infinite supply at a particular price and the supply becomes zero with a slight fall in price, then the supply of such a commodity is said to be perfectly elastic. In such a case $E_s = \alpha$ and the supply curve is a c horizontal straight line parallel to the X-axis, as shown in Fig. 3.3

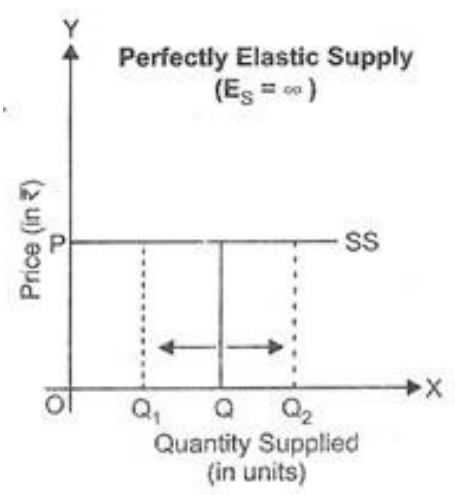


Fig 3.3 : Perfectly Elastic Supply

ii. Perfectly Inelastic Supply: When the supply does not change with change in price, then supply for such a commodity is said to be perfectly inelastic. In such a case, $E_s = 0$ and the supply curve (SS) is a vertical straight line parallel to the Y-axis as shown s in Fig. 3.4

Perfect Inelastic supply (E_s=0)

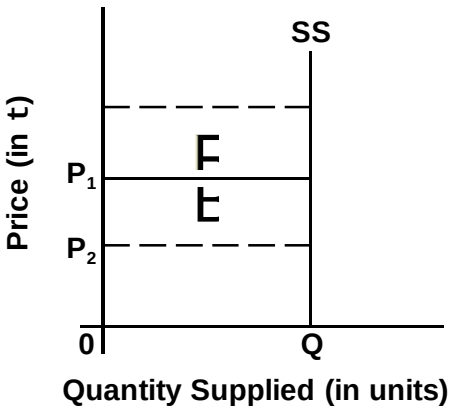


Fig 3.4 : Perfect Inelastic Supply

iii. Highly Elastic Supply: When percentage change in quantity supplied is more than the percentage change in price, then supply for such a commodity is said to be highly elastic. In such a case, $E_s > 1$ and the supply curve has an intercept on the Y-axis as shown in Fig. 3.5

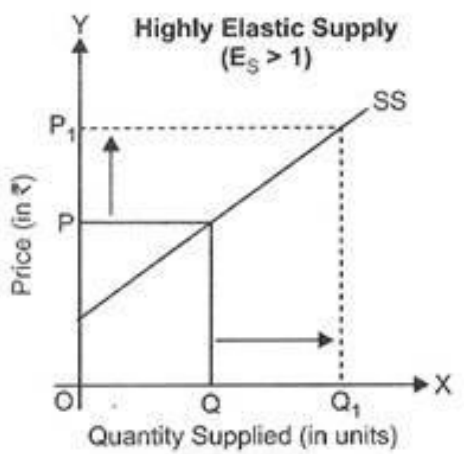


Fig 3.5 : Highly Elastic Supply

iv. Less Elastic Supply: When percentage change in quantity supplied is less than the percentage change in price, then supply for such a commodity is said to be less elastic. In such a case, $E_s < 1$ and the supply curve has an intercept on the X-axis as shown in Fig. 3.6

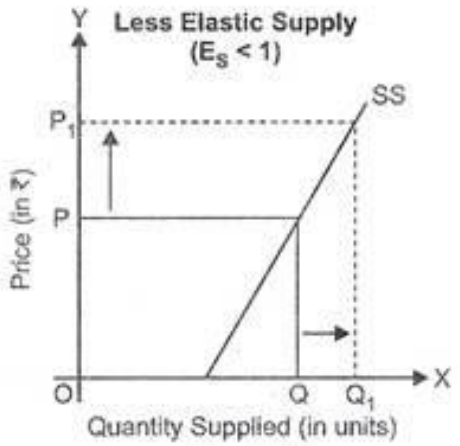


Fig 3.6 : Less Elastic Supply

v. Unitary Elastic Supply: When percentage change in quantity supplied is equal to percentage change in price, then supply for such a commodity is said to the unitary elastic. In such a case, $E_s = 1$ and supply curve is a straight line passing through the origin as shown in Fig. 3.7

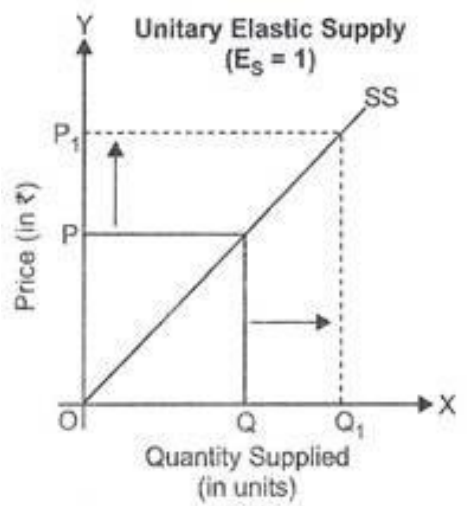


Fig 3.7 : Unitary Elastic Supply

3.8 EXCEPTIONS TO THE LAW OF SUPPLY

Although the price of a commodity and supply are directly related, there are various exceptions to the law of supply. Exception to the law of supply implies that there may be situations, in which in spite of increase in price of a commodity, there is no simultaneous increase in its supply. Various exceptions of the law of supply are

- Supply of the commodity may rise instead of falling when the supplier expects an even bigger fall in its price in the near future. In such a situation the supplier seeks to sell more of the commodity in the present before the price falls further in the future.
- The taste and preferences of the consumers must remain constant for supply to increase. Otherwise the law of supply will not be valid.
- Weather conditions affect the supply of commodities, particularly agricultural commodities. When the monsoon fails, the supply of agricultural commodities may not rise when the prices go up.
- The cost of production of the commodity determines the supply of the commodity. When the cost of production rises because of a fall in the productivity of workers or additional taxes on raw materials or rise in wages, supply of the commodity may fall with the price of the commodity remaining unchanged.
- In case of substitute goods, the law of supply is not applicable. If the prices of the substitute goods for a commodity increase, when other factors are constant, the willingness of supplying the commodity decreases.
- With regard to the supply of labour, it is seen that the supply falls with the rise in wages beyond a certain level.



ACTIVITY 3.1

You may notice that in the post-harvesting period, the abundance of supply in the market reduces the prices of the product. This adversely affects the farmers, as they do not receive their due income. What factors

would you make responsible for such situations? What measures may be adopted to tackle such situations?

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CHECK YOUR PROGRESS

Q 3: What happens to the supply curve when there is an increase in supply?

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Q 4: Does the law of supply always apply? Mention any two situations in which the law of supply may not operate.

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3.9 LET US SUM UP

- Supply refers to quantity of a product offered for sale at a given price at a given point of time.
- The seller/producer may have huge quantity of a produces kept in his warehouse. But only the amount released to the market for sale constitutes supply.
- *Individual supply* refers to the quantity of a product made available by an individual firm for sale at the market at a given price at a given point of time. *Market supply* refers to aggregate of quantities of the product offered by all the suppliers of the product at a given price at a particular point of time.

- Supply may also be categorised as fixed supply and flexible supply. Supply of certain goods cannot be changed i.e., they cannot be increased.
- The main idea behind law of supply is that higher the price greater the supply, and lower the price, lower the supply.
- Supply schedule exhibits the functional relationship between quantities of a commodity that the producers/sellers are willing to produce/sell and its different prices at a particular point of time.
- The various factors that determine supply are: price of the commodity, prices of related commodities, prices of factors of production, state of production technology, Objective of the firm, future price expectations, etc.
- Exception to the law of supply implies that there may be situations, in which in spite of increase in price of a commodity, there is no simultaneous increase in its supply.



3.10 FURTHER READING

1. Ahuja, H.L. (2003), *'Advanced Economic Theory';* New Delhi: S.Chand & Co.
2. Koutsoyiannis, A (1979), *'Modern Microeconomics';* New Delhi: Macmillan.
3. Jhingan, M.L. (1986), '*Micro Economic Theory';* New Delhi: Konark Publications.



3.11 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: According to the law of supply, other things remaining the same, as price of a commodity rises, the supply of the commodity rises and as price of the commodity falls, the supply of the commodity also falls.

Ans to Q No 2: As prices of the commodity increases, volume of supply also increases, and as the price of the commodity falls, supply of the commodity also falls. This means that price and supply of a commodity are directly and positively related. This is the reason for the supply curve rising upwards from left to right.

Ans to Q No 3: In case of increase in supply, the supply curve shifts to the right. This means that at each of the price points, the supply of the commodity increases with the increase in supply.

Ans to Q No 4: Although the price of a commodity and supply are directly related, there are various exceptions to the law of supply. For example, (1) supply of the commodity may rise instead of falling when the supplier expects an even bigger fall in its price in the near future. Secondly, (2) if the taste and preferences of the consumers change, the law of supply will not be valid.



3.12 MODEL QUESTIONS

Short Questions (Answer each question in about 100-150 words)

Q 1: What do you mean by Supply? Distinguish between supply and stocks.

Q 2: State the law of supply. Draw a supply curve from a hypothetical schedule.

Essay-type Questions (Answer each question in about 300-500 words)

Q 1: Discuss the various determinants of supply. What are the different exceptions of law of supply? Explain

Q 2: Discuss the various types of elasticity of Supply**.** Discuss in detail with illustrations.

*** ***** ***

UNIT 4: PRODUCTION

UNIT STRUCTURE

4.1 Learning Objectives

4.2 Introduction

4.3 Concept of Production

4.4 Factors of Production

4.5 Production Function

4.6 Linear Homogeneous Production Function

4.7 Optimum Input Combination

4.7.1 Isoquant

4.7.2 Iso- cost Line

4.8 Law of Variable Proportions

4.9 Returns to Scale

4.10 Economies and Diseconomies of Scale

4.11 Let Us Sum Up

4.12 Further Reading

4.13 Answers To Check Your Progress

4.14 Model Questions

4.1 LEARNING OBJECTIVES

After going through this unit, you will able to-

- explain the meaning of production
- describe the factors that are used to produce goods and services
- discuss the relationship between factors of production (inputs) and output
- discuss the lowest-cost combination of inputs that can produce the level of output
- describe the advantages and disadvantages of large- scale production.

4.2 INTRODUCTION

In this unit, we will analyse the behaviour of a producer. A producer or a firm produces and sell a certain amount of goods and services by utilizing various factors or resources. Production is done by producer to earn profit.

In this unit we will discuss the different aspects of the production function of a firm. We will also discuss the relationship between the resources utilised for production and the final output produced with the help of the resources. Besides that we will focus on the law of variable proportion and the laws of returns to scale in discusing the relationship between resources utlised and output produced. In this connection we will also discuss the combination of input that a firm will choose to minimise its cost of production.

4.3 CONCEPT OF PRODUCTION

By production we mean the process of creating the various goods and services. A producer or a firm acquires different inputs like labour, machine, land, raw- materials etc. Combining these inputs it produces output. This is called the process of production. In order to acquire inputs, it has to pay for them which is known as cost of production. Once the output has been produces, the firm sells it in the market and earns revenue. The revenue that the firm earns after deducting cost of production is called the profit of the firm. We assume here that the objective of every firm is to maximise its profit. A profit maximising firm would decide to produce that level of output at which it can maximise its profit.



Output - Whatever is obtained (goods or services) from the process of production is an output

4.4 FACTORS OF PRODUCTION

Anything that is necessary for the production of goods and services is an input or factor of production. There are mainly four factors of production land, labour, capital and organisation. The production of goods and services is the result of the combined effort of the four factors of production. Among

the four factors of production the land and labour are primany factors and the last two capital and organisation are the derived factors of production. In the absence of primary factors, no production is possible. The factor capital is produced with the joint effort of land and labour. The fourth factor organisation is the creation of labour. let us discuss the characteristics of each of these factors of production.

Land : In ordinary language land means soil or the surface of the earth. In economics land refers to all the natural resources including water, soil, forest, minerals etc. All the free gifts of nature which are limited in supply are regarded as land.

Characteristics of Land : As a factor of production, land has the following characteristics–

i) Land is the gift of nature. As such it has no cost of production.

ii) The supply of land is limited.

iii) Land differs in quality. More fertile land will produce more output compared to less fertile land.

iv) Land lacks geographical mobility. It cannot be physically transferred from one place to another. But ownership of land can be transferred.

Labour : Labour can be defined as any exertion of mind or body undergone partly or wholly with a view to produce goods or service. It is the human abilities or productive powers both mental and physical. In short, labour in economics means any type of work performed by labourer with an intention to earn income.

Characteristics of Labour : The characteristics of labour are explained below–

i) Labour cannot be separated from the labourer. The labourer cannot supply labour from distance.

ii) Labour cannot be stored up. Labour, once lost, is lost forever.

iii) Labour is mobile. Movement of labour from one place to another is possible.

iv) Labour is influenced not only by wages paid to it, but also by other factors like the work environment, the length of working hours, recreation and so on.

v) Labour differs in efficiency. Like machine every worker cannot render same quantum of work and therefore wages differ from labourer to labourer.

Capital : Capital is defined as the 'assets which are capable of generating income and which have themselves been produced'. Though capital is a factor of production, it is man-made. That is why it is also referred to as the 'produced means of production.' Capital consist of machines, plant and buildings, equipment etc. that made production possible. But capital does not include raw-materials, land and labour.

Characteristics of Capital : Following are the characteristics of capital –

i) Capital is created by man, it is not a gift of nature.

ii) The supply of capital is more elastic than the supply of land.

iii) All capital is wealth because all the characteristics of wealth-utility, scarcity, transferability and externality are present in capital.

iv) Capital is productive. The use of capital increases production.

v) Capital grows out of savings. Saving is that part of income which is not consumed. Saving is converted into capital.

Organisation : As a factor of production organisation bears the reponsibility of assembling the other factors of production. It is the organiser or the entrepreneur or the captain of the industry who mobilises the three other factors of production - land, labour and capital and makes use of the factors in a co-ordinated manner to a definite plan.

Characteristics of Organisation :

i) This factor is the most active factor of production. It is the duty of the entrepreneur to mobilise other passive factors.

ii) All entrepreneurs are not homogeneous, because ability of the entrepreneur differ from one to another.

iii) Entrepreneur gets profit for its contribution to the field of production.

Functions : As an active factor of production, a number of functions are performed by the entrepreneur. Some of the important functions are stated below–

i) The organiser has to plan what to produce, how much to produce, when and where to produce etc. Accordingly, the organiser has to co-

ordinate the functions of other factors. Besides, he has to take all decisions regarding the payments of other factors and marketing of products.

ii) The plans prepared by the organiser has been executed by itself. The act of supervision or evaluation from time to time has been performed by the organisation.

iii) This is the area which requires special ability of the entrepreneur. Innovations and creating new ideas in the area of production or marketing or in other fields bring more profits for the entrepreneur.

iv) Risks and uncertainly bearing is the ultimate function of the entrepreneur. The demand for the commodity, the price of raw materials and their supply, the taste and preferences of the consumers and so on are not constant. In the presence of these uncertainties, the organiser takes the decision to produce.

As the organiser has to bear heavy responsibilities and face a lot of uncertainties, the organiser has to be a man of creative abilities. The organiser is known as the captain of the industry.



CHECK YOUR PROGRESS

Q 1: Define production.

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Q 2: What are the four factors of production?

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4.5 PRODUCTION FUNCTION

The production function of firm is a relationship between inputs used and output produced by the firm. For various quantities of inputs used, it results in varied quantities of output. Let us take an example of a

manufacturer who produces steel chairs. He employs two workers – worker 1 and worker 2, two machines – machine 1 and machine 2 and 50 kilogram of raw – materials. Worker 1 is good in operating machine 1 and worker 2 is good in operating machine 2. If worker 1 uses machine 1 and worker 2 uses machine 2, then with 50 kilogram of raw materials, they can produce 10 steel chairs. However, if worker 1 uses machine 2 and worker 2 uses machine 1, which they are not good at operating, with the same 50 kilogram of raw-materials, they can produce only 7 steel chairs. So with efficient uses of inputs, 10 steel chairs can be produced whereas an inefficient use results in production of 7 steel chairs. Production function considers only the efficient use of inputs. It means that worker 1, worker 2, machine 1 and machine 2 and 50 kilograms of raw-materials together can produce 10 steel chairs which is the maximum possible output for this input combination.

A production function is defined for a given technology. If the technology improves, the maximum level of output produce for different input combinations increases. We then have a new production function.

We consider a firm that produces output (Q) using only two factors of production labour (L) and capital (K), and the production function will be–

$$Q = f(L, K)$$

Where, Q = output

L = labour

K = capital

f = function

Let us express the production function numerically.

$$100 = f(2, 1)$$

The above equation implies that by using 2 units of labour and 1 unit of capital (machine), the firm can produce 100 units of the commodity.

4.6 LINEAR HOMOGENEOUS PRODUCTION FUNCTION

Production function can take several forms but a particular form of production function enjoys wide popularity among the economists. This is a

linearly homogeneous production function. Linearly homogeneous production function implies that if all the factors of production are increased in a given proportion, output also increases in the same proportion. Hence, linearly homogeneous production function represents the constant returns to scale. If there are two factors labour (L) and capital (K), then homogeneous production can be mathematically expressed as–

$mQ = f(mL, mK)$

Where 'Q' stands for output (Total product) and 'm' is any real number.

The above function means that if factor labour (L) and capital (K) are increased by m-times, the total product 'Q' also increased by m times. Let us see the example below-

Labour (L)	Capital (K)	Total product (output)
2	1	100
4	2	200

By using 2 units of labour and 1 unit of capital, the firm can produce 100 units of the commodity. When it makes the labour and capital double (i.e. 4 units of labour and 2 units of capital), the output also get double (i.e. 200 units). This is the case of linearly homogeneous production function.

4.7 OPTIMUM INPUT COMBINATION

An important problem facing an entrepreneur is to decide about the particular combination of factors which should be employed for producing a product. There are various combinations of factors which can yield a given level of output and from among which producer has to select one for production. Let us first discuss two major related concepts–

4.7.1 Isoquant

An isoquant is the set of all possible combinations of the two inputs that yield the same maximum possible level of output. Let us consider a production function with two inputs.

If the inputs used are labour (L) and capital (K), then a sugar factory will be able to produce 20 quintals of sugar by employing any

four combinations of inputs–

(a) 5 units of L and 5 units of K

(b) 4 units of L and 6 units of K

(c) 2 units of L and 7 units of K

(d) 6 units of L and 4 units of K

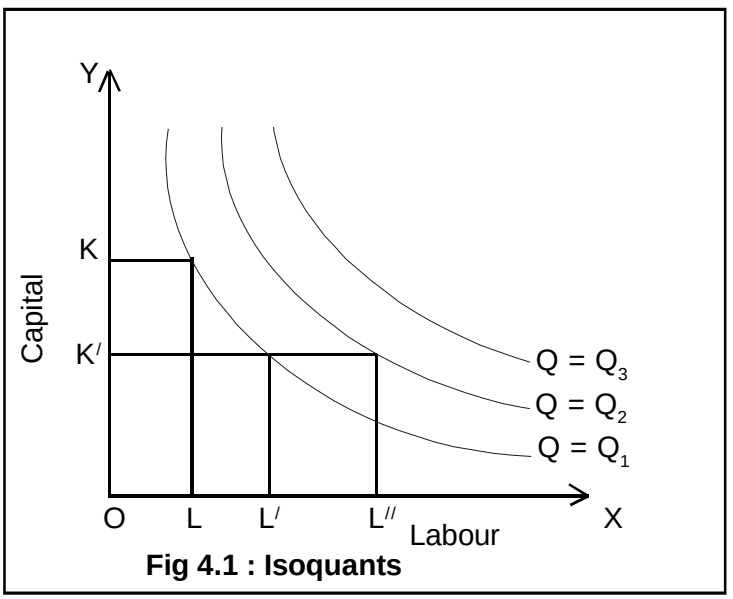


Fig 4.1 : Isoquants

In the diagram, labour is measured along the OX – axis and capital along the OY – axis. Here, we have three isoquants for the three output levels, namely $Q = Q_1$, $Q = Q_2$ and $Q = Q_3$ in the inputs plane. Two input combinations (L, K) and ($L^{/}$, $K^{/}$) give the same level of output Q_1. If we fix capital at $K^{/}$ and increase labour to $L^{//}$, output increases and we reach a higher isoquant $Q = Q_2$. Thus higher isoquant represents higher level of output.

4.7.2 Iso-cost line

An iso-cost line illustrates all the possible combinations of two factors that can be used at given cost and for a given producer's budget. In simple words, an isocost line represents a combinations of inputs which cost the same total amount.

Now suppose that a producer has a total budget of Rs. 120

and for producing a certain level of output, he has to spend this amount on two factors- labour (L) and capital (K). Price of labour and capital are Rs.15 and Rs.10 respectively.

Combinations	Units of capital (K)	Units of labour (L)	Total expenditure
A	8	0	120 = (8 x 15) + (0 x 10)
B	6	3	120 = (6 x 15) + (3 x 10)
C	4	6	120 = (4 x 15) + (6 x 10)
D	2	9	120 = (2 x 15) + (9 x 10)
E	0	12	120 = (0 x 15) + (12 x 10)

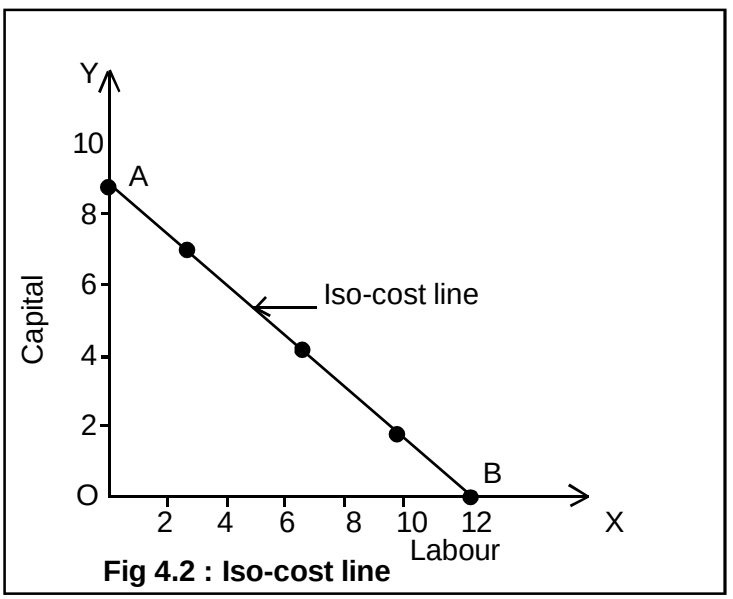


Fig 4.2 : Iso-cost line

In the above diagram we measure labour along OX - axis and capital along OY - axis. The straight line AB will pass through all combinations of labour and capital which the firm can buy with outlay of Rs.120, if it spends the entire sum on them at the given prices. The line AB is called the iso-cost line. Higher iso-cost line represents higher cost or outlay.

To produce a given level of output, the entrepreneur will choose the combination of factors which minimizes the cost of production and in this way he will be maximizing his profit. Thus, a producer will try to produce a given level of output with least cost combination of factors. This least cost combination of factors will be optimum combination for him.

The iso-cost line combined with the isoquant map helps in determining the optimal production point at any given level of output. Specifically, the point of tangency between any isoquant and an iso-cost line gives the lowest-cost combination of inputs that can produce the level of output associated with that isoquant.

Which will be the optimum input combination can be understood from the following figure–

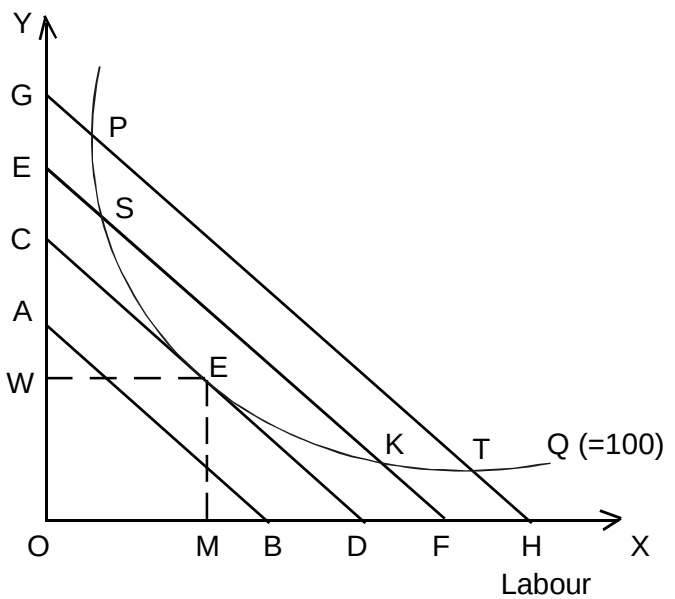


Fig 4.3 : Minimizing cost for a given level of output

Suppose the entrepreneur has decided to produce 100 units of output which is represented by isoquant Q. The 100 units of output can be produced by any combination of labour and capital such as P, S, E, K and T lying on the isoquant. But it is clear from the figure that for producing the given level of output (100 units) the cost will be minimum at point E at which the iso-cost line CD is tangent to the given isoquant. At no other point such as P, S, K and T, lying on the isoquant Q, the cost is minimum. It is seen in the figure that all other point on isoquant Q, such as P, S, K, T lie on higher iso-cost line than CD and which will therefore mean greater total cost for producing the given output. Therefore, the entrepreneur will not choose any of the combinations P, S, K, and T. We, thus, see that

factor combination E is the least-cost combination of labour and capital for producing a given output. Factor combination E is therefore an optimum combination for him under the given circumstances. Hence, we conclude that the entrepreneur will choose factor combination E (that is OM units of labour and OW units of capital) to produce 100 units of output.

It is thus clear that the tangency point of the given isoquant with an iso-cost line represents the least-cost combination of factors for producing a given output.



CHECK YOUR PROGRESS

Q 3: Define production function.

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Q 4: What is linearly homogeneous production function?

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Q 5: What is least-cost combination of factors?

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ACTIVITY

Visit a firm in your locality and ask the producer about the factors of production he/she is using. Also ask him whether he/she like to reduce the cost and what is the main motive of production?

4.8 LAW OF VARIABLE PROPORTIONS

Concept of Product

In the context of production function, three concepts of product are used viz-total product, average product and marginal product.

Total Product (TP) : Total product refers to the total quantity of goods

produced by a firm with the given inputs during a specified period of time. It signifies the relationship between the variable inputs and output keeping all other inputs constant. We write it as–

$$Q = f(L, K)$$

Here we keep capital (K) constant and vary labour (L). Then for each value of L, we get a value of Q.

Average Product (AP) : Average product is defined as the output per-unit of variable input. It is the output produced by one unit of variable input. We calculate it as–

$$AP = \frac{TP}{L}$$

Here, AP= Average Product
TP= Total Product
L= Labour

Suppose the total product of a firm is 100 units and the amount of labour employment is 5, thus the average product of the firm is–

$$AP = \frac{100}{5}$$

= 20 units

Marginal product (MP) :

Marginal product of an input is defined as the change in output per unit change in the input when all other inputs are held constant. When capital is held constant, marginal product of labour is–

$$MP = \frac{\text{Change in output}}{\text{Change in variable input}}$$

$$= \frac{\Delta Q}{\Delta L}$$

$$= \frac{\Delta TP}{\Delta L}$$

Where 'Δ' represents the change of the variable input. Marginal product can also be calculated in the following way–

MP = (TP at L units) – (TP at L – 1 units)

Suppose,

When L = 5, then TP = 100

When L = 6, then TP = 115

Fixed input : The factors that remain fixed during the production process are called fixed inputs. For example plant, machinery, building itc. Fixed inputs cannot be changed in the short-run but can be changed in the long-run.

Variable input : The inputs which the firm can vary are called variable inputs. Raw-materials, casual labourers etc. are the examples of variable inputs. Variable input changes both in the short-run and long-run.

Thus, MP = 115 – 100

= 15 units

Suppose marginal products are addition to total product, total product is the sum of marginal products. That is

$$TP = \Sigma MPs$$

Total product, average product and marginal product

Units of labour (L)	Total Product of labour (TP_L)	Average product of labour ($AP_L = TP_2/L$)	Marginal product labour ($MP_L = \Delta TP_L / \Delta L$)
0	0	–	–
1	15	15	15
2	35	17.5	20
3	50	16.67	15
4	40	10.0	–10
5	48	9.6	8

Let us discuss the law of variable proportions

The law of variable proportion examines the production function when output is increased by varying the quantity of one input. In other words, the law states that the marginal product of a factor input initially rises with its employment level, but after reaching a certain level of employment, it starts falling.

Assumptions of the law : The law operates under the following assumptions–

(i) The firm operates in the short-run. This means that only one factor of production is variable while all other factors are constant.

(ii) The technique of production doesnot change.

(iii) All units of the variable factors are equally efficient.

(iv) Factors of production are not perfect substitutes of each other. Labour cannot fully replace capital or vice-versa.

The law outlines three stages of returns to a variable factor. They are–

(i) Increasing returns.

(ii) Diminishing returns and

(iii) Negative returns.

These three stages are explained below with the help of schedule and diagram–

Returns to a factor : Three stages

Fixed factor	Units of labour (Variable factor)	Total Product (Quintals)	Marginal Product (Quintals)	Average Product (Quintals)	Stages
5 acers of land	1	8	8	8	Stage I Increasing returns
	2	18	10	9	
	3	30	12	10	
	4	48	18	12	
	5	65	17	13	
	6	78	13	13	Stage II Diminishing returns
	7	84	6	12	
	8	88	4	11	
	9	90	2	10	
	10	90	0	9	
	11	88	–2	8	Stage III Negative returns
	12	84	–4	7	

Assume that there is a given fixed amount of land, with which more variable factor, labour, is used to produce wheat. With a given fixed quantity of land, as a farmer raises the employment of labour from 1 unit to 9 units, total product increases from 8 quintals of wheat to 90 quintals. Beyond the employment of 9 units of labour, total product diminishes. Again it is important to mention that upto the use of 4 units of labour, total product increases at an increasing rate and afterwards it increases at a diminishing rate.

In the above table it is also seen from column 4 that marginal product of labour initially rises and beyond the use of four units of labour, it starts diminishing. Beyond the use of ten units of labour, total product diminishes and therfore marginal product becomes negative. As regards average product, it rises upto the use of fifth units of labour and beyond that it is falling throughout.

Graphical explaination of the three stages

In order to understand the three stages it is better to graphically illustrate the production function with one variable factor. In the figure (fig iv), the quantity of variable factor is measured on the OX-axis and total product, average product and marginal product are measured along OY axis. The total product curve goes on increasing to a point and after that it starts falling. Average and marginal product curves also rises in the beginning and then decline, marginal product curve starts declining earlier than the average product curve.

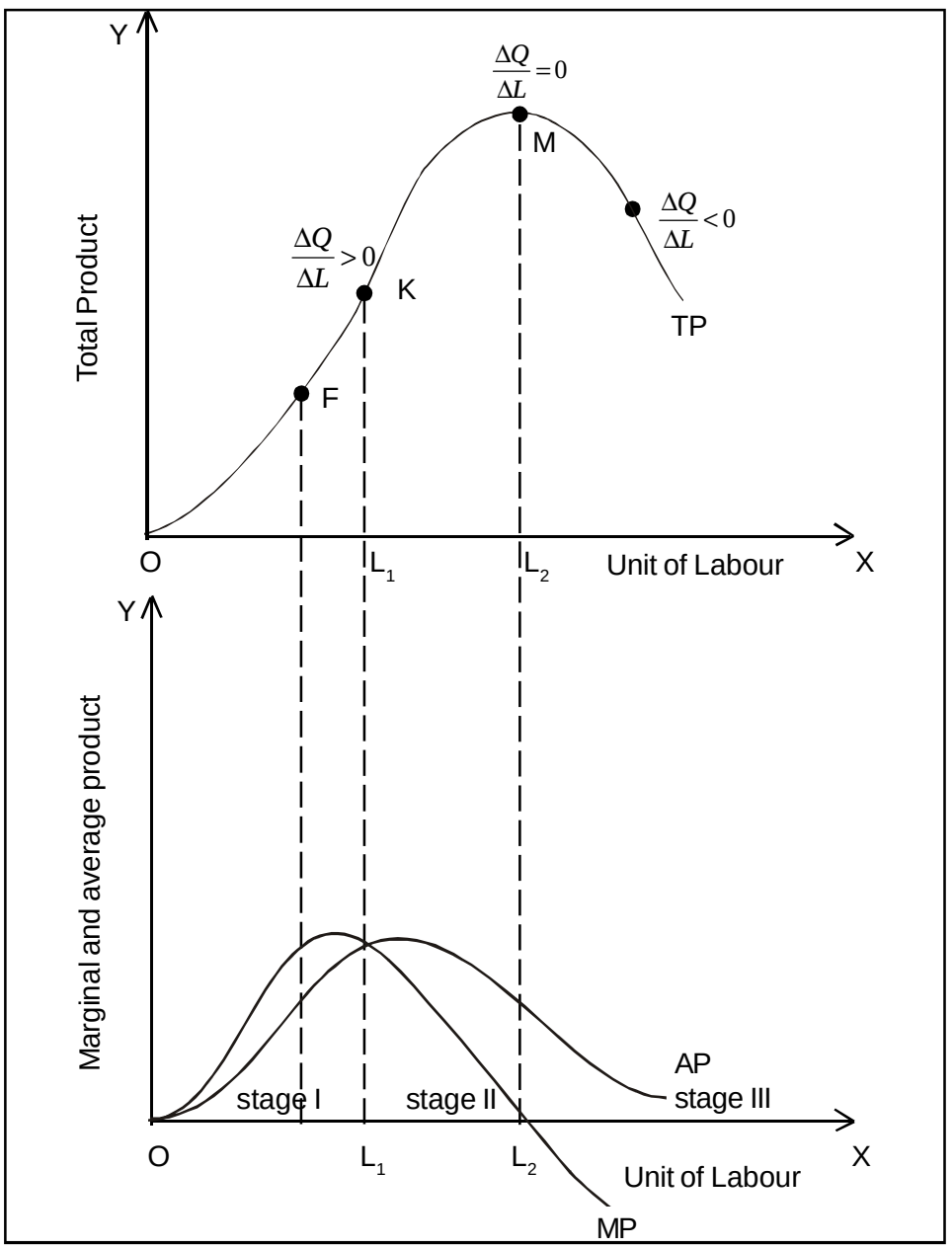


Fig 4.4 Three stages of production with one variable factor

Stage I : Stage of increasing returns

In the above figure from the origin to point F, slope of the total product curve TP is increasing, that is, upto the point F, the total product increases at an increasing rate, which means that the marginal product MP rises. From point F onwards during the stage I, the total product increases at a diminishing rate i.e. marginal product falls but positive.

The stage I ends where the average product curve reaches its highest point. This stage is known as the stage of increasing returns because average product of the variable factor increases throughout this stage.

Stage II : Stage of diminishing returns

In this stage total product continues to increase at a diminishing rate until it reaches its maximum point M where the second stage ends. Here both the marginal product and average product of the variable factor are diminishing but positive. At the end of the second stage, that is, at point L_2 marginal product of the variable factor is zero (when TP is maximum at point M then MP is zero)

Stage III : Stage of negative returns

In this stage total product declines and therefore the total produce curve TP slopes downward. As a result, marginal product of the variable factor is negative and the marginal product curve MP goes below the OX-axis. This stage is called the stage of negative returns, since the marginal product of the variable factor is negative during this stage.

Stage of operation :

Now an important question is in which stage a rational producer will seek to produce. A rational producer will never operate in stage III. It is because, by entering stage III, a firm will have to incur higher cost on one hand and at the same time since output is falling, in the product market, it will get less revenues.

A profit maximising firm will also not operate in stage I because it is getting increasing marginal returns. That leaves out only stage II, in which the marginal returns to an input is positive but diminishing. From the viewpoint of the operation of the firm, this is the most relevant stage.

Causes behind operation :

The reason behind the law of variable proportion is the following. As we hold one factor input fixed and keep incerasing the other, the factor proportion changes, Initially, as we increase the amount of the variable factor, the factor proportions become more and more suitable for the production and marginal product increases. But after a certain level of employment, the production process becomes too crowded with the variable input and the factor proportions becomes less and less suitable for the production. It is from this point the marginal product of the variable input starts falling.

4.9 RETURNS TO SCALE

The law of variable proportion explains the change in output as a result of the variation in one factor when other factors are held constant. On the other hand, returns to scale studies the change in output when all factors become variable. Returns to scale will be meaningful in the long-run as in the long-run all the factors change.

The returns to scale also exhibits three different stagees, namely, increasing, constant and decreasing. These three are analysed below–

Increasing Returns to Scale : Increasing returns to scale holds when a proportional increase in all inputs results in an increase in output by more than the proportion. If, for instance, all inputs are increased by 25% and output increases by 45% then the increasing returns to scale holds.

Increasing returns to scale works due to several factors such as indivisibility of factors, specialisation and division of labour etc.

Increasing returns to scale can be shown through isoquants.

In the figure 4.5 we have three isoquants Q_1, Q_2 and Q_3 representing 100, 200 and 300 units of output respectively. OR is a straight line and it shows the increase in scale. It is seen that the distance between the successive isoquants decrease as we expand output by increasing the scale. Thus increasing returns to scale occur since OA > AB > BC which means equal increase in output are obtained by smaller and smaller incerament in inputs.

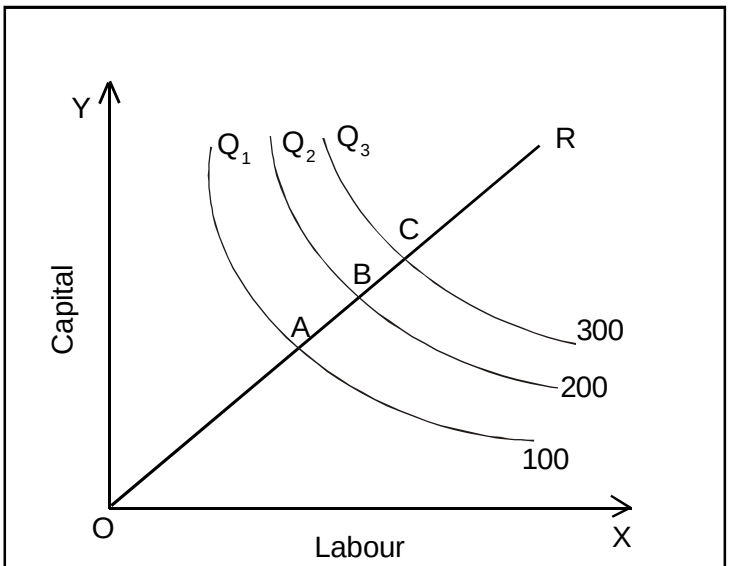


Fig 4.5 : Increasing returns to scale

Decreasing Returns to Scale :

Decreasing returns to scale holds when a proportional increase in all inputs results in an increase in output by less than the proportion. This stage is the ultimate stage of business expansion. According to some economist decreasing returns to scale occur because of the increasing difficulties arises in the areas of management, coordination and control with the expansion of business in the long period. Decreasing returns to scale can be shown through isoquants.

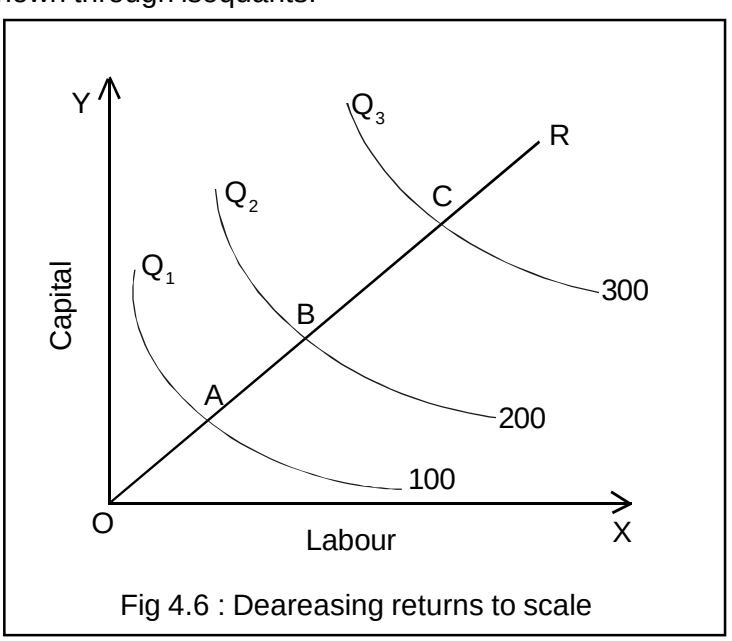


Fig 4.6 : Deareasing returns to scale

In this figure, distances between the subsequent isoquants have increased indicating less than proportionate increase in output as the business expands. Thus AB > OA and BC > AB. It means that more and more of inputs are required to obtain equal increament in output.

Constant Returns to Scale :

If all factor inputs are increased in a given proportion and the output increases in the same propertion, returns to scale is said to be constant. In mathematics the case of constant returns to scale is called linearly homogeneous production function. This also can be explained with the help of isoquants.

In figure 4.7, the successive isoquants are equidistant from each other. Thus AB = BC = CD. It indicates that output expands by the same proportion at which the labour and capital are increased in a given.

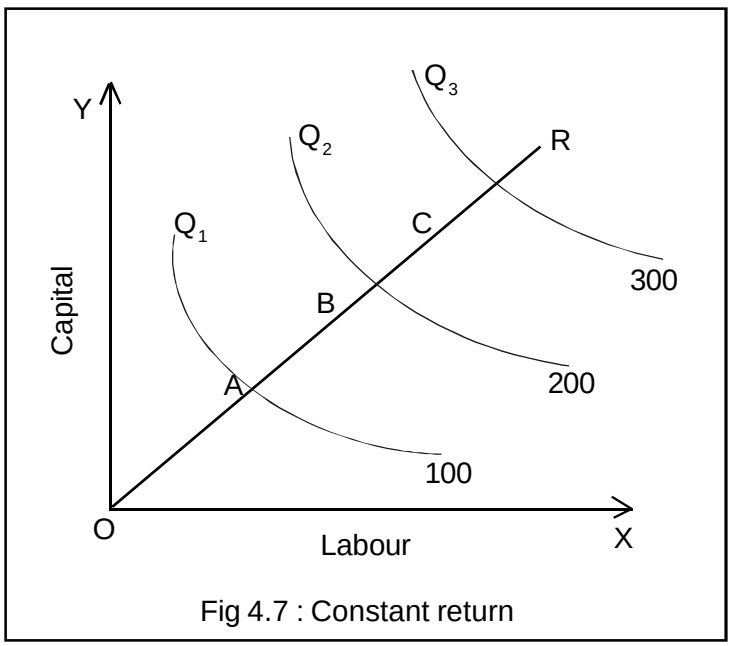


Fig 4.7 : Constant return

4.10 ECONOMIES AND DISECONOMIES OF SCALE

Economies of scale :

Economies of scale refers to the advantages or benefits enjoyed by a firm or an industry following an expansion of its scale of production. It is also regarded as the benefits of large scale of production. There are two types of economies of scale-

Scale – (a) internal economies and

(b) external economies

Internal Economies of Scale :

When a particular firm of an industry enjoys certain advantages following an expansion in its scale of production, the advantages will be known as internal economies of scale. Different internal economies are explained below–

(i) Financial economies : A big firm with a higher scale of production enjoys financial economies in the sence that the firm can easily secure bank loans as compared to a small firm.

(ii) Technical economies : Technical economies arises when a firm uses large machinaries. Large machineries have more productive capacity. Given the productive capacity of the machine and given the fixed cost, the smaller is the output produced, the higher is the cost per-unit and larger is the amount of output produced, the lower is the unit cost. A large firm will therefore, have lower production cost per-unit of output produced.

(iii) Market economies : A big firm will generate a higher demand for raw materials compared to a small firm. The supplier of raw-materials may offer rebates to the big firm as it makes a bulk purchase such rebates may not be given to a small firm which makes a small purchase. A big firm may also undertake extensive surveys of market demand for its product.

(iv) Managerial economies : A big firm may employ efficient personal to oversee the production plans and programmes. At a large scale production, managerial works are done in a very efficient way which helps to reduce the cost. In a large scale production, the whole unit is grouped into certain divisions, such as production, marketing, export etc. Eact division is leaded by an expert manager. Above all, a general manager is also appointed. Thus managerial economies arises as a result of expert work of the skill managers.

(v) Labour related economies : The big firm has a large market for its product. It can go in a big way for division of labour and specialisation.

Such a firm can offer various incentives like rapid promotion, provision of pension etc.

(vi) Risk bearing economies : Large scale firm can easily bear the risks. A big firm can produce a number of commodities. If the demand for a particular product goes down in the market, the big firm can still fall back upon the other products. They can easily cover the losses incurred by one or more units.

External Economies of Scale

External economies refers to the economies or benefits enjoyed by all the firm which are generated by the industry as a whole. External economies are associated with the benefits of localisation of industries. Sualkuchi is the center of the silk industry of Assam. As and when the number of loom increases, it may be possible to establish a sophisticated colouring and calendening plant at sualkuchi. This will benefit all the weavers. This is an example of external economies of scale. External economies can be analysed in the following way–

(i) Economies of concentration : When firms concentrate in a specific area, they can reap the benefits of several aspects. These aspects may be skilled workers, better transport facilities, credit facilities etc.

(ii) Economies of information : When a large scale industry publishes reports, statistics and other informations regarding the products, markets, future prospects and other related matters by its own survey and research, the other firms concentrated nearby can avail these necessary informations.

(iii) Economies of welfare : Welfare policy of one firm compels the others to adopt sufficient measures for the welfare of the workers. Besides, all firms can work together to bring welfare of the whole community.

Diseconomies of scale :

Diseconomies of scale refers to disadvantages that a firm or an industry faces following an expansion of its scale of production. There may be internal or external diseconomies of scale.

Internal Diseconomies of scale :

(i) As the firm expands beyond a certain stage the organiser finds it difficult



Division of labour : Division of labour means the breaking up of a job into smaller parts and assigning each part into a particular worker.

Specialisation : Specialisation is a wider sence of division of labour. Division of labour is specialisation only with regard to one factor of production ie. labour. But specialisation implies specialisation of all other factors of production land, capital and organisation.

Localisation of industry : Localisation of industry implies the concentration of the different firm of the industry at a certain place or region.

to co-ordinate the activities, efficiency suffers and there arises the problem of mismanagement of large-scale production.

(ii) Every machinery has a maximum productive capacity and when the firm overexpands it becomes difficult to raise output without raising the cost of production.

External Diseconomies of scale :

There are certain external diseconomies of scale. These are–

(i) The disadvantages of localisation of industry will become more prominent as the industry expands. Unplanned urbanisation, environmental pollution and other problem will begin to surface.

(ii) Large scale industry demands more raw materials and as a result, the price of raw materals will begin to rise leading to inflation in the economy.



CHECK YOUR PROGRESS

Q 6: What is the law of variable proportions?

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Q 7: What are the three stage of the law of variable proportions?

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Q 8: What is returns to scale?

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Q 9: Define economies and diseconomies of scale.

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4.11 LET US SUM UP

- Production is a process of creating various goods and services by using different inputs like land, labour, machine, raw-materiats etc.
- There are mainly four factors of production land, labour, capital and organisation and these factors contribute in the production process.
- Production function of a firm shows the relationship between input used and output produced by the firm.
- Linearly homogeneous production function implies that if all the factors of production are increased in a given proportion, output also increase in the same proportion.
- Optimum input combination is an input combination which is least expensive. This input combination is determined at the point of tangency between isoquant and iso-cost line.
- The law of variable proportion examines a production function when output is increased by varying the quantity of one input where other input remain constant. This concept is related to short-run as because there is the use of both fixed and variable input.
- Returns to scale examines a production function when output is increased by varying all the inputs. This concept is related to long-period of time.
- Economies of scale refers to the advantages or benefits enjoyed by a firm or an industry following an expansion of its scale of production.
- Diseconomies of scale refers to the disadvantages that a firm or an industry faces following an expansion of its scale of production.



4.12 FURTHER READING

1. Ahuja, H.L. (2003), *'Advanced Economic Theory';* New Delhi: S.Chand & Co.

2. Koutsoyiannis, A (1979), *'Modern Microeconomics';* New Delhi: Macmillan.

3. Jhingan, M.L. (1986), '*Micro Economic Theory';* New Delhi: Konark Publications.



4.13 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Production means the process of creating various goods and services.

Ans to Q No 2: The four factors of production are– land, labour, capital and organisation.

Ans to Q No 3: Production function of a firm shows the relationship between input used and output produced by the firm.

Ans to Q No 4: Linearly homogeneous production function implies that if all the factors of production are increased in a given proportion, output also increases in the same proportion.

Ans to Q No 5: It is the combination of factors at which the firm minimize its cost and maximize profit.

Ans to Q No 6: The law of variable proportion examines the production function when output is increased by varying the quantity of one input where other inputs held constant.

Ans to Q No 7: The three stages of the law of variable proportions are– increasing returns, diminishing returns and negative returns.

Ans to Q No 8: Returns to scale examines the production function when output is increased by varying all the inputs.

Ans to Q No 9: Economies of scale refers to the benefits enjoyed by a firm or an industry as a result of expansion of its scale of production. Diseconomies of scale on the other hand refers to the disadvantages arises due to the expansion of scale of production.



4.14 MODEL QUESTIONS

Q 1: Explain the concept of production.

Q 2: Mention the four factors of production and two characteristics of each of them.

Q 3: Explain the functions of an organisation.

Q 4: What do you mean by production function? Explain the concept of linear homogeneous production function with example.

Q 5: Explain the concept of law of variable proportions with the help of diagram.

Q 6: What is economies of scale? Mention any four types of internal economies of scale.

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UNIT 5: COST ANALYSIS

UNIT STRUCTURE

5.1 Learning Objectives

5.2 Introduction

5.3 Cost Concept

- 5.3.1 Opportunity Cost or Alternative Cost
- 5.3.2 Explicit Cost and Implicit Cost
- 5.3.3 Money Costs and Real Cost
- 5.3.4 Accounting Cost and Economic Cost
- 5.3.5 Sunk Costs, Marginal Cost and Incremental Cost

5.4 Short Run Cost

- 5.4.1 Total Cost
- 5.4.2 Average Cost
- 5.4.3 Marginal Cost

5.5 Long Run Cost Curve of Firm

- 5.5.1 Long Run Average Cost Curve
- 5.5.2 Long Run Marginal Cost Curve

5.6 Managerial Uses of Cost Function

5.7 Let Us Sum Up

5.8 Further Reading

5.9 Answer to Check Your Progress

5.10 Model Questions



Acquisition-
It is the act of contracting or assuming or acquiring possession of something.

5.1 LEARNING OBJECTIVES

After going through this unit, you will be able to

- explain the concepts of costs
- define cost function
- compare between various types of short run cost curves
- describe how long run average cost curves and marginal cost curves are derived

- explain the significance of cost function in managerial decision making

5.2 INTRODUCTION

Cost plays an important role in decision making process of a firm. Profit maximization is an important objective of a firm. Besides profit maximization, costs determined whether a new product is to be introduced or not, whether there should be new *acquisition* and so on. In the language of a layman, the sum of all expenditure incurred in the process of production is called cost. The term cost of production may be used in several senses. We will discuss all of them.

The costs incurred on the production process may be studied in both short run and long run. In the short run, fixed factors can not be changed. Output can be increased only by varying the quantities of variable factors. But in the long run there is no fixed factor. A period is called long run if all inputs can be changed within that period. In this unit we will discuss how long run average and long run marginal costs are derived. The concept of cost discussed in this unit falls within the purview of traditional theory of costs.

5.3 COST CONCEPT

The theory of costs plays a major role in managerial economics while allocating scarce resources. A cost function is a derived function. It is derived from the production function. The relationship between cost and output is known as cost function, i.e. it relates the cost of production to the firm's level of output. Economic theory distinguishes between short-run and long-run cost. Short run costs are the costs over a period of time during which some factors of production are fixed. The long-run costs are costs increased over a period of time during which it is possible to change all the factors of

production. But both in the short run and in the long run, total cost is a multivariate function. Symbolically, we may write the short run cost function as

$$C=f\ (X, T, P_f, K)$$

where C= total cost

X= output

T= Technology

P_f= prices of factors

K= fixed factors

The long-run function is different from short run cost function. It does not contain the variable 'K' which represents the fixed factor. Every factor is a variable in the long run. Symbolically, the long-run cost function may be represented as

$$C=f(X, T, P_f)$$

If we compare the long-run production function with the short run production function, we see that the variable K representing technology is absent in the long run production function. This happens because technology undergoes changes in the long-run.

Cost concepts: The term cost is frequently used without explaining what it actually means. Since the term cost has different meanings, it is essential that the term be defined precisely. Let us discuss them below.

5.3.1 Opportunity cost or Alternative cost

The concept of opportunity cost plays a major role in managerial decision making. While deciding the cost of a product, it is always important to consider what the customer is willing to sacrifice to obtain the particular product. The opportunity cost of any good is the next best alternative good that is sacrificed. Since resources are scarce, they can not be put in all uses simultaneously. If they are used to produce one thing they have to be withdrawn from other uses. For example, a plot of land can be used to

produce either rice or wheat. When it is employed to produce rice, it means that we have sacrificed the quantity of wheat for rice. The opportunity cost of producing rice is the amount of wheat sacrificed.



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Opportunity cost: It refers to the amount of subjective value foregone in choosing one activity over the next best alternative. The opportunity cost or transfer cost of any good is the next best alternative good that is given up. It is the opportunity missed or alternative foregone in having one thing rather than the other or in putting a factor service to one use instead of the other. While taking any production decision, opportunity cost associated with the use of firm's resources should be taken into account.

5.3.2 Explicit cost and Implicit cost

Explicit costs are those costs that involve an actual payment to other parties, while implicit costs represent the value of foregone opportunities but do not involve an actual cash payment. Implicit costs are as important as explicit costs. Ignoring implicit cost means that a part of the total opportunity cost has been ignored. Let us take the case of a person who does not hire a manager and runs his own business. While working for someone else, he could have earned a good salary. That salary foregone is often neglected in accounting statement but any rational decision making policy should include both explicit and implicit cost.

5.3.3 Money cost and Real cost

Money costs are total money expenses incurred by a firm for purchasing the inputs, together with certain other items. These will include wages and salaries of workers, cost of raw materials, expenditures on capital equipment, depreciation cost, rent on buildings, interest on capital invested and borrowed, advertisement and transportation cost, insurance charge, taxes and so on. It is also called nominal cost or expenses of production.

Some elements always lie behind the money cost which can not be explicitly measured. The efforts and sacrifices made by the capitalists to save and invest, the foregone leisure by the workers are some example of real cost. Marshall defined such expenditure as real cost. An unpleasant work does not always carry high wage and a pleasant work does not carry low wage. Thus, it can be said that money cost and real cost do not correspond to each other.

5.3.4 Accounting cost and Economic cost

The concept of cost as conceived by an accountant is different from the idea conceived by an economist. Accountants are concerned with reporting the past performance of the firm for external use, as in annual reports. Financial accountants tend to take a retrospective view of the firms finances and operations because they must keep track of assets and liabilities and evaluate past performances. It is called so because accountants use this cost concept. But an economists approaches cost somewhat differently. They take a forward looking view of the firm. They are concerned with the allocation of scarce resources. Therefore, they care about what cost is likely to be in future and about the ways in which resources could be rearranged to reduce cost and improve profitability. It refers to foregone opportunities. The word 'economic' tell us to distinguish between costs that the firm can control and those it can not.

5.3.5 Sunk cost, Marginal cost and Incremental cost

Sunk cost is an expenditure that has been made and can not be recovered. For example, let us take the case of a producer who buys specialized equipment designed for a particular purpose. That equipment can be used to do only what it was originally designed for and can not be converted for some other use. It has no alternative use and therefore, its opportunity cost is zero. The expenditure on this equipment is called sunk cost. In general, sunk costs are irrelevant in decision making.



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Sunk costs: Sunk cost is incurred in the past and it is not affected by current decision. The money used as sunk cost can not be recovered. It has no opportunity cost. Sunk cost is an expenditure that has been made and can not be recovered.

Marginal cost refers to the change in total cost corresponding to an increase in output by an additional unit. On the other hand **incremental cost** refers to the total additional cost of implementing a managerial decision. It may be the increase in expenditure owing to introduction of a new product line or acquisition of a new unit of production and so on.



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Incremental cost refers to the total additional cost of implementing a managerial decision. It may be the increase in expenditure owing to introducing a new product line or acquiring a new production unit etc. It is important to measure incremental cost carefully so that all additional costs are included while taking any new decision.



CHECK YOUR PROGRESS

Q1. Distinguish between marginal cost and incremental cost.

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Q2. What is sunk cost? Is sunk cost relevant in managerial decision making?

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5.4 SHORT- RUN COST

The short-run is a period in which the firm can not change its plant, equipment and the scale of organization. To increase output, it can only employ more variable factors with the same quantity of fixed factors.

5.4.1 Total Cost

Total cost is an all inclusive concept encompassing expenses of all kinds required to do business. It is the cost of producing any fixed level of output. The total cost may further be subdivided into **total variable** and **total fixed** cost. Let us discuss them below.

Total variable cost:

The total variable costs are those expenses of production which change with the changes in total output of the firm. It means that they can be adjusted with the change in output level. For example a bread producer wants to increase the production of bread from 200 to 350 units. Now he will require more wheat and more labourers. Therefore, expenditure on these two items is called variable cost. Variable costs are also called primary cost or direct cost. Variable cost includes expenditure on labour, raw materials, power, fuel, etc.

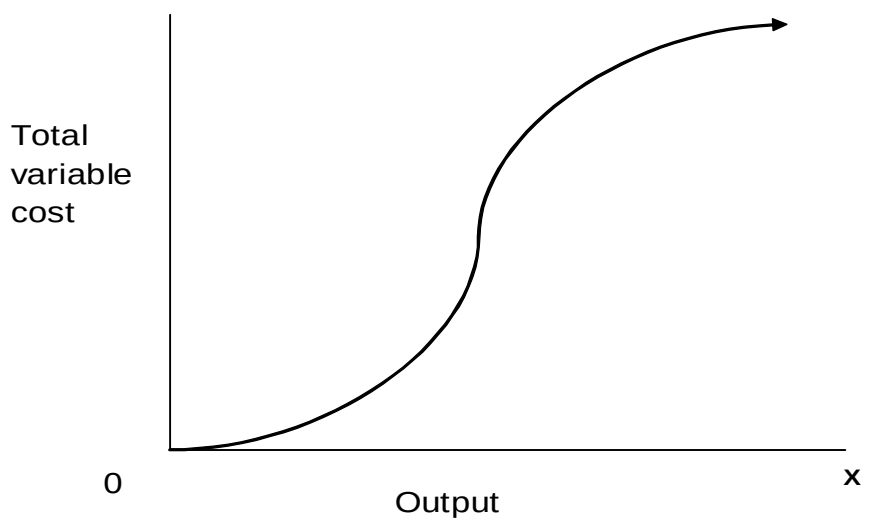


Fig: 5.1 Total variable cost curve

The total variable cost curve starts from the origin as shown in the Fig: 5.1. It is so because when nothing is produced total variable cost is zero.

Total Fixed cost:

On the other hand, some components of production can not be varied in the short run. For example, our bread producer can not increase its plant size quickly in the short run. He has to collect capital and order the equipment for purchasing. Such expenditure on capital equipment, building, administrative staff salaries, land maintenance etc are called fixed costs. It is called so because it can not be adjusted in the short run. Fixed cost is the cost which does not vary with the level of output. Fixed costs are known as 'overhead' cost. The total fixed cost curve is horizontal line as shown in diagram 2 which is parallel to the X axis. In the Fig 5.2, 0A is the quantity of fixed cost incurred in the short run.

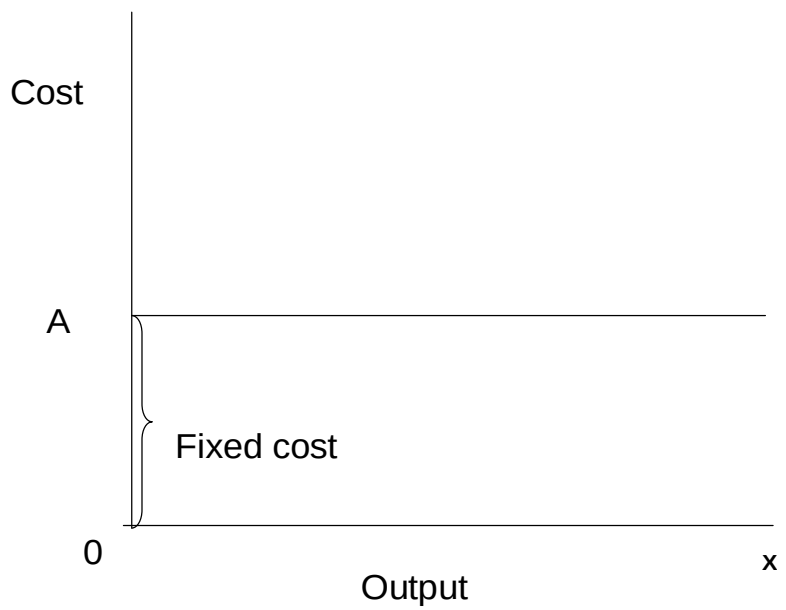
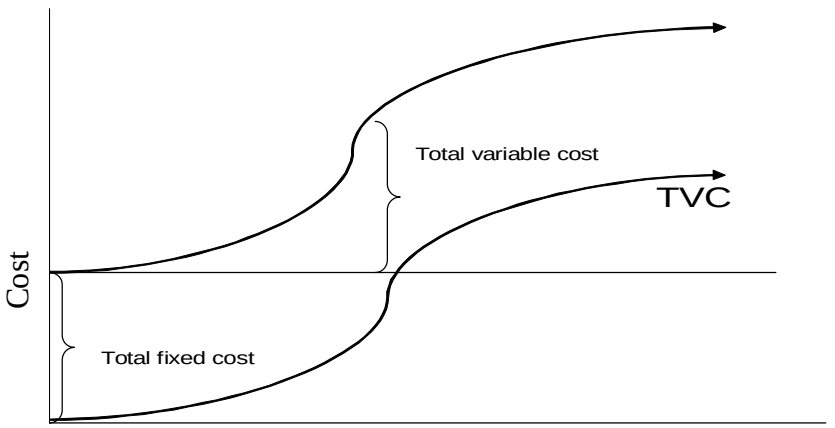


Fig: 5.2 Total Fixed cost

Both total fixed costs (TFC) and total variable cost (TVC) together constitute total cost (TC). Thus,

TC = TVC + TFC

The shape of the total cost curve resembles the shape of the total variable cost curve as shown by fig 5.3. The distance between the total cost curve and the total variable cost curve represents total fixed cost.



Output

Fig 5.3

The slope of the total cost curve is related to returns to scale concept. We know that returns to scale refers to resultant increase in output for increase in all inputs in a particular proportion. A production function does not always exhibit the same degree of returns to scale over the entire range of output. It has been found in most of the cases that returns to scale is increasing at the initial stage, followed by constant returns to scale over the intermediate levels of output and finally decreasing returns to scale operates at high levels of output.

5.4.2 Average cost

Average cost (AC) is defined as total cost of production divided by the total number of output produced. Cost per unit is more relevant in decision making than the total cost function. This is because the manager must compare cost per unit of output to the market price of that output.

$$AC = \frac{TC}{Q}$$

Here, TC represents total cost incurred in the process of production and Q represents the number of output produced. We have already studied that total cost (TC) is nothing but the sum of total fixed cost and total variable cost.

$$ATC = \frac{TC}{Q}$$

$$\text{Or, } ATC = \frac{TVC+TFC}{Q}$$

$$= \frac{TVC}{Q} + \frac{TFC}{Q}$$

$$= AVC + AFC$$

It means that average cost is the sum total of average variable cost and average fixed cost. Now we will discuss the shape of average fixed cost and average variable cost curves.

Average fixed cost:

If the total fixed cost is divided by the total number of units of output produced, we arrive at average fixed cost. Average fixed cost is the amount of fixed cost required to produce a single unit of production. It is calculated by

$$AFC = \frac{TFC}{Q}$$

Where, Q is the number of total output produced. The shape of the average fixed cost curve is shown in Fig:5.4.

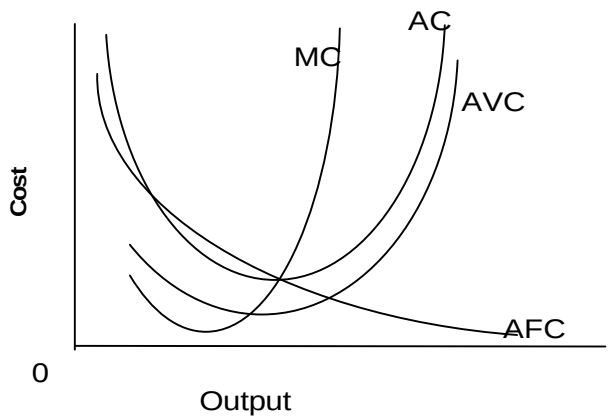


Fig: 5.4 Average fixed cost

Note: MC must cut both the AVC and AC at their respective minimum points

Average variable cost (AVC):

Average variable cost is the total variable cost divided by the number of units of output produced. It can be calculated in the following way-

$$AVC = \frac{TVC}{Q}$$

Where, Q stands for the total output produced. The average variable cost will generally fall as output increases from zero to the normal capacity output. But beyond the normal capacity of output it will rise steeply, because of the operation of the law of diminishing return. Average variable cost curve is shown in Fig 5.4.

5.4.3 Marginal cost

To understand the concept of marginal cost, let us go back to the concept of marginal product. Marginal product is an additional output produced. For example, one producer produces 100 units. When he produces 101 units, the extra unit is called marginal output. Therefore, marginal

cost is an addition to the total cost incurred on the production of an additional unit. Since total fixed cost does not undergo any change in the short run, marginal cost may also be called an addition to the total variable cost in the short run. With the help of mathematics MC can be expressed as

MC= (TC) / Q

where TC is total cost and Q is output, " stands for a small change.

There is a direct relationship between AC and MC. When AC falls MC also falls but it is below AC. When AC rises MC is above it and AC equals MC at the lowest point of AC.

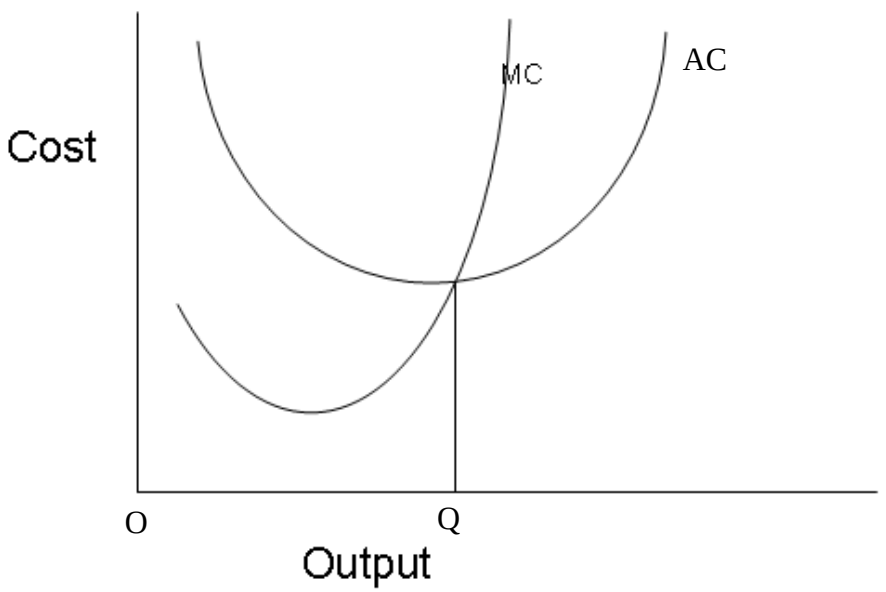


Fig: 5.5

Note: MC must cut AC from below at its minimum point

From the Fig: 5.5 it is clear that to the right of output Q, MC is higher than AC and to the left of Q, MC is lower than AC. But at output level Q, MC=AC. Thus, we find that

1. If MC< AC, then AC will be falling as output increases.

2. If MC>AC, then AC will be rising as output increases.
3. At point Q where AC is minimum, we have AC=MC.

5.5 LONG-RUN COST CURVE OF A FIRM

Long run is a period when a firm can change its plant size and scale of operation. In the long run all factors are variable. Now the question is how short is the short run and how long is the long run? This depends on the industry and the production techniques used. Production length will vary from firm to firm. If there are no transactions and no specialized inputs, then all inputs can be quickly adjusted, and the long run is not very long.

5.5.1 Long-Run Average Cost Curve

Let us first discuss how long-run average cost curve is derived in the long run. We all know that a particular plant can produce a particular range of output. It is the lowest point of average cost curve beyond which production is not economic because of the operation of law of decreasing returns to scale which may occur for various reasons. Suppose the demand for a firm's product increases. Now the producer will install a new plant. The firm will be making use of the newly installed plant till it reaches the lowest point on the average cost curve. This way more new plants will be installed with the increase in demand for the firm's product.

We can derive the long-run average cost (LAC) curve from the short run average cost curves by fitting a line which is tangent to all SAC curves.

In Fig: 5.6, LAC is the long run average cost curve. Each point on the LAC is a point of tangency with the corresponding short run average cost curve. Therefore, it is also called Envelope Curve. The firm will produce OM amount of output at the minimum point E. If the firm produces less than OM, it is not reaping fully the economies of scale and if it produces beyond OM, there

will diseconomies of scale. In both the cases, the average cost of production will be higher.

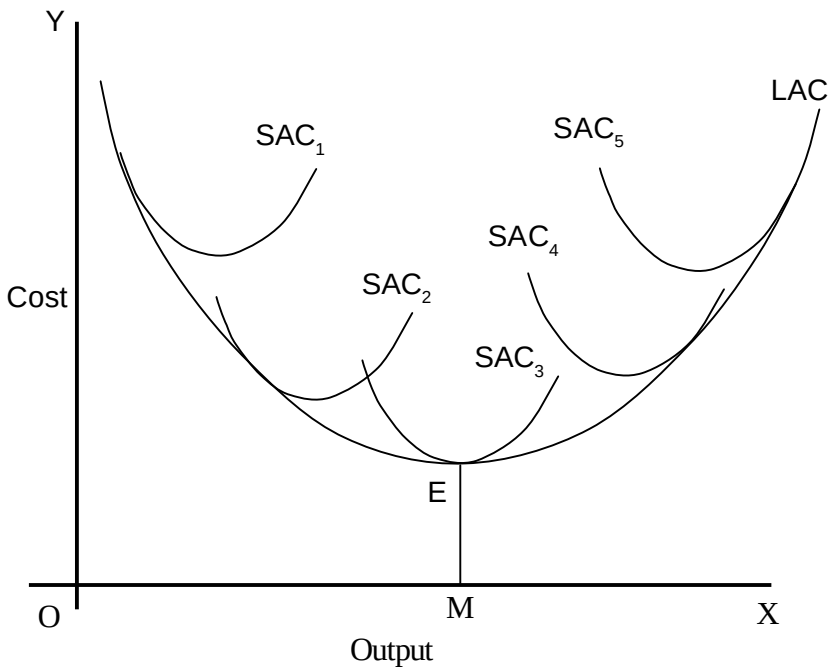


Fig: 5.6 Long Run Average Cost Curve

The shape of the long-run average cost curve is like U. This shape reflects the laws of returns to scale. According to this law, the unit cost of production decreases as plant size increases, due to the economies of scale which large plant sizes make possible. It has been assumed that this plant is completely inflexible. There is no reserve capacity, not even to meet temporary rise in demand. If this plant size increases further than this optimum size there are diseconomies of scale. The turning up of the LAC is due to managerial diseconomies of scale when output is increased beyond the optimum size.

5.5.2 Long Run Marginal Cost Curve

The long-run marginal cost can be derived from the short run marginal cost curves (SRMC) but it does not envelope them like the LAC. The

LRMC curve is formed from the point of intersection of the SRMC curves with vertical lines to the X axis drawn from the points of tangency of the corresponding SAC curves and the LRA cost curves. At that level of output, the LMC must be equal to the SMC curve at which the corresponding SAC curve is tangent to the LAC curve.

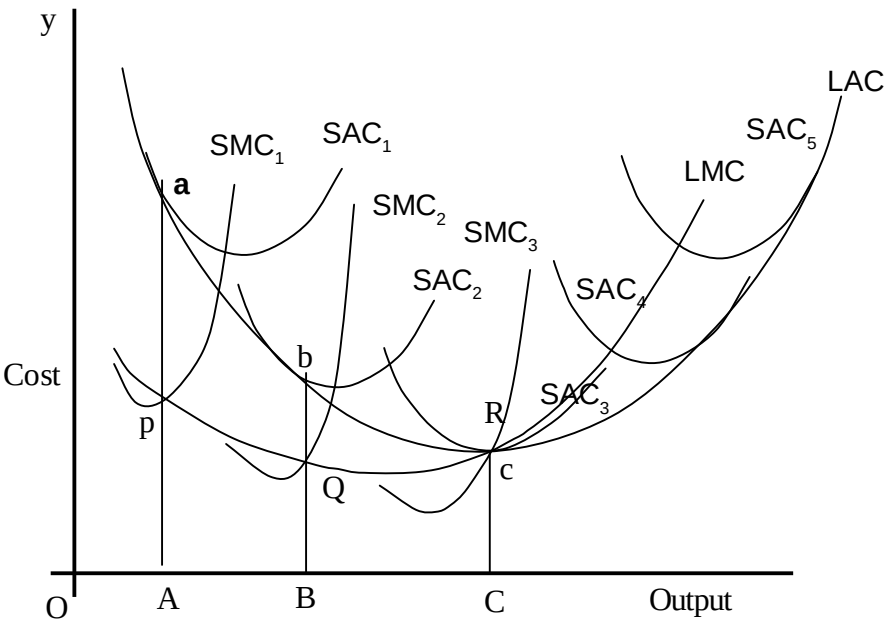


Fig: 5.7 Long Run Marginal Cost Curve

In Fig: 5.7, let us start with the point 'a' which is a point of tangency between SAC and LAC. From this point a vertical line aA is drawn on the X axis and it cuts the SMC_1 at point P. Similarly 'b' and 'c' are the other two points of tangency between other two SAC curves and the LAC curve. Corresponding to these two points of tangency, the point of intersection between vertical lines bB and cC are Q and R. After joining P, Q and R we get the LMC curve. At this minimum point R, the LMC curve intersects the LAC curve. Long run marginal cost bears direct relationship with the long run average cost. When both LAC and LMC falls, LMC is lower than LAC. But as LAC and LMC both increase, LMC is higher than LAC. But the LMC cuts the LAC at the lowest point. The same relationship is true in the short run also.

5.6 MANAGERIAL USES OF COST FUNCTION

The theory of cost is a fundamental concern of managerial economics. It is difficult to make managerial decisions without taking help of cost. For a profit maximizing firm, the decision to add a new product is made by comparing additional revenues to the additional costs associated with that new product. Similarly, the decision on capital investment is made by comparing the rate of return on the investment with the opportunity cost of the funds used to make the capital acquisitions. Cost is also important in the non profit sectors. For example, in obtaining new fund for a project on dam, the respective authority must show that the benefit of cost must be higher than all negative externalities arising from the cost.

Managerial decision making is facilitated by information that shows the cost of each level of output, i.e. average cost. A firm operates in short run but plans in the long run. At a particular point of time, the firm has one or more fixed factor of production. Therefore, production decision must be based on short run cost curves. But a firm can change the scale of operation in the long run. The long run cost functions are used for planning the optimal scale of plant size.



CHECK YOUR PROGRESS

Q3. Fill in the blanks with appropriate words:

(i) The total cost may further be subdivided into .....and .....cost.

(ii) Average cost = ...

(iii) .....refers to the change in total cost corresponding to an additional increase in production.

(iv) .....is an expenditure that has been made and can not be recovered.

(v) The shape of the long run average cost curve is like .....



5.7 LET US SUM UP

This unit is associated with the learning of the concepts of cost, short run costs and long run costs.

- Cost plays an important role in decision making process of firus.
- Cost function is a derived function from the production function.
- Some of the cost concepts are –
  - Opportunity cost
  - Money cost
  - Real cost
  - Sunk cost
  - Explicit cost
  - Marginal cost and incremental cost etc.

The theory of cost has been approached here from both short term and long term perspectives. In the short run, total cost is the sum of total variable and total fixed cost. The total variable costs are those expenses of production which change with the changes in total output of the firm. But some components of production can not be varied in the short run, they are called fixed costs. Average fixed cost is the fixed cost per unit of output and average total cost is total cost per unit of output. Marginal cost is the increase in cost resulting from the production of one extra unit of output. There is a direct relationship between AC and MC. When AC falls MC is below AC. When AC rises MC is above it and AC equals MC at the lowest point of AC.

In the long run, average cost curve is an envelope curve of the short run average cost curve. The shape of the LAC curve is like the U. The U shape occurs due to the laws of returns to scale. The long run marginal cost curve can be derived from the short run marginal cost curves (SRMC), but it does not envelope the short run marginal cost like the LAC curve. The

same direct relationship between average cost and marginal cost curve which is applicable in the short is also applicable in the long run. Break Even Analysis is concerned with finding out the break even point i.e. the point at which total cost equals sales revenue.



5.8 FURTHER READING

1. Ahuja, H.L. (1991), '*Modern Economics',* S. Chand and Company LTD.
2. Keats and Young (2004), '*Managerial Economics'*, Pearson Education
3. Koutsoyiannis, A. (1994), '*Modern Microeconomics'*, Macmillan
4. Peterson et al. (2008), '*Managerial Economics'*, Pearson Education
5. Pindyck, R.S and D.L. Rubinfeld (2004), '*Microeconomics'*, Prentice-Hall India



5.9 ANSWER TO CHECK YOUR ROGRESS

Ans to Q1: Marginal cost refers to the change in total cost corresponding to an additional increase in production and incremental cost refers to the total additional cost of implementing a managerial decision

Ans to Q2: Sunk cost is an expenditure that has been made and can not be recovered. In general, sunk costs are irrelevant in decision making.

Ans to Q3: (i) Total variable cost and total fixed cost,
(ii) Total cost,
(iii) Marginal cost,
(iv) Sunk cost
(v) U shape of cost curve .



5.10 MODEL QUESTIONS

1. Discuss the relationship between average cost and marginal cost with the help of a diagram.
2. Distinguish between fixed cost and variable cost.
3. Explain why there is no fixed cost in the long run.
4. What is the main reason behind the U shape of LAC curve?
5. Discuss the Break even Analysis and its assumptions

*** ***** ***

UNIT 6 : MARKET STRUCTURE: PERFECT COMPETITION

UNIT STRUCTURE :

6.1 Learning Objectives

6.2 Introduction

6.3 Concept of Market and Revenue Curves

6.3.1 Classification of Market Structure

6.3.2 Concepts of Total Revenue, Average Revenue and Marginal Revenue,

6.3.3 Break Even Pint (BEP)

6.4 Perfect Competition: Short Run Analysis

6.4.1 Equilibrium of Firm in the Short Run

6.4.2 Equilibrium of the Industry in the Short Run

6.5 Perfect Competition: Long Run Analysis

6.5.1 Equilibrium of Firm in the Long Run

6.5.2 Equilibrium of the Industry in the Long Run

6.6 Let Us Sum Up

6.7 Further Reading

6.8 Answers to Check Your Progress

6.10 Model Questions

6.1 LEARNING OBJECTIVES

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

- define market.
- classify markets into different forms.
- discuss perfect competition and equilibrium of firm and industry both in the short-run and in the long-run.

6.2 INTRODUCTION

We all buy and sell goods and services in a market. In general, whenever we talk of a market, we have a place in mind, where buyers interact with

sellers and buy goods and services in exchange of money. In this unit, we shall try to get a deeper insight into this concept 'market'. We shall try to define the term market in business and economic sense, and shall discuss the evolution of this concept. We shall also try to explain the classification of markets on the basis of different parameters. Again, we shall make an attempt to explain the equilibrium of a firm / industry under one of the major market structures: viz, perfect competition. This unit will be helpful for us in relating the theoretical principles of market with the day-to-day maket environment.

6.3 CONCEPT OF MARKET AND REVENUE CURVES

CONCEPT OF MARKET : As we have said, by the term 'market', we in general understand a particular place or locality where goods are sold and purchased. However, in economics, the term 'market' does not mean a particular geographical place or locality. Thus, to define market in economics, the concept of a particular place or locality is not much important. What is important is the contact between the buyers and the sellers so that transaction (i.e., sale and purchase of commodities) can take place at an agreed price.

Thus, the essentials of a market are: a) commodity which is to be traded; b) the existence of buyers and sellers; c) a communication between buyers and sellers, which ensures only one price for a commodity at a time.



Plastic money or electronic money: Credits cards, Debit cards, etc. which facilitate cashless transaction.

EVOLUTION OF MARKET : When goods were exchanged for goods in the barter system, markets were very simple. But with the progress of time, increasing needs and with improvement in science and technology, markets have become complex. Medium of exchange has evolved from goods to metallic coin and paper currencies and then to the present '***plastic money***'. Similarly the geographic coverage of a market has also widened from the local market to the global market. Today, advancement in telecommunication has brought the concept of electronic commerce, which facilitates business on a global scale.

6.3.1 Classification of Market Structure

Market structure refers to the type of market in which firms operate. Market structure may be classified:

a) On the basis of area as local, national and world markets;
b) On the basis of time, as market price on any particular day or moment; short-period price, long-period price, or secular markets covering a very long period;
c) On the basis of nature of competition – perfect competition and imperfect competition.

Here, we shall basically discuss market structure on the basis of the nature of competition. The nature of competition can be distinguished on the basis of the following three criteria:

a) Number of Sellers in the industry,
b) Entry barriers into the industry, and
c) Nature of the product.

Based on these above criteria, classification of a market structure is shown in the following tree diagram 6.1:

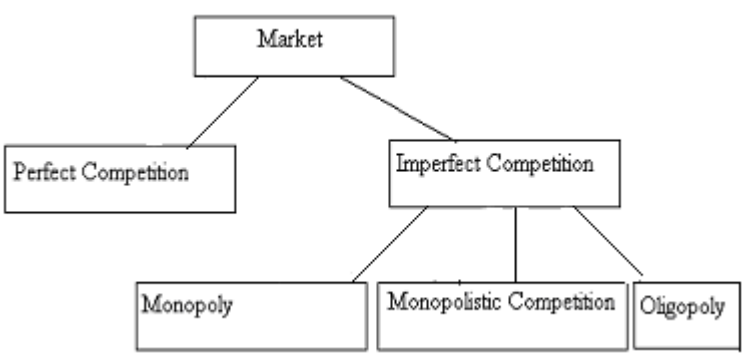


Fig 6.1: Classification of Market Structure

Thus, the market structure can broadly be classified into two categories – perfect competition and imperfect competition. Market structure under imperfect competition can be further classified into – monopoly, monopolistic competition and oligopoly. In the following

Secular : very long term period.

Products include:
Goods: Those, which are tangible; like – books, foods, torch light, batteries etc.

Services: Those, which are intangible; like- the services of a barber, cobbler, lawyer, nurse etc.

table 6.1, We are presenting the individual characteristics of these market structure with regard to the above three criteria.

Table 6.1: Individual Characteristcs of Different Types of Market

Market Type	Number of Sellers	Entry Barrier	Nature of Product
Perfect Competiton	Large, small, Independent	None	Homogenous
Monopoly	One	Very high	No close Substitute
Monopolistic Competition	Large, small, virtually independent	None	Differentiated/ close Substitute
Oligopoly	Few, interdependent	Substantial	Homogenous or Differentiated

6.3.2 Concepts of Average Revenue,Total Revenue and Marginal Revenue

Before discussing the different types of market in detail, let us first discuss the concepts of Average Revenue, Marginal Revenue and Total Revenue and their inter-relationships.

Average Revenue (AR): Consumers pay for the goods and services they buy. These consitute the earning of revenue/income of the sellers. Thus, the whole income received by a seller from the sales of a given amount of the product is called his total revenue. If we divide total revenue by the number of units sold, we get the average revenue. Converesely, by multiplying average revenue with the number of units sold, we get the total revenue. Thus:

where, AR = Average Revenue, TR = Total Revenue, Q= Total units sold.

Marginal Revenue (MR) : Marginal revenue is the revenue earned by selling an additional unit of the product. Thus:

$$\text{Marginal Revenue} = \frac{\text{Change in Total Revenue}}{\text{Change in Total units sold}}$$

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

where, MR = Marginal revenue, TR = Total Revenue, Q= Total units sold, Δ means change.

AR and MR curves of a Firm Under Perfect Competition: A firm under perfect competition has to accept the prevailing market price and can sell any amount of output in the market at that price. Let us suppose that a firm sells 5 units of a product at the market price of Rs. 14 per unit. Then its total revenue, average revenue and marginal revenue will as shown in the follows table :

Table 6.2: Total, Average and Marginal Revenue Schedules

Number of units sold (Q)	Price	Total Revenue (AR x Q)	Average Revenue (AR)=TR/Q	Marginal Revenue
(1)	(2)	(3)	(4)	(5)
1	14	14	14	-
2	14	28	14	28-14=14
3	14	42	14	42-28=14
4	14	56	14	56-42=14
5	14	70	14	70-56=14

The AR and MR of the firm may be graphically depicted as in the following diagram:

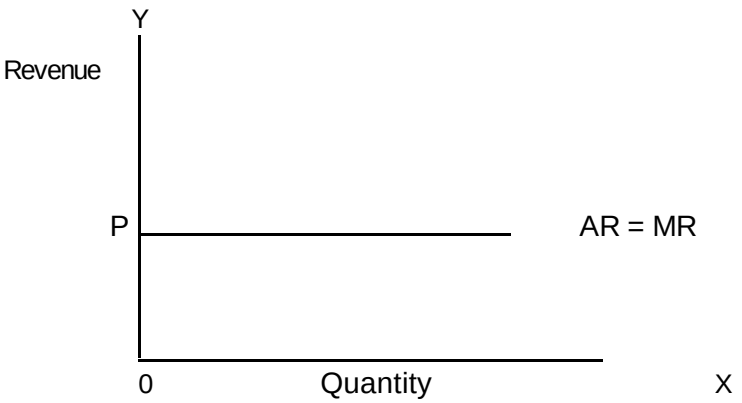


Figure 6.2: AR and MR Curves of a Firm under perfect competition

As we can see in the diagram , the AR curve of a firm under perfect competition is horizontal to the quantity axis and MR coincides with it.

AR and MR curves of a Firm Under Imperfect Competition : Unlike perfect competition, a firm under imperfect competition does not have to sell all its amount at a fixed market price. The firm can sell more units of the product by lowering its price. We have shown a hypothetical schedule of AR, TR and MR in Table 6.3.

Table 6.3: Total, Average and Marginal Revenue Schedules

Number of units sold (Q)	Price	Total Revenue (AR x Q)	Average Revenue (AR) = TR/Q	Marginal Revenue
(1)	(2)	(3)	(4)	(5)
1	20	20	20	20
2	19	38	19	18
3	18	54	18	16
4	17	68	17	14
5	16	80	16	12

Based on the above schedule, the shapes of AR and MR curves of a firm under imperfect competition has been shown in the following figure:

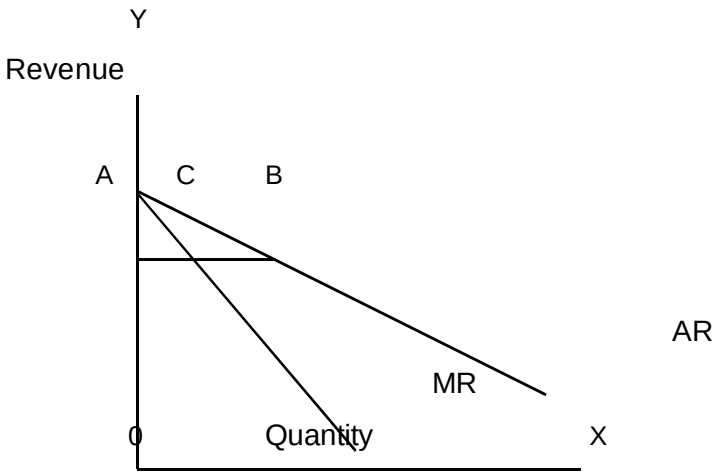


Figure 6.3: AR and MR Curves of a Firm under Imperfect Competition

It can be seen from figure 6.3 that, unlike perfect competition, the firm's AR and MR curves under imperfect competition are not the same. It is to be noted that both the curves are downward sloping. Again, the slope of the marginal revenue curve is twice as much steeper as that of the average revenue curve. This is because it can be seen from the above table 6.3 that as sale increases by one unit, average revenue falls by one unit , marginal revenue falls by two units. Thus if we draw a perpendicular line to the Y-axis from any point of the AR curve, say AB as in figure 6.3, the MR curve will cut it in the middle. Thus, AC = half of AB(1/2 . AB)



LET US KNOW

In real market situation, perfect competition rarely exists. Many economists, therefore, question the usefulness of studying perfect competition. Though unreal, the study of perfect competition helps us to understand- what may happen, if such a situation actually arises. And secondly, it also helps us to understand the real imperfect market structure – how much they deviate from perfect competition. In many advanced countries – the markets of home and car insurance; internet service providers are highly competitive, though not perfectly competitive.

Again, the market of products like – detergents, toothpastes etc constitute the examples of monopolistic competition. In Indian context, the Indian Railway constitutes the example of monopoly in case of passenger carriage through railways. On the other hand, the market of passenger cars can be said as a good example of oligopoly.

6.3.3 Break Even Point (BEP)

Break Even Analysis is concerned with finding out the break even point i.e. the point at which total cost equals sales revenue. In broader sense, it is the system which determines the possible profits at any level of product. Break Even Analysis establishes the relationship of cost, volume and profits. So it is also known as Cost Volume Profit Analysis.

Break even point is the base of break even analysis. This is that point where there is no profit and no loss. According to G.R Crowning Shield "Break even is the point at which sales revenue equals to the cost to make and sell the product and no profit and loss is recorded'

Revenue

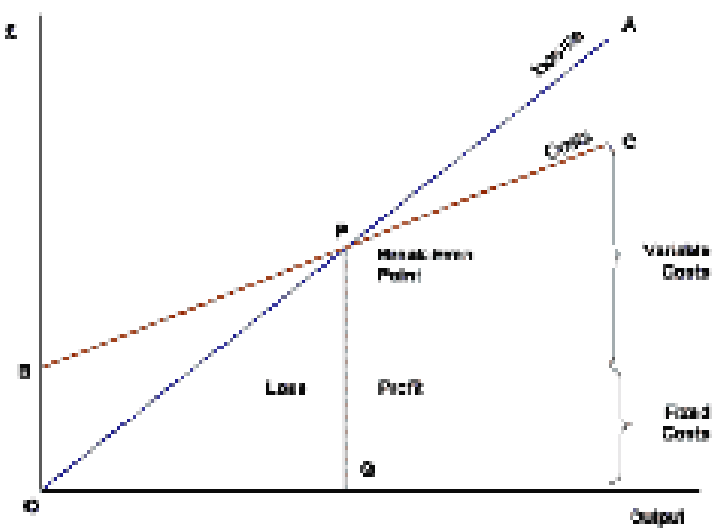


Fig 6.4: Break Even Analysis

Assumptions of Breakeven Analysis:

Break even analysis can be based on the following assumptions:

1. All cost can be separated into fixed and variable cost.
2. Fixed cost remains constant and does not change with the level of output.
3. Selling price will remain constant
4. Variable cost will vary in the same proportion in which the volume of output changes.
5. There will be only one product or in the case of many products, product mix will remain unchanged.



CHECK YOUR PROGRESS

Q1. Define market.

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Q2. What are the different categories of a product? Give examples of each category.

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6.4 PERFECT COMPETITION: Short Run Analysis

Perfect competition is described as the market structure having no rivalry among the individual firms Thus, the concept of perfect competition is totally opposite to our general idea where we mean by competition, 'rivalry' among the individual firms. In the subsequent sections, we shall discuss equilibrium of firm and industry both in the short run and in the long-run under this market structure.

Again under perfect competition, firms face two cost conditions: identical cost conditions and differential cost conditions. We shall be confining our discussion only to identical cost conditions. Identical cost conditions will help us generalize our discussion from an individual firm to all other firms and thereby to industry as a whole. We shall now look at the assumptions on which this market structure rests.

Assumptions of Perfect Competition

a) Large number of sellers and buyers: Presence of a large number of buyers and sellers implies that it is not possible either for the individual firms or the individual buyers to affect the price or output in the market. That means, in perfect competition, individual firms have zero market power. Thus, an individual firm under perfect competition is a price taker.

b) Product homogeneity: This assumption of perfect competition ensures that neither the buyers nor the sellers have any ground to differentiate among the products and hence ask a different price. (For the concept of product homogeneity, please refer to 'Let us know 2' in the next page).

c) Free entry and exit of firms: There are no barriers, whatsoever, for entering the industry or exiting it. Any firm can enter the industry at any time and can leave as well at will.

d) Profit Maximisation: The only goal of a firm in perfect competition is profit maximization.

e) No government intervention: There is no government intervention in the market in any form like: tariffs, subsidies, rationing of production or demand, etc.

Fulfillment of the above five conditions forms a market structure known as '**pure competition**'. This market form is different from perfect competition, which requires the fulfillment of the following additional assumptions:

f) Perfect mobility of factors of production: The factors of production including labour are fully mobile. Thus labours are fully mobile between different jobs and there is no labour union.

g) Perfect Knowledge: All sellers and buyers possess complete knowledge of the conditions of the market. Information is free and costless.

h) No Transport Cost: There is no cost of the transportation of goods. Geographical distance does not matter to a firm as far as transport cost is concerned.



LET US KNOW

Product Homogenity: It is the quality of goods, services or factors which ensures that they cannot be differentiated. A range of commodities is said to be homogeneous, if all of them in that range are perfect substitutes for each other. The commodities may be physically distinct but economically homogeneous. The more the degree of homogeneity of products, the more will be the substitutability among them.

Short run: It is that period of time which is too short for all economic agents (firm, industry or a buyer) to fully respond to a change. In our present analysis of market, short run is the period in which a) no firm can enter into or exit from the industry, and b) the individual firms cannot make any adjustments to its *fixed factors of production*.

Long run: It is that period of time which is sufficient for all economic agents to fully adjust to a change. The firms and industry can change both the variable and the fixed factors of production during this period.

We shall now discuss the equilibrium of an individual firm and the industry both in the short run and in the long run. Here we shall utilize different cost concepts, which have already been discussed in the earlier unit 5.4. It will

be therefore helpful for us to refer to that unit if any doubt arises with regard to these concepts.



CHECK YOUR PROGRESS

Q3: What is the basic difference between short-run and long-run.

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6.4.1 Equilibrium of a Firm in the Short-run

An industry is in equilibrium : 1. when there is no tendency for the firms either to leave or enter the industry and 2. when each firm is also in equilibrium.The first condition implies that the average cost curves coincide with the average revenue curve of all firms in the industry.

While discussing the assumptions of perfect competition, we have seen that the only goal of the firm is profit maximization. Profit is calculated by: *TR* – *TC* (*TR* = Total Revenue and *TC* = Total Cost). Thus, the firm will produce that output which yields the maximum profit. Now, as the price is constant, hence marginal revenue and average revenue are constant and equal to price. The equilibrium of a firm may be shown graphically in two ways: either by using *TR* and *TC* curves, or by using *MR* and *MC* (MR = Marginal revenue and MC = Marginal Cost) curves.

Using TR and TC Curves: The figure 6.4 describes the equilibrium of a firm using TR and TC curves. The *TR* curve is a straight line

through origin O, which means that price is constant at any level of output and *TR* (*TR* = Price x Quantity) increases proportionate to sales. This means that as sales increase, total revenue will also increase by the same proportion.

Again, the shape of the *TC* curve reflects the U shape of *AC* (Average Cost)

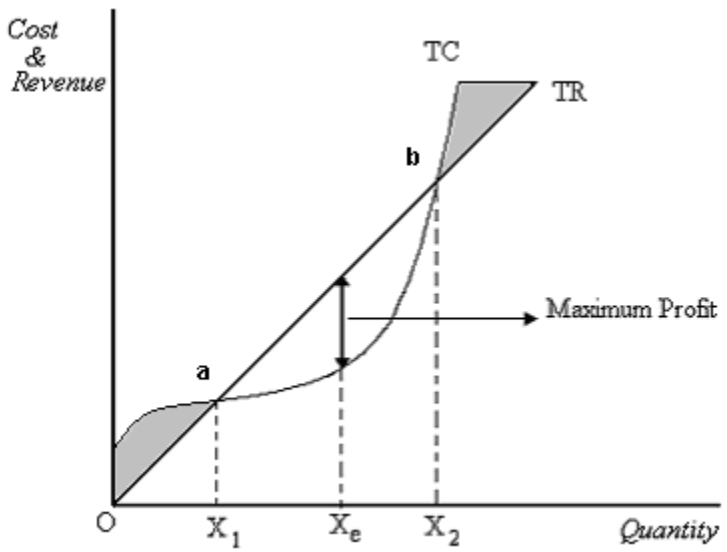


Fig 6.5: Firm's Equilibrium in the Short-run: TR & TC approach

curve (we have already known about the shapes of the different cost curves in unit 5). We also know that the prime motto of a business firm is to earn maximum profits. The profit maximizing firm will attain equilibrium at the output level, where profit (gap between *TR* and *TC*) is maximum. In the figure, X_e is that point and, thus, is the equilibrium point. At output levels smaller than X_1 and larger than X_2, the firm will incur losses. Because, in both the cases, total cost of the firm will be more than the total revenue the firm earns. To the left of *a,* the point where quantity is X_1, it can be seen that the Total Cost (TC) curve lies above the Total Revenue (TR) curve, and hence the firm will suffer losses. Similarly, towards the right of *b*, the same thing is observed.

Using MR and MC Curves: This approach of explaining equilibrium of firm is more beneficial as it uses price as an explicit variable; and also helps in explaining the behavioural rule that leads to profit maximization. Following figure 6.5 explains equilibrium of firm using this approach:

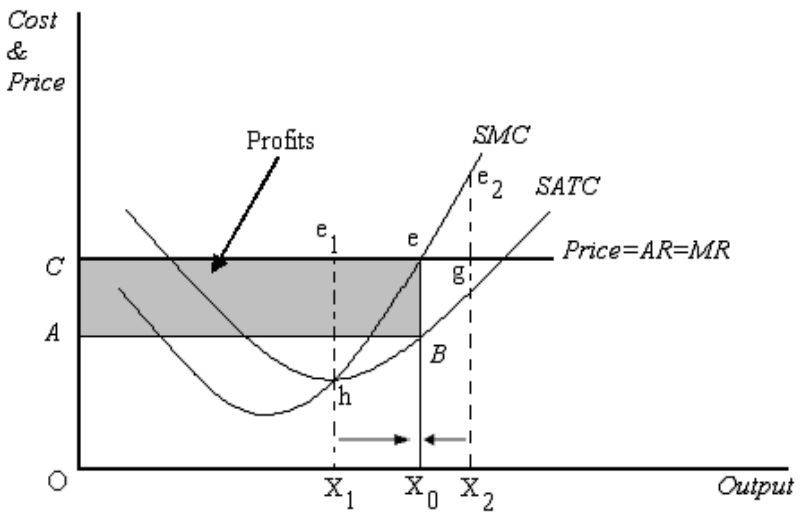


Fig 6.6: Firm's Equilibrium in the Short-run: MR & MC approach

The firm attains equilibrium at that output level, where MR=MC above the level of SATC. In figure 6.6, *e* is that point and hence is the equilibrium point and X_0 is the equilibrium output. At any point left to X_0 output level, say at X_1, revenue is greater than marginal cost ($X_1e_1 > X_1h$), and this induces the firm to increase the output level to X_0. Similarly, any point right to X_0 output level, say X_2, the marginal cost of the firm is above revenue ($X_2e_2 > X_2g$), and this induces the firm to reduce output to the level X_0.

In figure 6.6, at point e, MR=MC, which means that the short run profit is maximized at the equilibrium output level, X_e. In fact, this is the first condition that must be fulfilled for firm's equilibrium. However, fulfillment of this condition does not always mean that the firm will necessarily be in equilibrium. It is possible, that in certain situations, MR=MC, but the firm is not in equilibrium. Figure 6.7 as shown in

the next page explains this point. It is clear from the figure 6.7 that the first condition of firm's equilibrium, i.e. MR=MC is fulfilled at two points: e_1 and e_0. The firm however, will not attain equilibrium at e_1, since profit is not maximized. The firm attains equilibrium at e_0, since profit is maximized $X_0 > X_1$.

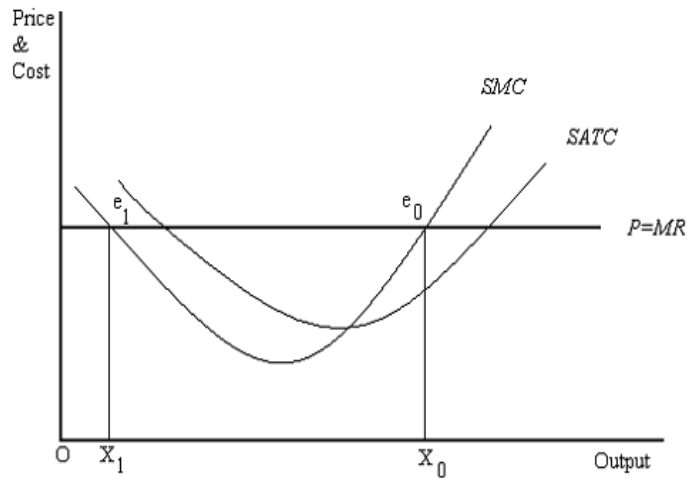


Fig 6.7: MR=MC is not the sufficient condition of firm' equilibrium

Thus, from the above figure it is clear that a second condition is required for firm's equilibrium. This condition can be stated as: MC cuts MR from below. Thus, we derive two conditions of firm's equilibrium:

a) MC = MR; and

b) MC cuts MR from below.

In our case of figure 6.5, the firm earns excess profits of an amount of eB (price X_0e – SATC X_0B) per unit of output. And as the total output sold is OX_0 or AB, the excess profit earned by the firm amounts to the shaded area CABe. It is to be kept in mind that the firm however, does not always earns excess profits while in short run equilibrium. To the contrary, the firm may have to suffer losses in the short-run while in equilibrium. This point has been explained with the help of the following figure 6.8.

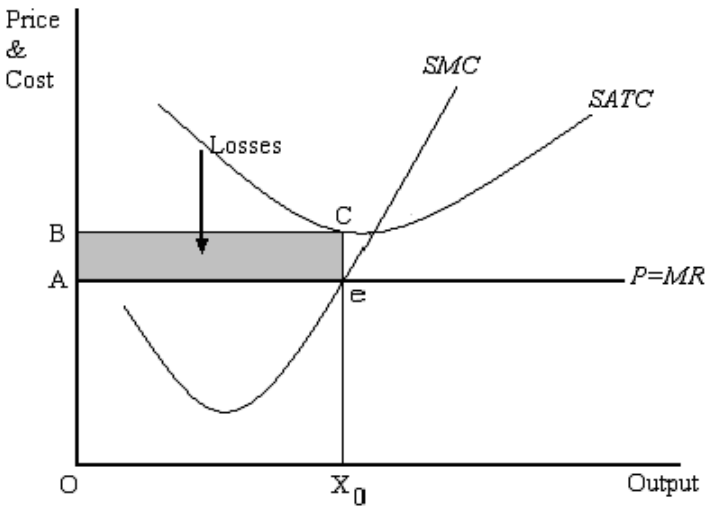


Fig 6.8: Firm's Short-run Equilibrium with Losses

It can be seen in figure 6.7 that the firm suffers losses. This is because, at equilibrium point e (MR = MC; and MC cuts MR from below), cost per unit X_0C > revenue X_0e. This means that the firm suffers total losses eC per unit of output. Thus, the firm suffers a total loss of AeCB (eC x oX_0 or eA).

Thus, from the above discussion, we have seen that two conditions must be fulfilled for a firm to be in equilibrium. These are:

a) MC = MR; and
b) MC cuts MR from below.
c) And under perfect competition, a firm can earn excess profit or incur losses while attaining short-run equilibrium.



CHECK YOUR PROGRESS

Q 4: MR = MC. Is this condition alone sufficient for a firm's equilibrium? If not, why?

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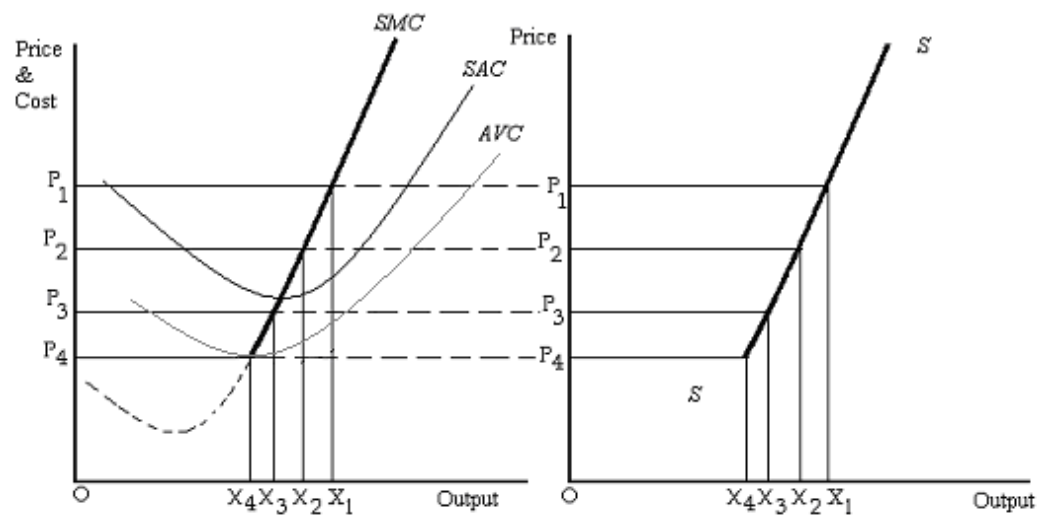
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In the subsequent sections, we shall discuss industry equilibrium. It is to be noted here that all along, we have utilized SMC curves for discussing firm's equilibrium. We have not derived firm's supply curve. This is because, we have assumed that the price is given and there are large number of firms; hence it is unlikely that an individual firm will influence either industry supply or demand. But in case of the industry as a whole, the industry can influence the market demand or supply by changing the price. Hence, to discuss industry's equilibrium, it becomes imperative to deduce the industry supply curve.

As we have discussed firm's equilibrium under identical cost conditions in the above, hence derivation of a firm's supply curve will help us derive the industry's supply curve as well.

Derivation of the Firm's Supply Curve :

Figure 6.9 shows how much a firm produces under perfect competition at a given price. By varying the price, we get different levels of output, and this gives firm's short run supply curve as has been shown by panel (b) in Fig.6.9.



(a) *MC* and *AVC* curves (b) Supply curve.

Fig 6.9: Short run supply curve of a firm

In the above figure, the minimum output the firm produces is X_0, where price P_4 is equal to the minimum point on the *AVC* curve. For any price below P_4, the firm's revenue does not even cover the variable cost, and it does not pay the firm to produce any output. From panel (a), for different levels of the price, we get different quantities supplied by equating price to MC. In figure 6.9 (b) we plot these prices and quantities to get the supply curve.

In the above, while deriving the short run supply curve of the firm we have assumed that the minimum price P_4 is equal to the minimum AVC. That is, we have assumed that the revenues of the firm must cover variable costs. In the long run, unless the revenues of the firm cover the fixed costs as well, the firm cannot stay in production.

Derivation of the Industry Supply Curve:

As we have assumed identical cost conditions, hence the market supply curve can be obtained by lateral summation (horizontal addition) of short run supply curves (i.e., short run marginal cost curves) of all individual firms in the industry. This has been explained with the help of figure 6.10 as has been shown in the next page.

In figure 6.9, we reproduce the panel (a) of figure 6.9, which describes the supply curve (MC curve) of a single firm. Now if we suppose that there are 500 such firms in the industry, the multiplication of each output level of the individual firms will give us the short-run industry supply curve. Thus, $OQ_4 = 500 \times OX_4$; $OQ3 = 500 \times OX_3$ and so on. While putting these different quantities OQ_4, OQ_3, OQ_2 and OQ_1 against the respective prices P_4, P_3, P_2 and P_1, we get the industry supply curve SRS as has been shown in panel (b) of the figure 6.10.

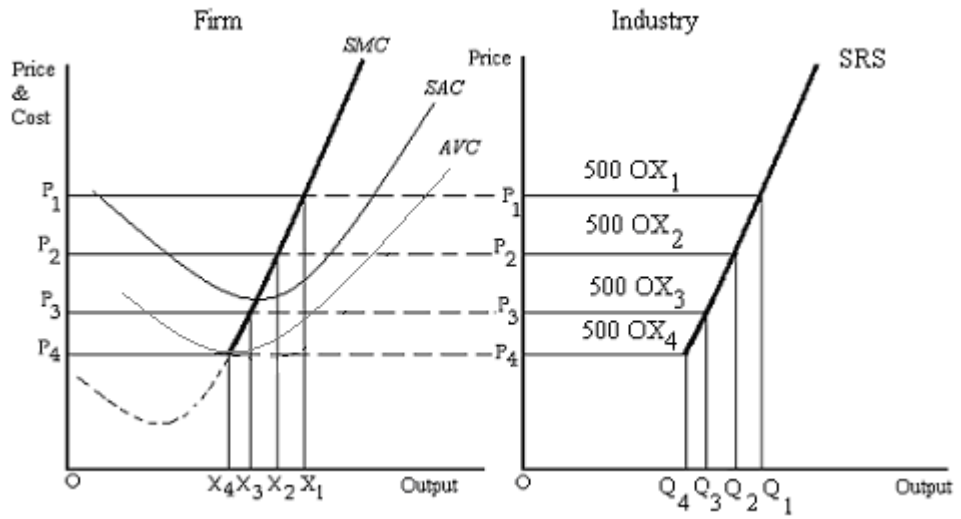


Figure 6.10: Derivation of the short-run supply curve of a firm

Derivation of the Industry Demand Curve:

We know that to explain equilibrium, we need to consider both the demand and the supply curve. We have derived the short-run industry supply curve. Now, let us see how is the shape of the industry supply curve. We have already seen that the demand curve of a competitive firm is horizontal straight line. But the shape of the industry's demand curve is negatively sloped. This has been shown in the following figure 6.11.

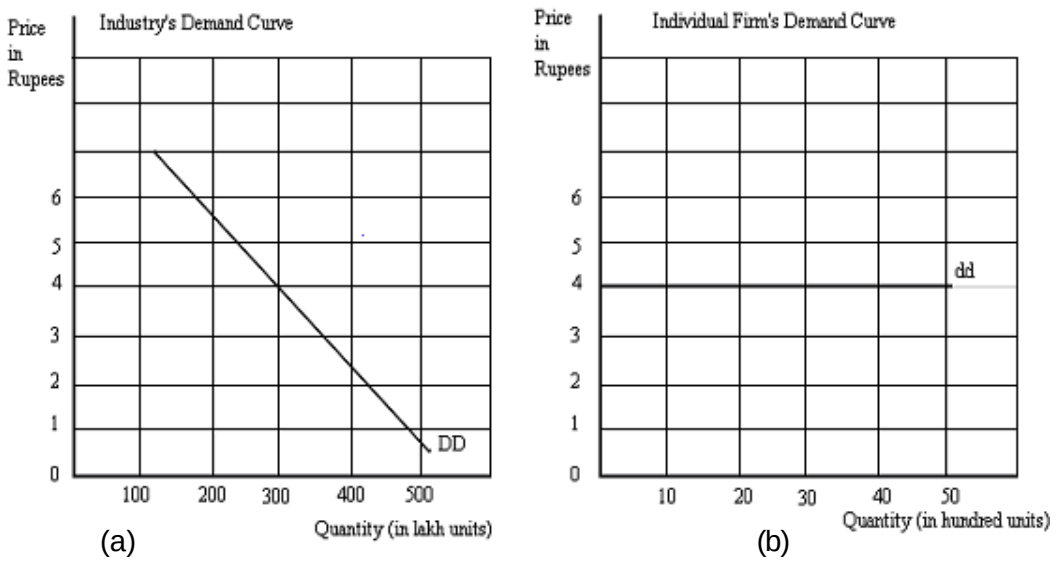


Fig 6.11: Short-run Demand curve under perfect competition

In panel (a) of the figure the industry demand curve has been depicted, and in panel (b), the firm's demand curve has been shown. The demand curve for the industry as a whole is downward sloping, because the industry can as a whole change the market price; thus affecting consumers' demand. Therefore, the demand curve of industry (DD) represents the general law of demand.



ACTIVITY 6.1

Derive the short-run supply curve of a perfectly competitive firm.

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6.4.2 Equilibrium of the Industry in the short run

The industry equilibrium in the short run is attained at the point where the short-run demand curve curve intersects with the short-run supply curve. This has been shown in Figure 6.12. In figure, e is the point where demand curve dd intersects with the supply curve ss. Hence, *e* is the equilibrium point. Q* is the equilibrium quantity and P* is the equilibrium price.

It is to be noted here that though no individual firm can exert any influence on price, the collective action of suppliers and demanders determines the price.

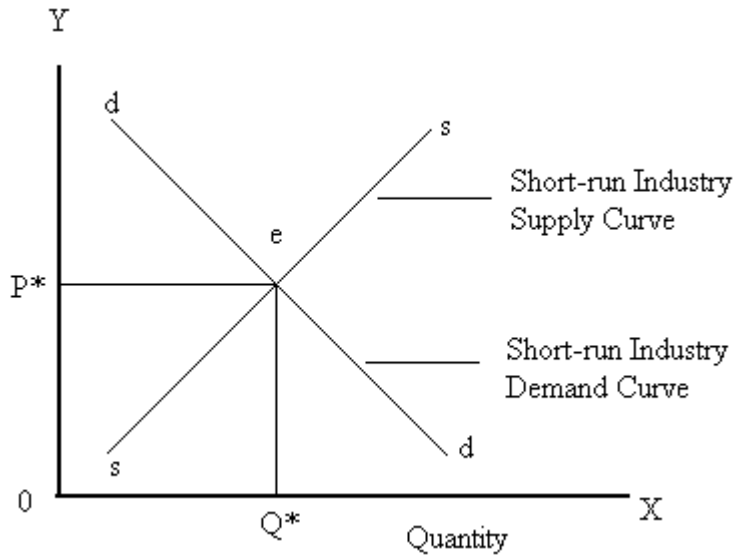


Figure 6.12: Determination of equilibrium price under perfect competition



CHECK YOUR PROGRESS

Q.5: State whether true or false (T/F)

(i) Under identical cost condition, it is possible to derive the industry supply curve through lateral summation of the individual firms' supply curves. (T/F)

(ii) In the long-run, a firm willl continue its production even when its revenue does not cover fixed costs, but the variable costs are covered. (T/F)

Q.6: Unlike firm's horizontal demand curve, the industry's demand curve is negatively sloped. Why?

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6.5 PERFECT COMPETITION: LONG-RUN ANALYSIS

So far we have discussed the short-run equilibrium analysis of a firm and industry under perfect competition. In the subsequent sections, we shall discuss the long-run equilibrium analysis of a firm and industry under this market structure.

6.5.1 Equilibrium of a Firm in the Long-run

In the long run, entry and exit of firms may take place. Again, in the long run, existing firms can adjust the quantities of their fixed inputs as well. Thus, in the long run we expect two things: (1) existing firms will make adjustments in their output and costs. (2) if after these adjustments, a firm is still unable to cover its total costs, it will exit the industry. And if existing firms are earning profits, then new firms will be lured into the industry.

Thus, for a competitive firm to be in equilibrium in the long run, the following three conditions must be fulfilled:

a) Price = Marginal Cost
b) Price = Average Cost
c) LMC curve cuts LAC curve from below at its minimum point.

Again, as both the marginal cost and the average cost is equal to price, hence both these conditions can be combined as:

Price = Marginal Cost = Average Cost.

In the earlier unit 5, we have discussed the shapes and concepts of different cost curves. Thus, conceptually we have learnt that the marginal cost can be equal to average cost only at the point where the average cost is neither falling nor rising, i.e., at the minimum point of the average cost curve.

This gives us the condition of long-run equilibrium for a firm as:

Price = Marginal Cost = Minimum Average Cost.

LMC curve cuts LAC curve from below.

This has been explained in the following figure 6.13.

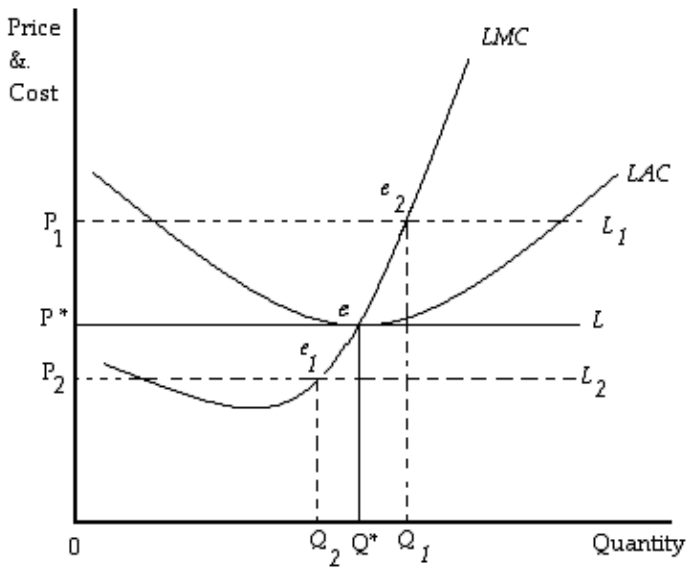


Figure 6.13: Long-run Equilibrium of a Firm under perfect competition

In figure 6.13, LAC is the long-run average cost curve and the LMC is the long run marginal cost curve. The firm is in equilibrium at point e, where LMC curve cuts the LAC curve at its minimum. Corresponding to this equilibrium level, the equilibrium price is 0P*, and the equilibrium quantity is 0Q*. At this equilibrium level, the firm earns only normal profit.

The firm will not attain equilibrium at any other price or quantity. Above the equilibrium price 0P*, let us consider price $0P_1$. At this price level, the firm's marginal cost will be higher than its average cost. Thus, the firm earns supernormal profits. This means that all the firms will earn super normal profits; and this will attract entry of new firms to the industry. Thus, entry of new firms will ultimately lead the price to be settled at the level 0P*as the supply of the product will increase. Similarly, below price level 0P* as well, the firm does not attain equilibrium. Say at price $0P_2$, the marginal cost of the firm will be below the average cost curve. This means that the firm will incur loss at price level $0P_2$. This means that all the firms will incur

losses at this level. This will force some firms to exit from the industry. Thus, exit of firms will ultimately lead to increase the price level to 0P* as the supply of the product will decrease.

Thus, we can conclude from the above discussion, that a firm under perfect competition in the long run will be in equilibrium, when:

Price = MR =MC= Minimum AC.

6.5.2 Equilibrium of the Industry in the Long-run

In the above, we have seen how a firm under perfect competition attains equilibrium in the long run. An industry in the long run attains equilibrium when the following three conditions are satisfied:

1) the long run supply and demand for the product of the industry are equal;
2) all firms in the industry are in equilibrium; and
3) there is neither the tendency for the new firms to enter the industry nor the existing firms to leave it.

Figure 6.13, shown in the next page explains the attainment of industry equilibrium in the long run.

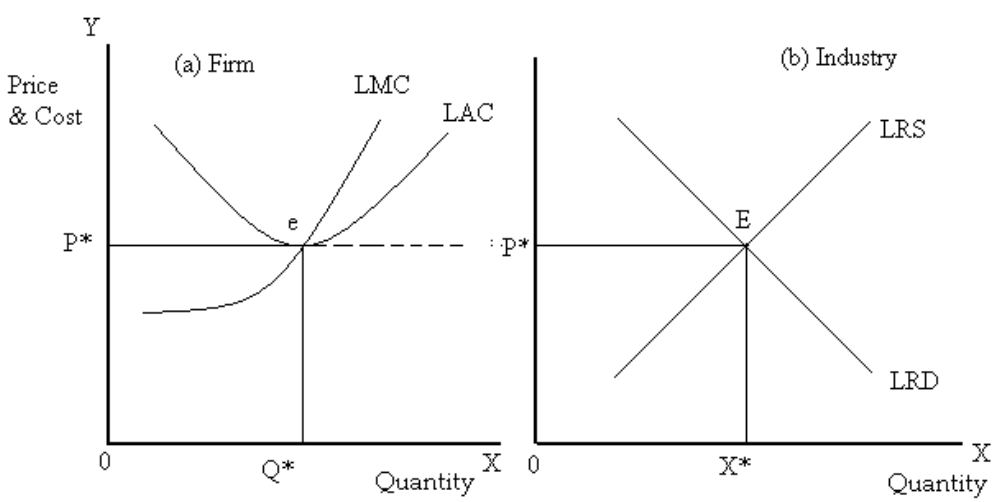


Figure 6.14: Industry Equilibrium in the Long-run

Panel (b) of the above figure 6.14 depicts industry equilibrium in the long run. The long-run supply curve LRS intersects with the long-run demand curve LRD at point E and hence long-run equilibrium is established at this point. Therefore, 0X* is the equilibrium quantity of the industry and 0P* is the equilibrium price. Corresponding to this point E, the firm's equilibrium has been shown in panel (a) of the figure. The firm attains equilibrium at point e, where the LAC curve intersects with the LMC curve. Corresponding to this equilibrium level, the equilibrium quantity is 0Q*, and the equilibrium price 0P*. As the firm has attained equilibrium at the minimum point of the LAC curve, hence the firm is earning normal profit only. Again, as we have assumed identical cost conditions, hence all the firms will be in equilibrium at this level and will be earning only normal profits. The equilibrium of all firms with normal profit ensures that there is neither the tendency of the existing firms to exit from the industry nor new firms are attracted to enter the industry.

Thus, we have seen that under perfect competition when the industry attains equilibrium in the long run, all the three conditions are satisfied; i.e.,

1) the long run supply and demand for the product of the industry are equal;
2) all firms in the industry are in equilibrium; and
3) there is neither the tendency for the new firms to enter the industry nor the existing firms to leave it.



6.6 LET US SUM UP

- The essentials of a market are:
  - a commodity to deal in;
  - the existence of buyers and sellers;

- Ø a communication between buyers and sellers, which ensures only one price for a commodity at a time.

- n The market structure can broadly be classified into two categories – perfect competition and imperfect competition.
- n Market structure under imperfect competition can be further classified into – monopoly, monopolistic competition and oligopoly.
- n Market structure can be distinguished based on the three criteria:
  - Ø number of sellers in the industry;
  - Ø entry barriers into the industry;
  - Ø nature of the product
- n Two conditions must be fulfilled for a firm to be in equilibrium. These are:
  - Ø MC = MR; and
  - Ø MC cuts MR from below.
- n And under perfect competition, a firm can earn excess profit or incur losses while attaining short-run equilibrium.
- n The conditions of the long-run equilibrium for a firm are:
  - Ø Price = Marginal Cost = Minimum Average Cost.
  - Ø LMC curve cuts LAC curve from below.
- n Under perfect competition when the industry attains equilibrium in the long run, when three conditions are satisfied :
  - Ø the long run supply and demand for the product of the industry are equal;
  - Ø all firms in the industry are in equilibrium; and
  - Ø there is neither the tendency for the new firms to enter the industry nor the existing firms to leave it.



6.7 FURTHER READING

1. Dewett, K.K (2005), '*Modern Economic Theory*', 22nd Ed., S.Chand & Sons.
2. Chopra, P.N. (2008), '*Micro Economics'*, 2nd Ed., Kalyani Publishers.
3. Ahuja, H L (2006), *'Modern Economics',* 12th Ed., S. Chand.
4. Ahuja, H.L. (2007), '*Managerial Economics'*, 1st Ed., S.Chand.



6.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q.1: A market is an institutional arrangement whereby buyers and sellers come into contact and transact in a commodity at an agreed price.

Ans to Q.2 : Products include:

Goods: Those, that are tangible; like – books, foods, torch light, batteries etc.

Services: Those, which are intangible; like- the services of a barber, cobbler, lawyer, nurse etc.

Ans to Q.3 : The basic difference between short-run and long-run is that during the short-run an economic agent (a firm or an industry) can change only the variable factor of production. But in the long-run an economic agent can change both the variable and the fixed factors of production.

Ans to Q.4: No. Because, it is possible that a firm fulfills the condition of MR=MC, but yet its profit may not be maximised. This may occur when the short- run MC curve cuts the MR curve when it (MC curve) is still falling, and hence the minimum cost has not been yet achieved.

Ans to Q.5 : (i) True

(ii) False

Ans to Q.6 : Unlike the horizontal demand curve of a pefect competitive firm, the demand curve for the industry as a whole is downward sloping. This is because, the industry can as a whole change the market price; thus affecting consumers' demand. So, the demand curve of industry represents the general law of demand.



6.9 MODEL QUESTIONS

Short Type of Questions:

1. Define Economics.
2. What are the three basic criteria of market classification?
3. What is the difference between pure competition and perfect competition?
4. What is product homogeneity?

Essay Type Questions:

1. Describe the price and output determination of a firm in the short- run under perfect competition.
2. Describe the price and output determination of an industry in the short-run under perfect competition.
3. Describe the price and output determination of firm in the long-run under perfect competition.
4. Describe the price and output determination of an industry in the long-run under perfect competition.

*** ***** ***



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