GCM(S1) 03

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

Patgaon, Rani Gate, Guwahati - 781 017

FIRST SEMESTER

BACHELOR OF COMMERCE

COURSE: 03

Managerial Economics

CONTENTS

UNIT 1 : Introduction to Managerial Economics
UNIT 2 : Demand
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UNIT 5 : Cost
UNIT 6 : Market Structure: Perfect Competition
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UNIT 8 : Imperfect Competition: Monopolistic Competition and Oligopoly
UNIT 9 : Theory of Distribution
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REFERENCES : For All Units

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COURSE INTRODUCTION

The course “Managerial Economics” aims at providing a basic framework to the learners about the concepts of managerial economics. The course consists of the following units, viz. Unit 1: Introduction to Managerial Economics; Unit 2: Demand; Unit 3: Supply; Unit 4: Production; Unit 5: Cost; Unit 6: Market Structure: Perfect Competition; Unit 7: Market Structure: Imperfect Competition; Unit 8: Imperfect Competition: Monopolistic Competition and Oligopoly; Unit 9: Distribution; Unit 10: Profit.

The course starts with the introduction of the basic concepts of managerial economics. When we purchase goods and services, we often face a question “how much to purchase?” i.e. what is our demand for a particular product or service? Similarly, companies also face that question in producing goods and services i.e. what is the market demand for a particular product or service produced by the company? This vital issue “demand” has been discussed in this course by focusing on the concept of demand, elasticity of demand and the various determinants of the elasticity of demand. Other important concepts discussed in this course are production, cost, market structures, distribution and profit. The course widely discusses the different market structures, like monopoly, perfect competition etc. as well as the determination of price and output under different market structures.

While going through a unit, you will notice some along-side boxes, which have been included to help you know some of the difficult, unseen terms. Some “ACTIVITY’’ (s) have been included to help you apply your own thoughts. Again, we have included some relevant concepts in “LET US KNOW” along with the text. 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 PPROGRESS” given at the end of each unit.

BACHELOR OF COMMERCE

Managerial Economics

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UNIT 1: INTRODUCTION TO MANAGERIAL ECONOMICS

UNIT STRUCTURE

1.1 Learning Objectives

1.2 Introduction

1.3 Concept of Managerial Economics

1.4 Characteristics and Scope of Managerial Economics

1.5 Significance of Managerial Economics in Decision-Making

1.6 Role and Responsibilities of Managerial Economist

1.7 Let Us Sum Up

1.8 Further Reading

1.9 Answers to Check Your Progress

1.10 Model Questions

1.1 LEARNING OBJECTIVES

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

- discuss the concept of managerial economics
- discuss the characteristics of managerial economics
- describe the scope of managerial economics
- explain the significance of managerial economics in managerial decision-making
- describe the role and responsibilities of a managerial economist in business organisations.

1.2 INTRODUCTION

The success of business organisations to a great extent depends on the decisions taken by the business managers. The manager is responsible for organising, managing and utilising the resources. As the resources are scarce, the manager has to make optimum use of the resources in achieving the objectives of the organisation. In modern business world, decision-making is a difficult job due to complexity of business environment. In such a situation, managerial economics play a

very important role. It is concerned with the application of economic theory and methods to analyse the decision-making problems faced by business firms. The managerial economists help the organisations in achieving its predetermined goals with the optimum use of the resources. In this unit we will discuss the concept of managerial economics and its scope. Besides that you will come across the importance of managerial economics in making business decisions. We will also discuss the role and responsibilities of a managerial economist in the business organisations.

1.3 CONCEPT OF MANAGERIAL ECONOMICS

Economics is a social science in which only those activities of mankind are studied which is concerned with earnings and spending of money. For the successful handling of these activities certain rules and by-rules are formed in the theory of Economics. To make use of these rules in practice or in business, is the subject matter of managerial economics. The new methods and concepts of Economics came to be used for solving management related problems of business units. This in turn, caused the development of a new subject– Managerial Economics.

Managerial economics can be described as the use of theories and techniques of modern economics for decision-making problems of business firms. Managerial economics is also known as business economics which is concerned with the application of economic theory and methods for analysis of decision-making problems faced by business firms. Some important definitions can be studied here in order to identify the meaning of Business Economics.

According to Spencer and Siegelman, ‘‘Business Economics may be defined as the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.’’

According to McNair and Meriam, ‘‘Business Economics consists of the use of economic modes of thought to analyse business situations.’’

In the words of W.W. Hayens, ‘‘Managerial Economics is economics applied in decision-making. It is a special branch of economics, bridging

the gap between abstract theory and managerial practice. Its stress is on the use of the tools of economic analysis in clarifying problems in organizing and evaluating information and in comparing alternative courses of action.''

According to Joseph L. Messey, ''Business Economics is the use of economic theories by the management in making business decisions.''

The chief activities of a business manager are decision- making and forward planning. Decision making means selecting the best alternative out of the available alternatives. Forward planning means planning for the future. The job of decision making and forward planning is very complicated because business units have to operate in an atmosphere of uncertainty. Business units do not have the exact knowledge of future before hand. So, the management has to make decisions and plans on the basis of past statistical data, present information and future anticipations. Managerial economics helps management in making right decision and planning for the future in an atmosphere of uncertainty.

On studying the above definitions it can be concluded that managerial economics is that branch of knowledge in which theories of economic analysis are used for solving business management problems and determination of business politics. This science is situated on the border-lines of Economics and Business Management and serves as a bridge between Economics and Business Management.

1.4 CHARACTERISTICS AND SCOPE OF MANAGERIAL ECONOMICS

The following are the main characteristics of managerial economics–

- **Managerial Decision:** Managerial economics is an applied subject, which helps in managerial decision to formulate business policies. It helps in decision-making to maximize output with minimum cost.
- **Based on Micro Economics:** The nature of managerial economics is micro economic. It deals with the problem of a particular firm and its activities.
- **Macro Economics Based:** Macro economics is also important and useful in managerial economics. The study of macro economics

enables the producer to adjust his business into the best possible environment with the outside forces like monetary, fiscal, industrial and labour policy.

- **Applied Nature of Economic Theory:** In economic theory different laws are formulated but the applied part of economics is used in managerial economics. The nature of managerial economics is applied, not theoretical.
- **Problems and Solutions:** Managerial economics helps in studying the complicated and different types of problems related to business and suggests policy implications, so that the problems are easily solved.
- **Economics of a Firm:** The aim of a firm is to get maximum profit, which is only possible by effective policy and decision-making to minimize the cost of production.
- **Coordinating Nature:** Managerial economics coordinates between the theoretical and practical aspects of running a firm. It uses micro as well as macro models.
- **Normative Science:** We study the theoretical aspects of the different laws of economics. We do not study whether these theories are good or bad. In managerial economics we study what ought to be, along with the good or bad effects of the operation of economic laws.

Scope of Managerial Economics: The scope of managerial economics is very wide because it includes theory, models and methods that help business firms in decision-making and future planning. It includes the following–

- **Theory of Consumption:** Managerial economics studies the behaviour of the consumer and its related aspects like law of demand, elasticity of demand, cardinal and ordinal approach to utility.
- **Theory of Production:** Managerial economics studies the input-output relation, which is known as the production function. Laws of return, returns to scale, optimum factor combination, iso-quant and iso-cost are important areas of managerial economics.

- **Theory of Pricing:** Price is one of the important subjects of managerial economics, because price is the revenue of the firm. Managerial economics studies the decision making with regard to price in various market structures.
- **Theory of Firm:** Managerial economics studies an individual firm's price and output determination in different markets like perfect competition, monopolistic competition, monopoly, duopoly and oligopoly.
- **Theory of Distribution:** Managerial economics studies factor pricing and the share of the factor in national income. Profit planning is the main area of managerial economics.
- **Theory of Profit:** Firms are created for the purpose of earning profit. Profit is calculated from revenue and cost difference. How to increase revenue and decrease cost is the main subject of managerial economics.
- **Demand Analysis and Forecasting:** A business firm functions in an atmosphere of uncertainties to achieve its goal of maximum profit. Hence it has to take decisions about price and output which are the areas of managerial economics.
- **Capital Management:** The decision of capital management in a firm is given a high priority. Managerial economics studies the capital management, cost of capital and decision of selecting projects for investment.
- **Sales Promotion:** A business manager has to pay proper attention for adopting sales advertisement costs. He has to determine the quality of the product, sales expenditure; trademark and size which are the main area of managerial economics.
- **Economic Policies:** Government policy such as monetary, fiscal, industrial, trade and labour policies influence the decision of a firm. The firm has to plan the allocation of resources in different alternative uses.



CHECK YOUR PROGRESS

Q.1: What is managerial economics? (Answer within 30 words)

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Q.2: State two characteristics of managerial economics.

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1.5 SIGNIFICANCE OF MANAGERIAL ECONOMICS IN DECISION-MAKING

It is a well-known fact that with the increasing complexity of the business environment, the usefulness of economic theory as a tool of business analysis has increased. Its contribution to the process of decision-making is a widely recognized fact today. In managerial economics, microeconomic analysis is a common tool for specific business decisions. This is why it bridges economic theory and economics in practice. Managerial economics makes good use of quantitative techniques like regression analysis and correlation techniques and Lagrangian linear calculus. Marginalization and incremental principle are also important techniques of managerial economics. Marginal analysis uses marginal changes in the dependent variable resulting from a unit change in its determinant and the independent variable. The incremental principle is applied to business decisions which involve a large increase in total cost and total revenue. Most economic managers strive to optimize business decisions given their firm's objectives as well as constraints imposed by scarcity. Operations research and programming prove to be very handy in this.

We can use the techniques of managerial economics to analyse any business decision. Howerver, these techniques are most frequently applied in case of the following :

i) **Risk Analysis:** It refers to a technique for identifying and assessing those factors or elements which have the potential to mar the success of a business enterprise. Through risk analysis, we can determine preventive measures so that these factors do not occur. Such an analysis can also help us decide counter measures to successfully deal with such probable obstacles. To determine or assess the riskiness of a business decision, we have the options to use several uncertainty models and risk quantification techniques.

ii) **Production Analysis:** Managerial economics techniques are used to analyse several factors relating to production of an enterprise, such as production efficiency, enterprise's cost function and optimum factor allocation.

iii) **Pricing Analysis:** It refers to examination and evaluation of a proposed price. It does not include the evaluation of its separate cost elements and proposed profit. Managerial economics techniques are very useful in analysing the various pricing decisions by policy decisionmakers and business managers, such as transfer pricing, joint product pricing, price discrimination, price elastrictiy estimations. These techniques are also helpful in choosing the optimum pricing method.

iv) **Capital Budgeting:** It refers to the planning process which is used to assess whether a firm's long-term investments are worth pursuring. These long-term investments could range from replacement of machinery to R & D projects. Business managers take the help of investment-related theories to dertermine and enterprise's capital puchasing decisions. Capital budgeting involves various methods such as net present value (NPV), internal rate of return (IRR), equivalent annuity, profitability index, and modified internal rate of return (MIRR).



CHECK YOUR PROGRESS

Q.3: What is risk analysis? (Answer within 30 words)

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1.6 ROLE AND RESPONSIBILITIES OF MANAGERIAL ECONOMIST

Economics contribites a great deal towards the performance of managerial duties and responsibilities; just as biology contributes to the medical profession and physics to engineering, economics contributes to the managerial profession. All other qualifications being the same, managers with a working knowledge of economics can perform their functions more efficiently than without it. The basic function of the managers of a business firm is to achieve the objective of the firm to the maximum possible extent with the limited resources placed at their disposal. The emphasis here is on the maximization of the objective and limitedness of the resources. Had the resources or resource management would have never arisen. But resources, howsoever defined, are limited. Resources at the disposal of a firm, whether finance, men or material, are by all means limited. Therefore, the basic task of the management is to optimize the use of the resources.

As mentioned above, economics, though variously defined, is *essentially the study of logic, tools and techniques of making optimum use of the available resources to achieve the given ends.* Economics, thus, provides analytical tools and techniques that managers need to achieve the goals of the organization they manage. Therefore, a working knowledge of economics, not necessarily a formal degree, is essential for managers. Managers are essentially practising economists.

In performing his functions, a manager has to take a number of decisions in conformity with the goals of the firm. Many business decisions

are taken under the condition of uncertainty and risk. Uncertainty and risk arise mainly due to uncertain behaviour of the market forces, changing business environment, emergence of competitors with highly competitive products, government policy, external influence on the domestic market and social and political changes in the country. The complexity of the modern business world adds complexity to business decision-making. However, the degree of uncertainty and risk can be greatly reduced if market conditions are predicted with a high degree of reliability. The prediction of the future course of the business environment alone is not sufficient. What is equally important is to take appropriate business decisions and to formulate a business strategy in conformity with the goals of the firm.

Taking appropriate business decisions requires a clear understanding of the technical and environmental conditions under which business decisions are taken. Application of economic theories to explain and analyse the technical conditions and the business environment contributes a good deal to the rational decision-making process. Economic theories have, therefore, gained a wide range of application in the analysis of practical problems of business. With the growing complexity of the business environment, the usefulness of economic theory as a tool of analysis and its contribution to the process of decision-making has been widely recognized.

Baumol has pointed out three main contributions of economic theory to business economics.

First, 'one of the most important things which the economic (theories) can contribute to the management science' is building analytical models which help to recognize the structure of managerial problems, eliminate the minor details which might obstruct decision-making, and help to concentrate on the main issue.

Second, economic theory contributes to the business analysis 'a set of analytical methods' which may not be applied directly to specific business problems, but they do enhance the analytical capabilities of the business analyst..

Third, economic theories offer clarity to the various concepts used in business analysis, which enables the managers to avoid conceptual pitfalls.



ACTIVITY 1.1

''Managerial economics is essential for effective decision-making in business.'' Give your opinion.

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1.7 LET US SUM UP

In this unit we have discussed the following–

- Managerial economics can be described as the use of theories and techniques of modern economics for decision-making problems of business firms. It is also known as managerial economics.
- Managerial economics is applied subject which help in the management in decision-making.
- It helps in studying the complicated problems of business.
- The scope of managerial economics is very wide and it includes areas like consumption, production, pricing, distribution, demand forecasting etc.
- Managerial economics helps in risk, production, pricing analyses as well as in capital budgeting decisions.
- Managerial economists play an important role in achieving the objectives of the business organisations by using its resources optimally.



1.8 FURTHER READING

1) Ahuja, H.L. (2007); *Advanced Economic Theory: Microeconomic Analysis*; New Delhi: S. Chand & Company Ltd.

2) Chopra, P.N. (2008): *Micro Economics*; Ludhiyana: Kalyani Publication.

3) Dewett, K.K. (2005). *Modern Economic Theory*; New Delhi: S. Chand & Company Ltd.

4) Sundharam, K.P.M. & Vaish M.C. (1997); *Microeconomic Theory*; New Delhi: S. Chand & Company Ltd.



1.9 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: Managerial economics is the study of economic theories and techniques for analysing business conditions. It helps in finding the appropriate solution to business problems. Managerial economics is applied micro economics.

Ans. to Q. No. 2: a) Based on Micro Economics: The nature of managerial economics is micro economic. It deals with the problem of a particular firm and its activities.

b) Applied Nature of Economic Theory: In economic theory different laws are formulated but the applied part of economics is used in managerial economics. The nature of managerial economics is applied, not theoretical.

Ans. to Q. No. 3: Risk analysis refers to the technique of identifying and assessing those factors which have the potential to hamper the success of a business firm.



1.10 MODEL QUESTIONS

Q.1: Define managerial economics.

Q.2: Discuss the scope of managerial economics.

Q.3: Discuss the importance of managerial economics in business decision-making.

Q.4: Discuss the role of a managerial economist in business firms.

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UNIT 2: DEMAND

UNIT STRUCTURE

2.1 Learning Objectives

2.2 Introduction

2.3 Concept of Demand

2.4 Law of Demand

2.5 Exceptions to the Law of Demand

2.6 Determinants of Demand

2.7 Elasticity of Demand

- 2.7.1 Price Elasticity of Demand
- 2.7.2 Income Elasticity of Demand
- 2.7.3 Cross Elasticity of Demand

2.8 Demand Forecasting

2.9 Methods of Demand Forecasting

2.10 Let Us Sum Up

2.11 Further Reading

2.12 Answers to Check Your Progress

2.13 Model Questions

2.1 LEARNING OBJECTIVES

After going through this unit, you will able to:

- explain the concept of demand
- discuss the law of demand
- explain the exceptions to the law of demand
- discuss the determinants of demand
- discuss the concept of elasticity of demand
- explain the concept of demand forecasting
- discuss the methods of demand forecasting

2.2 INTRODUCTION

In this unit we will discuss about demand. We will be able to know about the various aspects of demand. You may have observed that prices

of some commodities increases. Perhaps you are aware about the reasons for such price increase? Increase or decrease in price of a commodity is generally connected with its demand. Now question may arise what is the relationship between price of a commodity and demand for that commodity. In this unit we will discuss all these aspects.

2.3 CONCEPT OF DEMAND

The demand for a commodity is consumers attitude and reaction towards commodity. Demand and desire are not the same thing. When a person desire and is willing to pay for that desire,the desire is changed into demand. To be more precise, the demand for a commodity is the amount of it that a consumer will purchase or will be ready to take off from the market at various prices in a period of time. Thus, demand in economics, implies both the desire to purchase and the ability to pay for a good. It should be noted that desire for a commodity does not constitute demand for it, if it is not backed by the ability to pay. For example– if a beggar wishes to have a car, his wish or desire for a car will not constitute the demand for the car because he cannot afford to pay for it, that is, he has no purchasing power to make his wish or desire effective in the market. Now we will see the relationship between demand and price through demand curve.

Demand Curve: Demand curve shows the relationship between quantity demanded for a commodity and price of a commodity. Generally there are two types of demand curve. Individual demand curve and market demand curve. Let us discuss an individual demand curve.

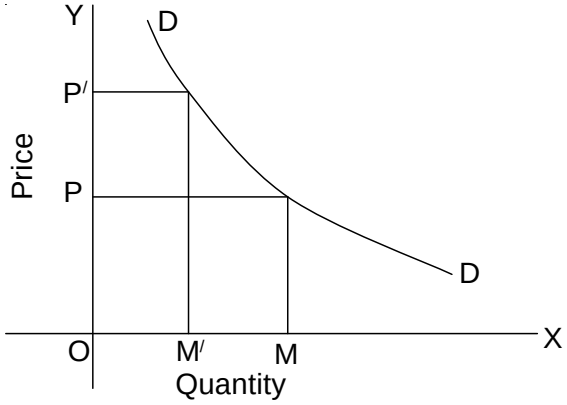


Fig. 2.1: Individual Demand Curve

In the above diagram, along the 'X' axis we have measured the quantity demanded and along the 'Y' axis we have measured the price of a commodity. At price 'OP' quantity demanded for a commodity is 'OM'. When price increases to OP/ the demand for the commodity falls and the amount is 'OM/'.

'DD' is the Individual demand curve.

Market Demand Curve: Now we will see the Market Demand Curve. Market consists of large number of individual consumers and market demand is reflected by the demand of the individual consumers. An illustration of market demand is given below:

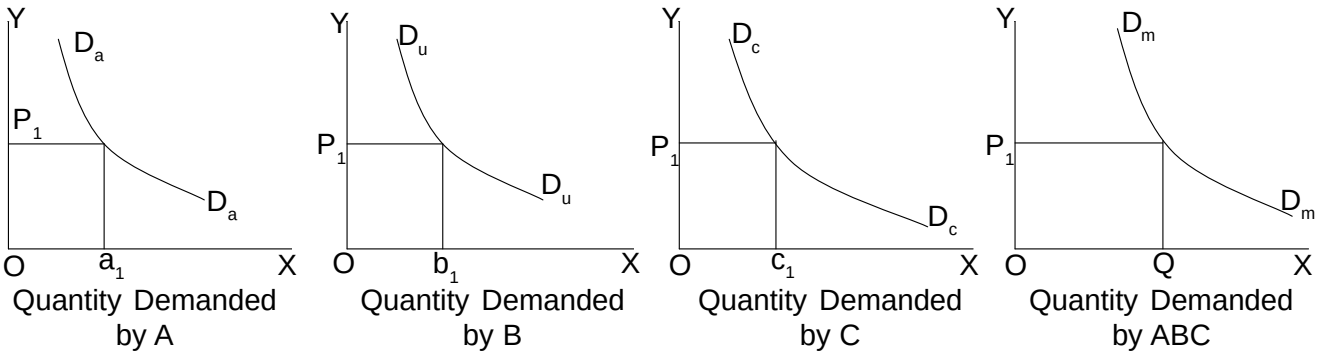


Fig. 2.2: Market Demand Curve

By adding the various quantities demanded by the number of consumers in the market we can obtain the market demand curve. At price P_1 the individual A, B and C wish to buy Oa_1 Ob_1, and Oc_1 amount of a good. The total quantity of the good that all the three individuals purchased at price P_1 is therefore $Oa_1 + Ob_1 + Oc_1$ which is equal to OQ in the above given figure. So, 'DmDm' is the market demand curve.

2.4 LAW OF DEMAND

The law of demand expresses the relationship between price and quantity demanded. According to the law of demand, other things remaining constant, if the price of a commodity falls, the quantity demanded for that commodity will rise, and if price of a commodity rises the quantity demanded for that commodity will fall. These other things which are assumed to be constant are the tastes and preferences of the consumer, the income of

the consumer, and the prices of the related goods. So there is the inverse relationship between price and demand for the commodity.

The law of demand can be illustrated through a demand schedule.

Demand Schedule of an Individual Consumer

Price (Rs.)	Quantity Demanded
12	10
10	20
8	30
6	40
4	50
2	60

From the demand schedule it is found that when price of a commodity is Rs. 12, consumer purchases 10 unit of the commodity. When price of the commodity falls to Rs. 10, the consumer purchases 20 units of the commodity. Thus, with the fall in price of the commodity, the quantity demanded for that commodity will rise. Thus, it also describe the inverse price-demand relationship. Since more is demanded at a lower price and less is demanded at a higher price, the demand curve slopes downward to the right. If any changes occur on those factors which are assumed to be constant in the law of demand, the whole demand schedule and demand curve will be changed.

Now question may arise why demand curve slopes downward?

We can answer this question with the help of Income effect and substitution effect.

Income Effect: When price of a commodity falls, the consumer can buy more quantity of the commodity with his given income or, if he chooses to buy the same amount of the commodity as before, some money will be left with him because he has to spend less on the commodity due to its lower price. In other words, consumer's real income or purchasing power has increased. This increase in real income induces the consumer to buy more of that commodity. This is called income effect indicating that a consumer buys more of a commodity whose price falls.

Let us see the following example–

Suppose income of Mr. X is Rs. 100 and the price of 1 kg orange is Rs. 60. If price of the oranges fall to Rs. 40 per k.g., the consumer will be able to purchase more oranges with his given income i.e. Rs. 100. Alternatively, if he chooses to buy the same amount of orange as before 1 kg of oranges at Rs. 40, some money will be left with him as the price of oranges has decreased Rs. 20 (60-40 Rs.). In other words the consumer's real income or purchasing power has increased as the price of oranges decreased. This increase in real income induces the consumer to buy more oranges. Thus, when price of a good falls, the consumer buys more of the good and vice-versa. That is why the demand curve slopes down-ward.



Substitute: Substitute or substitute goods are those which serve the same purpose or satisfies the same type of need.

Substitution Effect: Another important reason behind the downward sloping of demand curve is substitution effect. A fall in the price of a good, while the prices of its substitutes remain unchanged, will make it attractive to the buyers who will now demand more of it. On the contrary a rise in the prices of a commodity, while the prices of its substitutes remain unchanged, will make it unattractive to the buyer who will now purchase less of it.

For Example: 1) there are two substitute goods– Ice-cream and cold drink. If price of Ice-cream increases, while price of cold-drink remain unchanged, the consumer will substitute Ice-cream by cold-drink.

2) Tea and coffee are substitute goods. If price of Tea falls, while price of coffee remain unchanged, the consumer will substitute coffee by tea.

As a result of substitution effect, the quantity demanded of the commodity, whose price has fallen, rises.



CHECK YOUR PROGRESS

Q.1: What is demand?

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Q.2: What is the law of demand?

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2.5 EXCEPTIONS TO THE LAW OF DEMAND

In this section, we will discuss certain exceptions to the law of demand. Let us first go through Veblen effect.

- **Veblen Effect:** One exception of the law of demand is associated with the name of an American economist, Thorstein Veblen.

  According to Veblen– Utility of some commodity is measured by its price. The greater the price of a commodity, the greater its utility.

  For Example– Diamonds are considered as prestigeous goods in the society. The greater the price of the diamond, the greater will be its value and thus utility. At lower price the consumer will purchase less diamond because at lower price its value will fall and utility will be less. On the other hand, at a higher price quantity demanded for diamond will rise. This is known as veblen effect. In this case demand curve slopes upward. This is the exeption to the law of demand.

- **Giffen Goods:** Giffen goods are those goods whose demand increases with the increase in price of the goods.

  For example– Suppose a consumer eat two basic food rice and meat.

  Meat is a luxurious food and is much more expensive than rice. If price of rice increases then the consumption of meat will be less. Because the consumer have to purchase rice at higher price to gain enough calories. One cannot survive with meat only.

  In this case also demand curve slopes upward.



Giften Good: These are inferior goods which does not have easily available substitute.

2.6 DETERMINANTS OF DEMAND

You are aware that according to the law of demand, other things remaining the same, if price of a commodity increases the quantity demand falls and vice-versa. These other things are the determinants of demand. With the change in the determinant, the demand curve will also change. That is why in discussing the law of demand we assume that determinants will be constant. Here, we will discuss the determinants of demand.

- **Tastes and Preferences of the Consumers:** This is an important factor which determines demand for a good. A good for which consumers tastes and preferences are greater, its demand would be large and its demand curve will be at a higher level. The demand for various goods often change and as a result there is change in demand for them. The changes in demand for various goods occur due to the changes in fashion and also due to the pressure of advertisements by the manufacturers and sellers of different products.

  For example– We have seen frequent changes in the readymade garment industry because of change in consumers' tastes and preferences. Similarly, various model of television has been introduced in the market keeping in mind the changes in consumers' tastes and preferences.

- **Incomes of the People:** The demand for goods also depends upon incomes of the people. The greater the incomes of the people the greater will be their demand for goods. The greater income means the greater purchasing power. Therefore, when incomes of the people increase, they can afford to buy more.

  For example– When the income of Mr. X was Rs. 1000, he purchased 2 bananas. If his income increases to Rs. 5000, he may spend more and can purchase more than 2 bananas.

- **Changes in the Prices of Related Goods:** When a change in the price of one commodity influences the demand of the other commodity we say that the two commodities are related. The related commodities

are of two types– substitutes and complements. We have already discussed the concept of substitute goods When the price of a particular falls, the demand for its substitute good will decrease. When price of a substitute good will increase, the demand for that good will increase. e.g. apple and pears, tea and coffee etc.

The goods which are complementary with each other, the change in price of any of them would affect the demand of other. e.g. if price of milk falls, the demand for sugar would also be affected when people will take more milk the demand for sugar will also increase.

- **Expectations:** The consumers make two kinds of expectations:
  a) related to their future income; and
  b) related to future prices of the good and its related goods.

  In case the consumer expects a higher income in future, he spends more at present and thereby the demand for the good increases. Opposite will be the case, if he expects lower income in future. Similarly, if the consumer expects future prices of the good to increase, he would rather like to buy the commodity now than later. This will increase the demand for the commodity. Opposite will be the case when it is expected that prices in future will come down.
- **Number of Consumers in the Market:** The greater the number of consumers of a good, the greater the market demand for it. Now, the question arises on what factors the number of consumers of a good depends. If the consumer substitutes one good for another, then the number of consumers of that good which has been substituted by other will decline and for the good which has been used in its place, the number of consumer will increase. Another important cause for the increase in the number of consumers is the growth in population. For instance, in India, the demand for many essential goods, especially foodgrains, has increased because of the increase in population of the country and as a result increase in the number of consumers for them.

From the above discussion we have come to know about the various determinants of demand. Now, Let us focus on demand function–

Demand Function:

Where, P_x = Own price of the commodity x

I = Income of the individual

P_r = Prices of related commodities

T = Tastes and preferences of the individual consumer

A = Advertising expenditure made by the producers of the commodity.

Keeping all the determinants constant we can write the individual demand function as–

$$Q_1 = f(p) – (2)$$

This implies that quantity demanded for a good is the function of its own price.



CHECK YOUR PROGRESS

Q.3: What are the determinants of demand?

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2.7 ELASTICITY OF DEMAND

The concept of elasticity of demand refers to the degree of responsiveness of quantity demanded of a good to a change in its price, consumers' income and prices of related goods. The concept of elasticity has a very great importance in economic theory as well as for formulation of suitable economic policies. It is price elasticity of demand which is usually referred to as elasticity of demand. There are three types of demand elasticity. These are–

1) Price Elasticity of Demand
2) Income Elasticity of Demand
3) Cross Elasticity of Demand

Now we will discuss all these three types of elasticity of demand one by one.

2.7.1 Price Elasticity of Demand

Elasticity of demand is the measure of the degree of change in the amount demanded of the commodity in response to a given change in price of the commodity.

In other words, price elasticity of demand is defined as the ratio of the percentage change in quantity demanded of a commodity to a percentage change in price.

We can express this as follows:

$$\text{Prince Elasticity} = \frac{\text{Percentage change in Quantity Demanded}}{\text{Percentage change in Price}}$$

Measurement of Price Elasticity: Price elasticity can be precisely measured by dividing the percentage change in quantity demanded in response to a small change in price, divided by the percentage change in price. Thus, we can measure the price elasticity by using the following formula:

$$e_p = \frac{\frac{\Delta q}{q}\times 100}{\frac{\Delta p}{p}\times 100}$$

$$= \frac{\Delta q}{q} \div \frac{\Delta p}{p}$$

$$= \frac{\Delta q}{q} \times \frac{p}{\Delta p}$$

$$= \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

Where e_p = Price elasticity

q = Original quantity

p = Original price

Δ = Small change

In proportionate method:

$$e_p = \frac{\text{Proportionate change in Quantity}}{\text{Proportionate change in Price}}$$

$$= \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}}$$

$$= \frac{\Delta q}{q} \times \frac{p}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

When the percentage change in quantity demanded of a commodity is greater than the percentage change in price then price elasticity of demand will be greater than 1 and in this case demand is said to be elastic. That is $e_p > 1$.

When the percentage change in quantity demanded of a commodity is less than the percentage change in price then price elasticity of demand will be less than one and in this case demand is said to be inelastic. That is $e_p < 1$.

When the percentage change in quantity demanded of a good is equal to the percentage change in price then price elasticity is equal to one. That is $e_p = 1$. This is known as unitary elastic demand.

The two figures given below represents the elastic and inelastic demand.

Example (Percentage method) say:

Price	Quantity
10	100
9	120

Here P.C. change in Quantity is 20%

P.C. change in Price is a $\frac{1}{10} \times 100$

So, $e_p = \frac{20}{10} = 2$

Δq = Changes in Quantity

Δp = Change in Price

$\Delta q = q_2 - q_1$

$\Delta p = p_1 - p_2$

q_1 = original quantity

q_2 = new quantity

p_1 = original price

p_2 = new price

Example: (Proportionate method)

$$e_p = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}}$$

$$= \frac{q_2 - q_2}{p_1 - p_2} \times \frac{p_1}{q_1}$$

$$= \frac{120 - 100}{10 - 9} \times \frac{10}{100}$$

$$= \frac{20}{1} \times \frac{10}{100} = 2$$

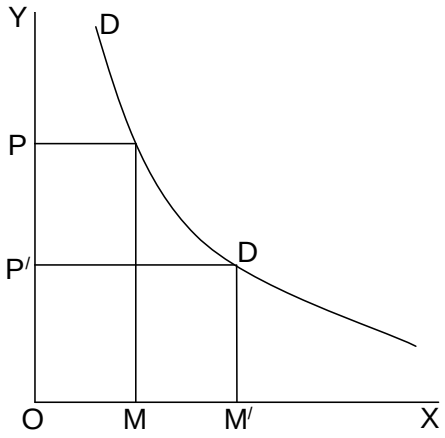


Fig. 2.3: Elastic Demand

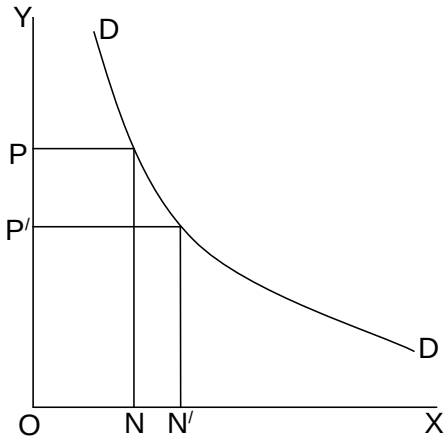


Fig. 2.4: Inelastic Demand

Here $\Delta q > \Delta p$

$MM' > PP'$

Here $\Delta q > \Delta p$

$NN' > PP'$

For a given fall in price from OP to OP/, increase in quantity demanded is much greater in figure 2.3 than in figure 2.4. Therefore, demand in figure1 is more elastic than the figure 2.4.

Examples: If the price of car falls, the quantity demanded for car will rise significantly. Thus the demand for car is elastic. It is the luxurious good. On the contrary, the demand for necessary goods like, salt, is inelastic because it satisfies a basic human want and no substitutes for it are available. People would consume almost the same quantity of salt whether it becomes slightly cheaper than before.

Perfectly Inelastic and Perfectly Elastic Demand:

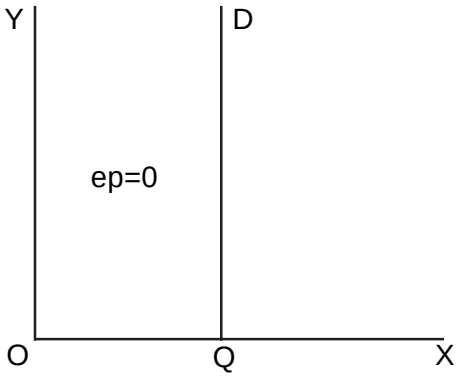


Fig. 2.5: Perfectly Inelastic Demand

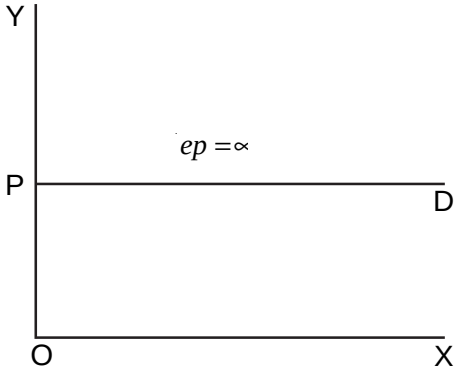


Fig. 2.6: Perfectly Elastic Demand

Figure 2.5 depicts the Perfectly Inelastic Demand. In this case changes in price of a commodity does not affect the quantity demand of the commodity at all. In this case demand curve is a vertical straight line with y axis. Here e_p=0.

For example: The demand for medicine will remain same whatever may be the price because a patient will take medicine in increasing price also.

Figure 2.6 depicts the perfectly elastic demand. Here, demand curve is horizontal straight line with X axis. In this case a small rise in price of the product will cause the buyers to switch completely away from the products so that its quantity demanded falls to zero. Here $ep = \propto$.

2.7.2 Income Elasticity of Demand

Income elasticity of demand shows the degree of responsiveness of quantity demanded of a good to a small change in the income of consumer.

It can be measured by dividing the proportionate change in quantity demanded by the proportionate change in income.

In other words, the income elasticity of demand may be defined as the ratio of the percentage change in purchases of a good to a percentage change in income.

$$\text{Income Elasticity} = \frac{\text{Percentage change in purchase of a good}}{\text{Percentage change in Income}}$$

Measurement of Income Elasticity of Demand :

$$e_y = \frac{\frac{\Delta q}{q} \times 100}{\frac{\Delta y}{y} \times 100}$$

$$= \frac{\Delta q}{q} \div \frac{\Delta y}{y}$$

$$= \frac{\Delta q}{\Delta y} \times \frac{y}{q}$$

Where, e_i = income elasticity of demand

y = initial income

Δq = change in quantity purchased as a result of a change in income

Δy = small change in income

q = initial quantity purchased.

Income elasticity of demand being zero is of great significance. It signifies that quantity demanded of the good is quite unresponsive to changes in income.

Income Elasticity in case of Normal goods, Inferior goods, Luxurious goods and Necessary goods.

When income elasticity is more than zero then an increase in income leads to the increase in quantity demanded of the good. This happens in case of **normal goods.**

When income elasticity is less than zero i.e. negative, in such case increase in income will lead to the fall in quantity demanded of the goods. This happens in case of **inferior goods.**

In case of **luxurious goods** income elasticity is greater than one. That is, the propartion of consumer's income spent on the good rises as consumer's income increases.

In case of **necessary goods** income elasticity is less than one. A good with an income elasticity less than one and which claims declining proportion of consumer's income as he becomes richer is called a necessity.

2.7.3 Cross Elasticity of Demand

Cross Elasticity of Demand can be defined as the degree of responsiveness of demand for one good in response to the change in price of another good.

When the quantity demanded of good X falls as a result of the fall in the price of good Y, the coefficient of cross elasticity of demand of X for Y will be equal to the percentage change in the quantity demanded of good X in respones to a given percentage change in the price of good Y.

It can be measured as follows–

Measurement of Cross Elasticity of Demand:

$$e_c = \frac{\text{Percentage charge in the quantity demanded of X}}{\text{Percentage change in the price of good Y}}$$

$$= \frac{\frac{\Delta q_x}{q_x} \times 100}{\frac{\Delta P_y}{P_y} \times 100}$$

$$= \frac{\Delta q_x}{q_x} \div \frac{\Delta P_y}{P_y}$$

$$= \frac{\Delta q_x}{\Delta P_y} \times \frac{P_y}{q_x}$$

Where, e_c = Cross elarticity of demand of X for Y

q_x = Original quantity demanded of X

p_y = Price of good Y

Δq_x = Change in quantity demanded of good X

Δp_x = Small change in the price of good Y.

Importance of Cross Elasticity of Demand for Business Decision Making: First, the concept of cross elasticity of demand is of great importance in managerial decision making for formulating proper price strategy. Multi product firms often use this concept to measure the effect of change in price of one product on the demand for other products.

For example: Maruti Udyog Ltd. produces Maruti Vans, Maruti 800 and Maruti Esteem. These products are good substitutes of each other and therefore cross elasticity of demand between them is very high. If Maruti Udyog decides to lower the price of Maruti 800, it will significantly affect the demand for Maruti Vans and Maruti Esteem. So it will formulate a proper price strategy fixing appropriate price for its various products.

Second, the concept of cross elasticity of demand is frequently used in defining the boundaries of an industry and in measuring inter-relationship between industries. An industry is defined as a group of firms producing similar products. Because of interrelationship of firms and industries between which cross-elasticity of demand is positive and high, any one cannot raise the price of its product without losing sales to other firms.

2.8 DEMAND FORECASTING

A forecast is a prediction or estimation of future situation, under given conditions. Good production and sales planning require forecast of the business conditions and their relationship to demand. The more realistic the forecast is more effective decisions can be taken for the future.

Forecasts can broadly be classified into two categories:

1) **Passive Forecast:** Where prediction about future is based on the assumption that the firm does not change the course of its action.
2) **Active Forecast:** Where forecasting is done under the condition of likely future changes in the actions by the firm.

For example: If Tata tea does not intend to initiate any action (like advertisement, quality control, etc.) to influence its sales in near future, the prediction of sales by its marketing department may to called a passive sales forecast.

On the other hand, Tata tea may like to initiate some actions and strategies to influence the future sales of the firm. The forecasted sales taking into account the planned actions and stratigies are called the active sales forecasts.

Generally, business firms are interested in both passive and active forecasts. Often they predict sales after taking into account changes in a host of policy variables, like prices of substitutes and complements, design, quality, advertisement outlay, etc.

Importance of Forecasting Demand: Forecasting is done both for the long-run as well as short-run.

In a short-run forecast seasonal patterns are of prime importance. Such a forecast helps in preparing suitable sales policy and proper scheduling of output in order to avoid over stocking or costly delays in meeting the orders. It gives the idea of future demand. Short-run forecast also help in arriving at suitable price for the product and in deciding about necessary modifications in advertising and sales techniques.

Long-run forecast is helpful in proper capital planning. When installing production capacity, an element of flexibility in their availability has to be ensured to take care of planned and expected changes in production. It only after a decision regarding the equipment and the process is taken, that the firm can plan for the recruitment of personnel etc. Long term planning thus helps in saving the wastages in material, man-hours, machine time and capacity. In the long-run forecasting changes in variables like population, age-group pattern, consumption pattern etc. are included. In short, long-run forecasting is usually used for 'new unit' planning, expansion of the existing units, planning long run financial requirements and mon-power requirements. Short-run forecasts are needed to evolve suitable production policy, controlling inventory and the cost of raw materials, determining suitable price policy, setting sales targets and planning future financial requirements.

2.9 METHODS OF DEMAND FORECASTING

In this section we will discuss about the methods of demand forecasting. There are several kinds of methods available for forecasting demand for products. Now we will discuss some of these methods.

- **Opinion Polling Methods:** The opinion polling Methods of demand forecasting are of various kinds, as discussed below :

  i) Consumers' Survey Methods: In this method, consumers are contacted personally to disclose the future purchase plans. This may be attempted with the help of either a complete survey of all consumers or by selecting a few consuming unit out of the relevant population. In case the commodity under considertion is an intermediate product (like-wood, steel, machinery parts etc.) then the industries using it is on end-product are surveyed.

  a) Complete Enumeration Survey: Under the complete enumeration survey, the probable demands of all the consumers for the forecast period are summed up to have the sales forecast for the forecast period.

  b) Sample Survey: Under the sample survey method, the probable demand expressed by each selected unit is summed up to get the total demand of sample units in the forecast period.

  ii) Sales-force Opinion Method: This technique is an attractive technique. The men who are closest to the market are questioned and their responses are aggregated.

  The advantages of this method are that it is cheap and easy, in the sense that it does not involve any elaborate statistical measurement. It also has the advantage that it is based on the first hand knowledge of the salesmen. This method generally proves quite useful for forcasting demand for new products and is therefore, known as 'reaction survey' method.

  One the other hand, it has certain disadvantages too. Any one who has ever worked with a team of sales representatives

will know that they suffer from one or other of the two defects : congential optimism or congential pessimism. This results in either exaggeration or deflation of future estimates.

iii) **Experts' Opinion Method:** This method is best suited in situations where intractable changes are occuring. e.g., forecasting future technological states (here basic data are non-existent). It is possible that in cases where basic data are backing experts may give divergent views, but even then it is possible for the manager to adopt his thinking on the basis of these views.



2.10 LET US SUM UP

In this unit we have discussed the following–

- The demand for a commodity is the amount of it that a consumer will purchase or will be ready to take off from the market at various prices in a period of time.
- Demand curve shows the relationship between quantity demanded for a commodity and price of a commodity.
- The law of demand states that other things remaining constant, if the price of a commodity falls, the quantity demanded for that commodity will rise, and if price of a commodity rises the quantity demanded for that commodity will fall.
- The factors that determine demand – taste and preference of the consumers, income, changes in prices of related goods etc.
- There are three types of demand elasticity. These are– Price elasticity, Income elasticity and Cross elasticity of demand.
- Price elasticity of demand is defined as the ratio of the percentage change in quantity demanded of a commodity to a percentage change in price.
- Income elasticity of demand shows the degree of responsiveness of quantity demanded of a good to a small change in the income of consumer.

- Cross Elasticity of Demand can be defined as the degree of responsiveness of demand for one good in response to the change in price of another good.
- The different methods of demand forecasting are- Consumers' Survey Method, Sales-force Opinion Method, Experts' Opinion Method etc.



2.11 FURTHER READING

1) Ahuja, H.L. & Ahuja, A. (2014); *Managerial Economics: Analysis of Managerial Decision-Making*; New Delhi: S. Chand & Company Ltd.
2) Mehta, P.L. (2001): *Managerial Economics*; New Delhi: Sultan Chand & Sons.



1.12 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: The demand for a commodity is consumers' attitude and reaction towards commodity. When, a person desire and is willing to pay for that desire, the desire is changed into demand. The demand for a commodity is the amount of it that a consumer will purchase or will be ready to take off from the market at various prices in a period of time.

Ans. to Q. No. 2: The law of demand expresses the relationship between price and quantity demanded. According to the law of demand, other things remaining constant, if the price of a commodity falls, the quantity demanded for that commodity will rise, and if price of a commodity rises the quantity demanded for that commodity will fall. These other things which are assumed to be constant are the tastes and preferences of the consumer, the income of the consumer, and the prices of the related goods.

Ans. to Q. No. 3: The determinants of demand are taste and preference of the consumers, income, changes in prices of related goods etc.



2.13 MODEL QUESTIONS

Q.1: What is demand?

Q.2: Describe the law of demand.

Q.3: Describe the determinants of demand.

Q.4: Discuss the exceptions to the law of demand.

Q.4: Explain the price elasticity of demand.

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UNIT 3: SUPPLY

UNIT STRUCTURE

3.1 Learning Objectives

3.2 Introduction

3.3 Concept of Supply

3.4 Law of Supply

3.5 Exceptions to the Law of Supply

3.6 Factors Determining Supply

3.7 Elasticity of Supply

3.8 Let Us Sum Up

3.9 Further Reading

3.10 Answers to Check Your Progress

3.11 Model Questions

3.1 LEARNING OBJECTIVES

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

- explain the concept of supply
- describe the law of supply and the exceptions to the law of supply
- discuss the factors that determine supply
- explain the concept of elasticity of supply.

3.2 INTRODUCTION

Price of a commodity is determined by the demand for and supply of a commodity. In the previous unit, we have discussed about ‘demand’. Have you remembered the relationship between price and demand? Yes, there is a inverse relationship between price and demand. To fulfil the demand of consumers for a good, the sufficient supply of that good is necessary. Like demand there is also a relationship between price and supply. Now, in this unit we will discuss about the meaning of supply, law of supply, factors which determine the supply of a commodity etc.

3.3 CONCEPT OF SUPPLY

The supply of goods comes from manufacturer or suppliers' end. Supply is the ability and willingness of a manufacturer or supplier to supply a particular good at different prices. Therefore, supply of a commodity refers to the quantities of a commodity that could be offered for sale at all possible prices during a period of time, for example a day, a week, a month and so on.

Supply should be carefully distinguished from stock. Stock is the total volume of a commodity which can be brought into the market for sale at a short notice and supply means the quantity which is actually brought in the market. For perishable commodities like fish and fruits, supply and stock are the same because whatever is in stock must be disposed of. The commodities which are not perishable, can be held back if prices are not favourable. If price is high, larger quantities of non perishable commodities are offered by the sellers from their stock. And if the price is low, only small quantities are brought out for sale.

3.4 LAW OF SUPPLY

Let us assume that Mr. X is selling Commodity A at a price of Rs. 50. At this price, he sells 100 units of Commodity A. His revenue is: 100 X Rs. 50 = Rs. 500. At a certain point of time, the price of Commodity A increases to Rs. 80. As a result, Mr. Xis willing to supply more units of Commodity A. Therefore, he supplied 200 units. If he could supply more than 200 units of Commodity A, his revenue will increase. This situation is reflected in the law of supply. The law of supply states that when the price of a commodity rises, the quantity supplied of it in the market increases and when the price of a commodity falls, its quantity supplied decreases, other factors remaining the same.

Thus, according to the law of supply, the quantity supplied of a commodity is positively related to price. Because of this direct or positive relationship between price and quantity supplied of a commodity the supply curve slopes upward to the right.

Now, we will see graphically– how supply curve slopes upward to the right. Let us go through the supply schedule that shows the quantity supplied at different prices.

Supply Schedule of Rice

Price Per Kg. (Rs.)	Quantity Supplied (in Kg.)
20	50
25	60
30	70
35	80
40	90
45	100

From the above schedule it is clear that when price of per kg. rice is Rs. 20, the quantity of rice supplied in the market is 50 kgs. Likewise, as the price goes on increasing, the quantity supplied also increases.

The above schedule can be diagramatically presented as under–

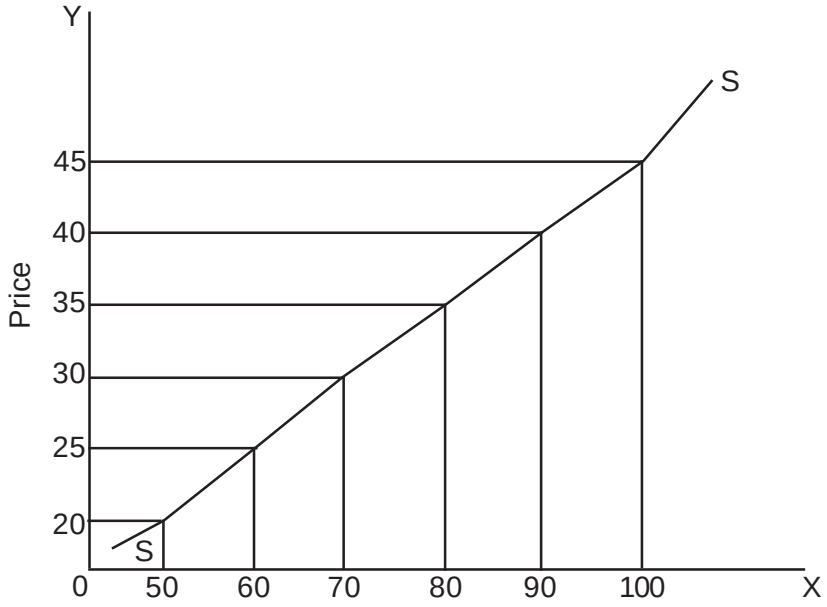


Fig. 3.1: Quantity Supplied

Along the X axis we have measured quantity supplied of rice. Along the Y axis we have measured prices of rice per kg. SS is the supply curve.

From the figure it is found that supply curve slopes upward from left to right which indicates that as the price of rice increases, quantity supplied increases.

Now, the question is why does supply curve slope upward?

From the above discussion, you came to know that there is a positive relationship between price of the commodity and supply of the commodity. That is at a higher price, more quantity is supplied and vice-versa, other thing remaining the same. The high price of a product serves as an incentive for the producer to produce more of it. The higher the price, the greater the incentive for the firm to produce and supply more of a commodity in the market, other things remaining same and as a result supply curve slopes upward.

Further, the changes in quantity supplied of a product following the changes in its price depends on the possibilities of substitution of one product for another. For example, if price of rice in the market rises, the farmers will produce more of rice by withdrawing land and other natural resources from the cultivation of sugarcane and devoting them to the production of rice. This is because high market price for rice than sugarcane induces farmers, who aim at maximising profits, to use more resources for production of rice and fewer resources for production of sugarcane.

To produce more of a product, firms have to devote more resources to its production. When production of a product is expanded by using more resources, diminishing returns occur. Due to diminishing returns, average and marginal costs of production increase. This implies that more quantity of commodity would be produced and supplied in the market only at a higher price so as to cover higher cost of production.

However, if marginal cost of production doesnot rise with the increase in output as, for instance, happens when a commodity is being produced under conditions of constant returns, the more will be produced and supplied at the given constant price. That is, supply curve in this case will be a horizontal straight line. It is also worth mentioning that if a commodity is subject to increasing returns, the expansion of output of the commodity will lower the unit cost of production. As a result of increasing returns, more will be supplied at the lower prices and the supply curve will be sloping downward. But, since it is diminishing returns which is generally the rule, the supply curve generally slopes upward to the right.



CHECK YOUR PROGRESS

Q.1: What is supply?

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Q.2: State the law of supply?

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3.5 EXCEPTIONS TO THE LAW OF SUPPLY

You are aware that the law of supply states that other factors kept constant as the price increases, the quantity supplied of a commodity increases and vice versa. If there is decrease in quantity supplied with rise in price and vice versa, what will happen? Such situations are called as exceptions to the law of supply.Let us discuss the exeptions to the law of supply:

- **Anticipation about Future Price:** If the sellers anticipate a future rise in price, they may restrict the supply with a view to earn more profits in the future. Even if the price is high, sellers are not ready to release the goods in anticipation of further rise in price, expecting to make huge profits. Therefore, there is no increase in supply inspite of high prices.
- **Labour Supply:** Workers normally prefer leisure after reaching certain amount of wage level. Therefore, after reaching that high level of wages, the labour supply will decline, even if they are offered more wages. Generally, the supply of labour is directly related to wage, but after a particular point of wage level, the supply of labour becomes inversely related to wage.

- **Need for Urgent Funds:** A businessman may face an urgent need for funds, and as such he may sell out more goods even at lower prices. This is an exception to the law of supply.
- **Change in Fashion:** If some goods become out of fashion, the sellers may sell such goods at low prices to clear the stock and the supply will increase. This is also an exception to the law of supply.
- **Perishable Goods:** The sellers have to dispose off certain goods like vegetables, flowers, etc. even if the price falls. They cannot wait for longer time for the price to rise, in order to increase supply.
- **Period of Recession:** During recession period the sellers are forced to sell the goods at low prices. This is because during recession, the purchasing power of the people is very low.



CHECK YOUR PROGRESS

Q.3: State two exceptions to the law of supply.

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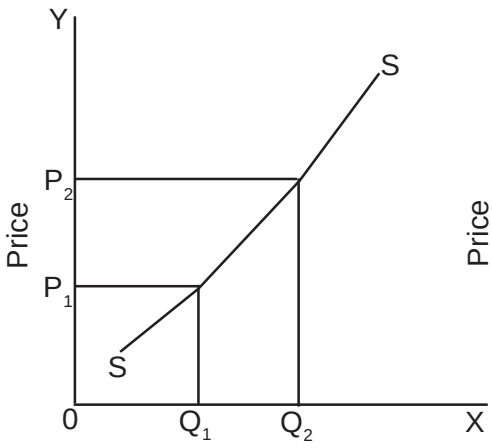
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3.6 ELASTICITY OF SUPPLY

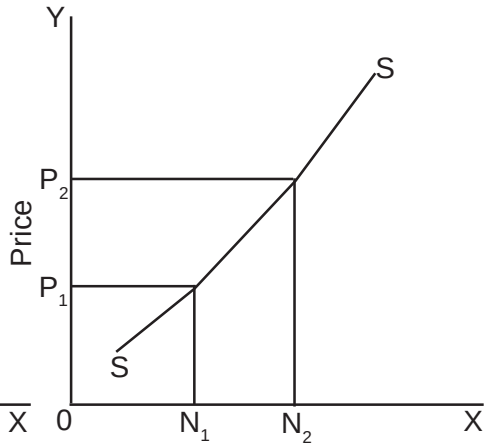
When a small fall in price leads to a large contraction in supply, the supply is comparatively elastic. But when a big fall in price leads to a very small contraction in supply, the supply is said to be comparatively inelastic. On the other hand, a small rise in price leading to a big extension in supply shows more elastic supply, and a big rise in price leading to a small extension in supply indicates inelastic supply.

Let us discuss elastic and inelastic supply graphically–



Quantity Supplied

Fig. 3.2: Elastic Supply



Quantity Supplied

Fig. 3.3: Inelastic Supply

From the above two figures we got two supply curves 'SS'and S_1S_1. Quantity supplied is measured along the horizontal axis and price is measured along the vertical axis. In figure 3.2, at price OP_1, the quantity supplied is OQ_1, and in figure 3.3 the quantity supplied is ON_1. Price is same in both the cases. With rise in price of the commodity, quantity supplied increases. In figure 3.2, due to change in price from OP_1 to OP_2, quantity supplied increases to OQ_2. In figure 3.3, the change in quantity supplied is from ON_1 to ON_2. In figure 3.2, the change in quantity supplied Q_1Q_2 is much larger as compared to increase in quantity supplied N_1N_2 in figure 3.3. Therefore, supply in figure 3.2 is elastic whereas supply in figure 3.3 is inelastic.

Definition of 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–

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

Symbolically we can write it as follows–

$$e_s = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}}$$

Using above formula we can measure elasticity of supply. In the given formula–

e_s = elasticity of supply

Δq = change in quantity supplied

Δp = change in price

p = price of commodity

q = quantity supplied of the commodity

Problem: If the price of a refrigerator rises from Rs. 2000 to Rs. 2100 per unit and in response to this rise in price the quantity supplied increases from 2500 to 3000 units, what will be the elasticity of supply?

Solution: We know that,

$$e_s = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}}$$

Here, Δq (Change in quantity supplied) = (3000-2500) units

= 500 units

Δp (Change in price) = (2100-2000)

= Rs. 100

P (initial price) = Rs. 2000

or (initial quantity supplied) = 2500 units

Hence, elasticity of supply will be 4.



CHECK YOUR PROGRESS

Q.4: What is elasticity of supply?

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3.7 FACTORS DETERMINING SUPPLY

In the law of supply we find that the quantity supplied varies positively with price of the product, other factors remaining constant. Now, we will discuss the factors that determine supply–

- **Production Technology:** The change in technology affects the supply function by altering the cost of production. If there occurs an improvement in production technology used by the firm, the unit cost of production declines and consequently the firms would supply more than before at the given price. That is the supply would increase implying that the entire supply curve would shift to the right.
- **Price of Factors of Production:** Changes in prices of factors or resources also cause a change in cost of production and consequently bring about a change in supply.
- **Prices of other Products:** When we draw a supply curve we assume that the prices of other products (Substitute and complementary products) remain unchanged. Now, any change in the prices of other products would influence the supply of a product.
- **Objective of the Firm:** The objective of a firm also determines supply of a product produced by it. If the firm aim to maximise sales or revenue rather than profits, the production of the product produced by them and hence its supply in the market would be larger.
- **Number of Firms:** If the number of firms producing a product increases, the market supply of the product will increase. When, in the short- run, firms in an industry are making large profits, the new firms enter that industry in the long-run and consequently the total production and supply of the product of the industry increases. On the other hand, due to losses if some firms leave the industry, the supply of its product will decline.
- **Future Price Expectations:** The supply of a commodity in the market at any time is also determined by sellers' expectations of future prices. During inflationary periods, sellers expect the prices to rise in future, they would reduce supply of a product in the market.

The hoarding of huge quantities of goods by traders is an important factor in reducing their supplies in the market and thus causing further rise in their prices.

- **Taxes and Subsidies:** Taxes and subsidies also influence the supply of a product. If an excise duty or sales tax is levied on a product, the firms will supply the same amount of it at a higher price or less quantity of it at the same price.



CHECK YOUR PROGRESS

Q.5: State two factors that determine supply.

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3.8 LET US SUM UP

In this unit we have discussed the following aspects–

- Supply of a commodity means the quantities of a commodity that is offered for sale at the possible prices during a particular period of time.
- The law of supply states that when the price of a commodity increases, the quantity supplied of it increases and when the price of a commodity decreases, the quantity supplied of it also decreases.
- The law of supply does not hold good if the sellers anticipate a future rise in price and restrict the supply to earn more profits in the future.
- There are some other situations where the law of supply may not be applicable like, change in fashion, need for urgent fund etc.
- The factors that determine supply are– production technology, prices of factors of production, prices of related products etc.



3.9 FURTHER READING

1) Ahuja, H.L. (2007); *Advanced Economic Theory: Microeconomic Analysis*; New Delhi: S. Chand & Company Ltd.

2) Chopra, P.N. (2008): *Micro Economics*; Ludhiyana: Kalyani Publication.



3.10 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: The supply of a commodity refers to the quantities of the commodity that could be offered for sale at all possible prices during a period of time, for example a day, a week, a month and so on.

Ans. to Q. No. 2: The law of supply states that when the price of a commodity rises, the quantity supplied of it in the market increases and when the price of a commodity falls, its quantity supplied decreases, other factors remaining the same. According to the law of supply, the quantity supplied of a commodity is positively related to price. Because of this direct or positive relationship between price and quantity supplied of a commodity, the supply curve slopes upward to the right.

Ans. to Q. No. 3: Need for Urgent Funds: A businessman may face an urgent need for funds, and as such he may sell out more goods even at lower prices. This is an exception to the law of supply.

Change in Fashion: If some goods become out of fashion, the sellers may sell such goods at low prices to clear the stock and the supply will increase. This is also an exception to the law of supply.

Ans to Q. No. 4: The elasticity of supply is the degree of responsiveness of supply to changes in the price of a good. 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.

Ans to Q. No. 5: Production Technology: The change in technology affects the supply function by altering the cost of production. If there

occurs an improvement in production technology used by the firm, the unit cost of production declines and consequently the firms would supply more than before at the given price. That is the supply would increase implying that the entire supply curve would shift to the right.

Price of Factors of Production: Changes in prices of factors or resources also cause a change in cost of production and consequently bring about a change in supply.



3.11 MODEL QUESTIONS

Q.1: What is meant by supply of a commodity?

Q.2: Discuss the law of supply

Q.3: Discuss the factors that determine the supply ofm a commodity.

Q.4: Why supply curve slopes upward to the right?

Q.5: What is elasticity of supply?

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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 Raturns 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
- describe the advantages and disadvantages of large-scale production.

4.2 INTRODUCTION

In unit 2, we have discussed the behaviour of the consumers by focusing on the law of demand. 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.



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

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 connectio 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.

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: What is 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

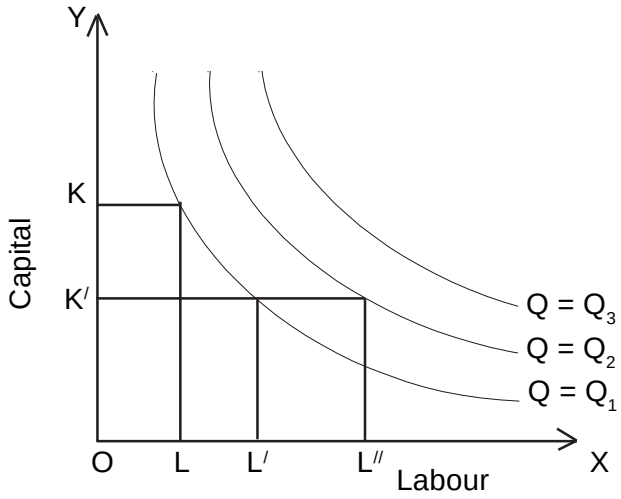


Fig. 4.1: Isoquants

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)

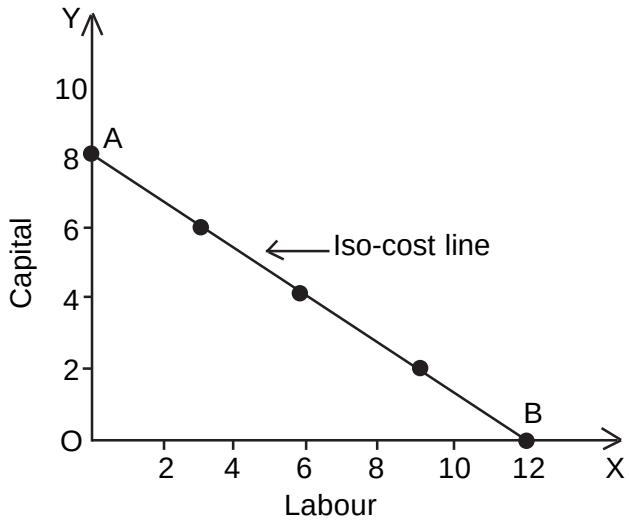


Fig. 4.2: Iso-cost line

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–

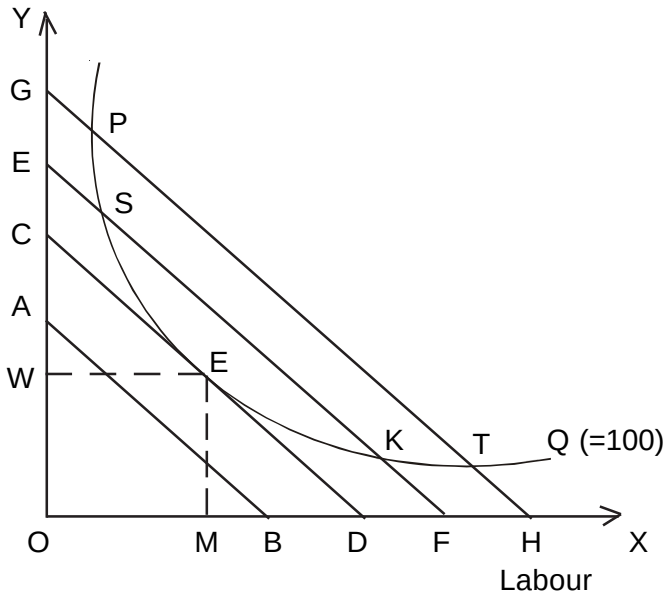


Fig. 4.3: Minimizing cost for a given level of output

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 4.1

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?

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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.

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 outpur 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–

$$AP = \frac{100}{5} = 20 \text{ units}$$

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

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 4.4, 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.

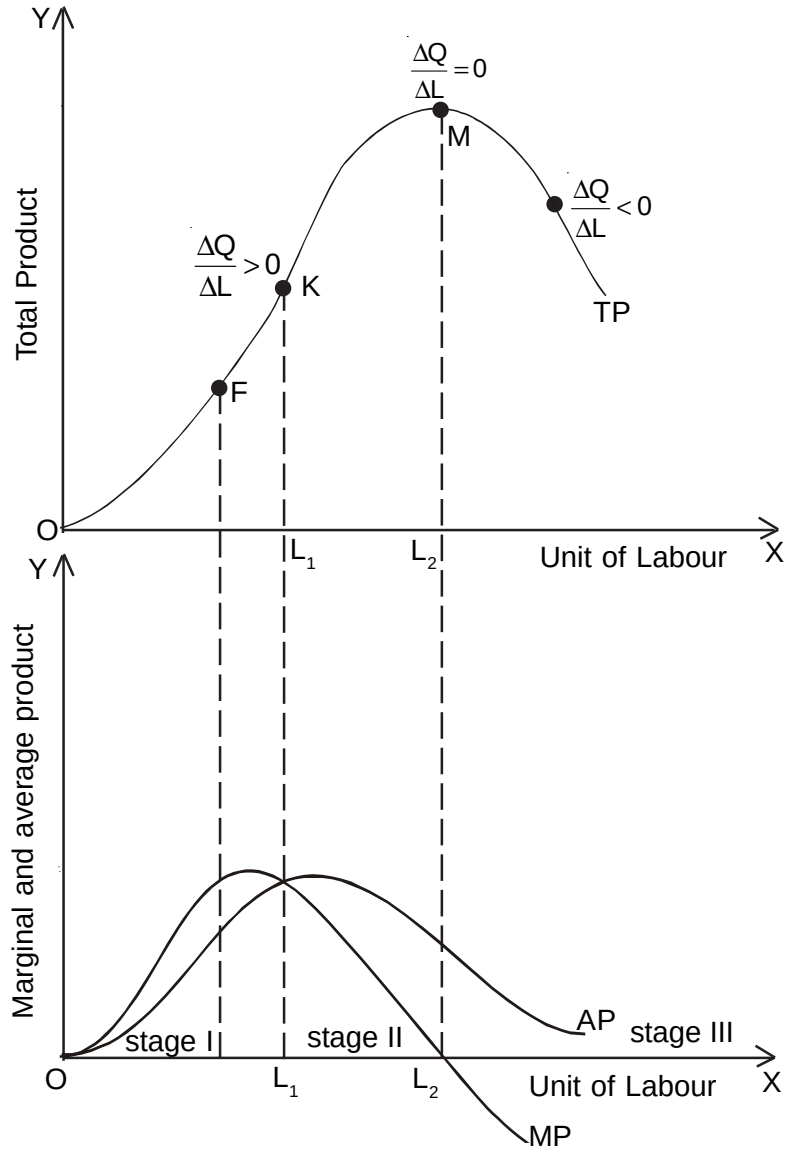


Fig. 4.4 Three stages of production with one variable factor

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 too 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 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.

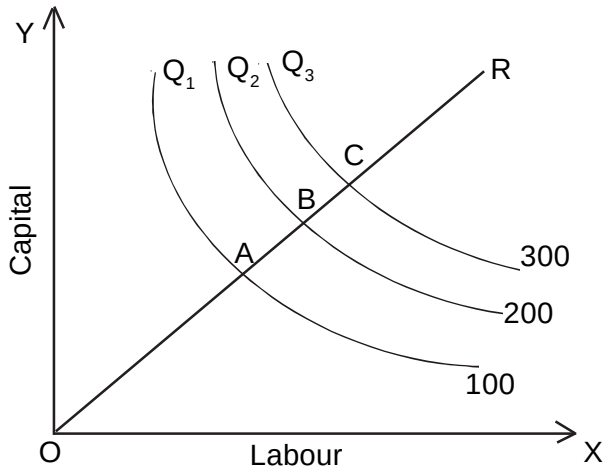


Fig. 4.5: Increasing returns to scale

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.

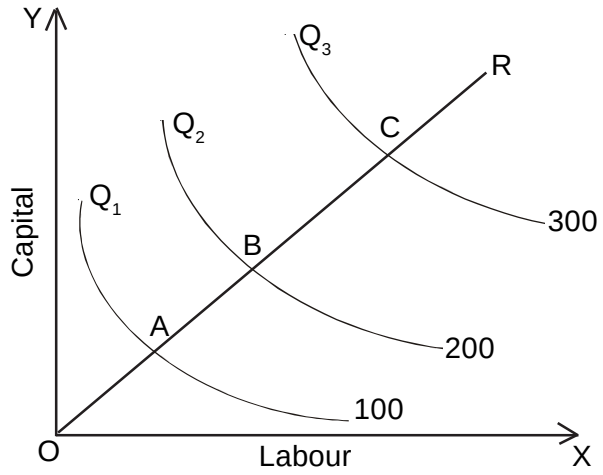


Fig. 4.6: Deacreasing returns to scale

In this figure 4.6, 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.

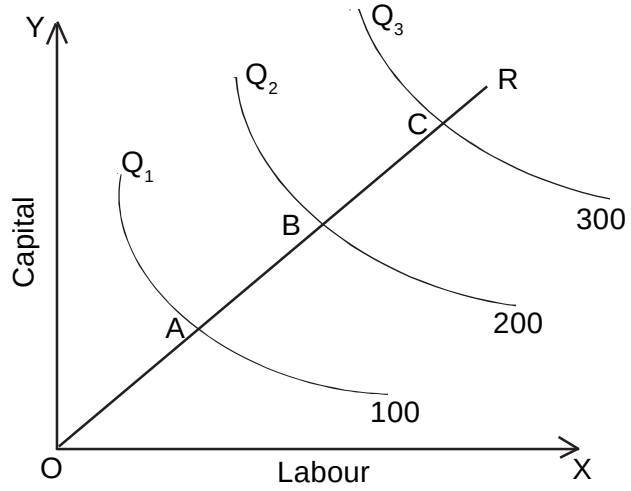


Fig. 4.7 Constant return

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 prodreced, 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 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.



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.



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

In this unit wer have discussed the following aspects–

- 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.
- Diaeconomies 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. (2007); *Advanced Economic Theory: Microeconomic Analysis*; New Delhi: S. Chand & Company Ltd.
2) Chopra, P.N. (2008): *Micro Economics*; Ludhiyana: Kalyani Publication.



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 is 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 product 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

UNIT STRUCTURE

5.1 Learning Objectives

5.2 Introduction

5.3 Meaning of Cost

5.4 Cost Function

5.5 Concepts of Cost

- 5.5.1 Opportunity Cost
- 5.5.2 Explicit and Implicit Cost
- 5.5.3 Money and Real Cost
- 5.5.4 Accounting and Economic Cost
- 5.5.5 Sunk Cost
- 5.5.6 Marginal and Incremental Cost

5.6 Short-Run Cost

- 5.6.1 Fixed Cost and Variable Cost
- 5.6.2 Total Cost
- 5.6.3 Average Cost
- 5.6.4 Marginal Cost
- 5.6.5 Marginal, Average and Average Variable Cost

5.7 Long-Run Cost

- 5.7.1 Long-Run Average Cost (LAC)
- 5.7.2 Long-Run Marginal Cost (LMC)

5.8 Managerial Uses of Cost Function

5.9 Let Us Sum Up

5.10 Further Reading

5.11 Answers to Check Your Progress

5.12 Model Questions

5.1 LEARNING OBJECTIVES

After going through this unit, you will able to:

- explain the concept of cost
- describe the relationship between cost and output

- explain the different concepts of cost
- discuss the concepts of short-run cost
- describe the concepts of long-run cost
- discuss the role of manager in determining the best output and cost combination.

5.2 INTRODUCTION

In the previous unit, we have discussed about production. In this unit we will analyse the concepts of cost. Cost indicates the total money expenditure incurred by a firm in the production of goods and services.

There are several concepts of cost of production used in economics. When we talk about the cost of a firm, generally, we refer to money cost. However, there are some other concept of costs which draws the attention of the economists. In this unit,we will discuss the different concept of costs.

In case of production cost, time period is very important. We have previously mentioned about the short-run and long-run. In the short-run, some of the factors of production cannot be varied, and therefore, remain fixed. But all the factors become variable in th long-run. In this unit you will gain knowledge about the short-run and long-run concepts of cost.

5.3 MEANING OF COST



Economic Goods: Commodities or services useful to people and have to be paid for to obtain. They are scarce in relation to demand.

In order to produce output any firm needs to employ inputs or factors of production like land, labour, capital and organisation. The factors of production are not free goods but economic goods. They are to be paid when their services are utilised in the production process. Land gets rent, labour gets wages, capital gets interest and organisation gets profits. Cost of production, therefore, is the payment made to the factors of production for rendering their services in the production process.

5.4 COST FUNCTION

Cost function means the functional relationship between cost and output. It shows total cost at each level of output. Cost function can be expressed in the following way–

$$C = f(Q)$$

Where, C = total cost

Q = output

For every level of output, the firm chooses the least-cost input combination i.e. the combination of inputs which is least expensive.

5.5 CONCEPTS OF COST

The different concepts of production cost are–

5.5.1 Opportunity Cost

In the modern economic analysis, the concept of opportunity cost plays a significant role. We know that we cannot satisfy all of our wants due to scarcity of resources. If we want to get more of a commodity, the less will be available of another commodity i.e. we have to sacrifice some units of the commodity for having more units of the other commodity. The sacrifice of the thing is the opportunity cost of gaining the other thing. Thus, opportunity cost of any good is the next best alternative good that is sacrificed. If, for example, a farmer by investing a certain amount of productive resources can produce either 100 quintals of rice or 110 quintals of wheat from cultivation of one acre of land. In this case, if he decides to produce wheat, he has to sacrifice the production of rice. Here the opportunity cost of producing 110 quintals of wheat is 100 quintals of rice. Since opportunily cost is the cost of foregone alternative, it is also known as alternative cost.

However, the concept of opportunity cost has certain drawbacks. Firstly, there are certain inputs which have specific uses and which cannot be transferred from one area of production to another. For example, if the machinery is used in paper mill cannot be used in textile industry, Thus opportunity cost of such input is nil. Secondly, certain opportunity cost cannot be measured. For example, the hazards and inconveniences suffered by the people

because of air, noise and water pollution in the industrial area are not measurable.

Besides having some deficiencies. this concept is widely used in economics. Economist from earlier period has been utilizing this concept for the analysis of economic activities in various fields.

5.5.2 Explicit and Implicit Cost

In the process of production it is the organiser who mobilise the three other factors of production- land, labour, capital and makes use of the factors in a co-ordinated manner. In the past, when life was simple, wants were limited, it was possible for an individual to produce the commodity with the help of his/ her own land, labour and capital. But such a situation no longer exist today. The society has become bigger with many wants. The scale of production has expanded and has become more complex than ever before. In this situation it is no longer possible for an organiser to carry out the production process with his/ her own land, labour and capital. Now the organiser acquires these inputs from different sources and made payment for utilizing their services.

Explicit cost means the cost of those factors of production whose payment is made to the outsiders. Explicit cost are also called paid-out cost. These cost the entrepreneur has to pay to those persons from whom he/ she has obtained factors of production or services. For example, the entrepreneuers have to pay wages to the labour employed, interest on the capital that has been borrowed and rent on land or bulding. These are explicit cost.

Implicit cost, on the other hand, are the cost of self-owned resources which are used in the process of production. For example, rent of entrepreneur's own building, interest on entrepreneur's own capital invested etc. Perhaps the entrepreneur himself is the owner of the business premises, he may have invested his own capital. He may be a full-time worker in the business, for instance he may be a managing director for which he may not be drawing any salary.

If he had lent out these factors to others, he would have received remuneration from them. Hence they must be taken into account while calculating profit. But since they are not actually paid out to anybody, they are called implicit cost.

5.5.3 Money and Real Cost

The cost incurred in terms of money in producing a commodity is the money cost of production. These costs are expressed in monetary terms. The following expenses are included in the cost of production which is termed as money cost–

a) Cost of raw-materials.
b) Interest on capital.
c) Rent on land.
d) Cost of entrepreneurial services (Profit).
e) Wages and salaries.
f) Cost of electricity.
g) Advertisement cost.
h) Transport cost.
i) Depreciation and obsolescence charges.
j) Insurance charges.
k) All types of taxes viz; property tax, license fees, excise duty etc.
l) Packing charges.



Depreciation: Fall in the value of fixed capital assets due to normal wear and tear and expected absolescence.

Therefore, money cost relate to money outlays by a firm on factors of production which enable the firm to produce and sell a product.

Another concept of cost is real cost. It is a philosophical concept which refers to all those efforts and sacrifices undergone by various members of the society to produce a commodity. It is difficult to quantify this cost. Marshall has called these cost as the 'Social Cost of Production". Adam Smith regarded pains and sacrifices of labour as real cost of production. Some other economists define real cost as the next best alternative sacrificed in order to obtain a

commodity. Thus, we can say real cost is the trouble, sacrifice of factors in producing a commodity.

This concept is used in another sense. It typically include the value of all tangible resources such as raw-materials and labour that are used in the production process. In other words, real cost means the sum-total of the cost of factors of production used in the production of a commodity. For example– 200 hours of labour, 1000 bags of cement, 1000 quintals of steel and so on.

5.5.4 Accounting and Economic Cost

Accounting cost only include what economists call 'explicit cost'. It will take into account only the payment and charges made by the entrepreneur to the outside suppliers of the various productive factors. For example, if you open a business of selling clothes from your home, the accounting cost would include things like the price of clothes that you pay to wholeseller, the money you spend on advertising, if any, and the amount that it costs you to go around selling your product.

Accounting costs come from the total explicit cost of the company during the fiscal year. Accounting cost do not include implicit cost resulting from unused resources. Explicit cost with defined monetary values are factored into the accounting cost of the company to calculate net income at the end of the fiscal year. For example, if a company spends Rs. 1,00,000 on employees wages, Rs. 50,000 on equipment purchases and Rs. 20,000 on interest payment, the total accounting cost are Rs. 170,000 for the year.

Economic cost is some what different from accounting cost. The accounting cost considers those costs which involve cash payment by the entrepreneur of the firm to others which we can termed as explicit cost. The economic cost takes into account all of these accounting costs, but in addition, they also take into account the amount of money the entrepreneur could have earned if he

had invested his money capital and sold his own services and other factors in next, best alternative uses. The accounting costs payment which the firm makes to other factor owners for hiring the various factors are also known as explicit costs. The return on money capital invested by the entrepreneur and the wages or salary for his services and the oppurtunity cost of the other factors the entrepreneur himself owns and employs them in the firm are known as implicit cost. The economic cost take into consideration both the explicit and implicit costs. Therefore,

Economic costs = Accounting costs + Implicit cost.

5.5.5 Sunk Cost

Firms in every industry have to spend money to earn money. A company budget may allow for investing money in employees salaries, inventory or office space or any other cost of doing business. Once the company's money is spent, that money is considered as a sunk cost. A sunk cost that already been incurred, cannot be recovered. Money which already spent are permanently lost. For example, once rent is paid, that amount of money is no longer recoverable, it is sunk.

Sunk cost are independent of any event that may occur in the future. Sunk cost are past opportunity cost that are partially or totally irretrievable and therefore, should he considered irrelevant to future decision making.

Some Examples of Sunk Cost:

Example 1: A company spends Rs. 1,00,000 to train its sales staff in the use of new tablet computers, which they will use to take customer order. The computer proved to be unreliable, and the sales manager wants to discontinue their use. Thus, cost of training is the sunk cost i.e. Rs. 1,00,000.

Example 2: A firm spent Rs. 3,00,000 to buy a machine but the machine proved to be unused after one year, that cost is 'sunk' because it cannot be recovered once spent.

5.5.6 Marginal and Incremental Cost

The increase or decrease in the total cost of production for making one additional unit of an item is marginal cost. In economics, marginal cost is the change in the total cost that arises when the quantity produced is increased by one unit, that is, it is the cost of producing one more unit of a good. In general terms, marginal cost at each level of output includes any additional cost required to produce the next unit. For example, the total cost of producing 100 cell phone is Rs. 50,000. When the firm produce one more cell phone i.e. 101, the total cost become Rs. 54,000. Thus the marginal cost of producing cell phone is Rs. 4,000 (Rs. 54,000 – Rs. 50,000).

Increamental costs are closely related to the concept of marginal cost but with a relatively wider connotation. It refers to total additional cost associated with the decision to expand output or to add a new variety of product etc. It is the change in total cost as a result of change in the methods of production or distribution such as use of improved machinery, addition to a product, use of improved technology or selection of additional sales channel. For example, if a company's total cost increases from Rs. 5,30,000 to Rs. 5,80,000 as a result of increasing its labour hours from 8 to 10 hours per-day, the incremental cost of 2 extra labour hours is Rs. 50,000.

The incremental cost is also called the differencial cost. The incremental cost is the relevant cost of making a short-run decision between two alternatives. Moreover, the incremental cost is always purely variable. It only includes variable cost where fixed cost remains constant. For example–

	Total Production 10,000 units	**Additional Production 1,000 units**
Fixed cost	Rs. 40,000	
Variable cost	Rs. 50,000	Rs. 7,000
Total cost	Rs. 90,000	Rs. 7,000
Cost per-unit	Rs. $9\left(=\frac{90{,}000}{10{,}000}\right)$	Rs. $7\left(=\frac{7{,}000}{1{,}000}\right)$

With the additional production of 1000 units, there is no change in fixed cost. However, variable cost increases by Rs. 7,000. The increamental cost of additional production of 1,000 units is the variable cost of Rs. 7,000 i.e. Rs. 7 per-unit.



CHECK YOUR PROGRESS

Q.1: What is production cost?

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Q.2: What is opportunity cost?

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Q.3: Define explicit and implicit cost.

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Q.4: What is money cost?

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Q.5: Define accounting and economic cost.

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5.6 SHORT-RUN COSTS

Short-run is a time period in which all costs cannot be varied. Some inputs are fixed and other inputs remain variable during the short-run. Therefore, short-run costs of production can be divided into two parts (i) fixed costs and (ii) variable costs.

5.6.1 Fixed Costs and Variable Costs

Total Fixed Costs (TFC): The costs that a firm incurs to employ the fixed inputs (eg. machines, building etc.) is called fixed cost (or total fixed cost). Whatever amount of output the firm produces, the cost remain fixed for the firm in the short-run.

The following table indicates that change in the quantity of output causes no change in fixed cost. When output is zero, fixed cost is Rs. 20.

Table 1: Fixed Costs

Quantity of Output (Q)	Fixed Cost (in Rs.)
0	20
1	20
2	20
3	20
4	20
5	20

When output increases to 2 or 3 or 5 units fixed cost remain the same i.e. Rs. 20

In the figure, the amount of output is measured along the OX-axis and fixed cost along OY-axis. TFC is the fixed cost line which is parallel to OX-axis, TFC line touches OY-axis at point P. It indicates that even when output is zero, fixed cost remains at Rs. 20.

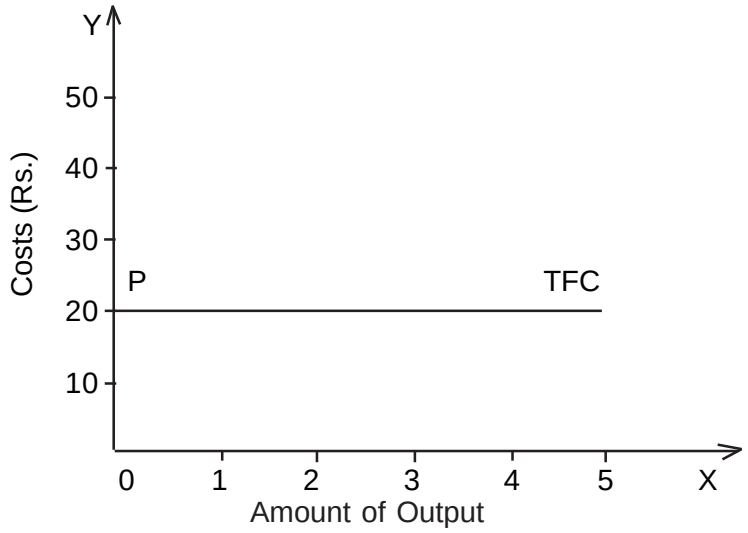


Fig. 5.1: Fixed cost curve

Total Variable Costs (TVC): The cost that a firm incurs to employ the variable inputs (eg, raw-materials, wages to temporary labourer, fuel or power etc.) is called the variable cost (or total variable cost). It is the variable cost which changes with the change in the level of

output. If output falls these costs also fall and if output rises these costs also rises.

The following table reveals that as output increases, the variable cost also increases. When output is zero, variable cost is also zero. When output is one unit variable cost is Rs. 10, when output increases to 2 units variable costs increases to Rs. 18 and so on.

Table 2: Variable Costs

Output	Variable costs (in Rs.)
0	0
1	10
2	18
3	24
4	29
5	33

In figure 5.2 TVC is the total variable cost curve which is upward rising, signifies that as output increases variable costs also increases. The TVC curve always starts from the point of origin which indicates that TVC is zero when output is zero.

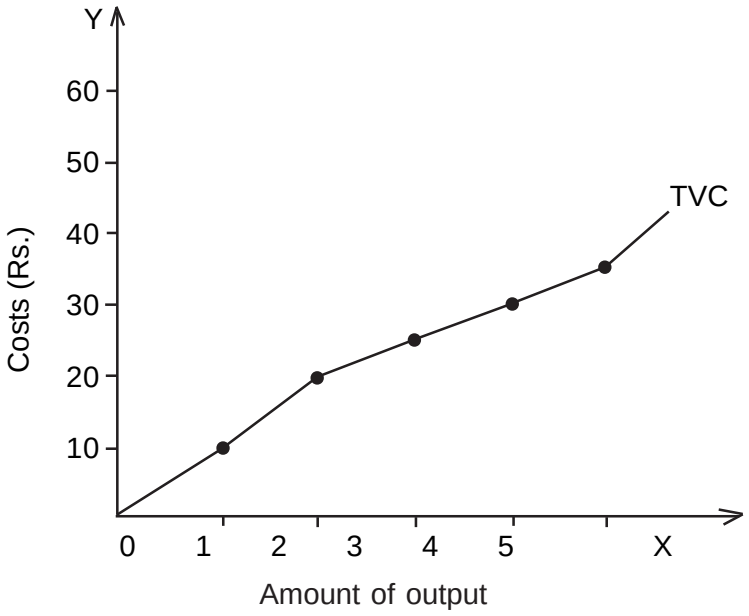


Fig. 5.2: Total variable costs curve

5.6.2 Total Costs

Total cost is the total amount of expenditure incurred by a firm to produce a given level of output. Thus, adding the total fixed costs (TFC) and total variable costs (TVC), we get the total costs (TC).

$$TC = TFC + TVC$$

In order to increase the production of output, the firm needs to employ more of the variable inputs. As a result, total variable cost and total cost will increase.

Relationship between total costs, total variable costs and total fixed costs

In the short-run, total cost is equal to total fixed cost plus total variable costs. This is shown in the following table.

Table 3: Total Costs

Output (units)	TFC (Rs.)	TVC (Rs.)	TC (Rs.)
0	20	0	20
1	20	10	30
2	20	18	38
3	20	24	44
4	20	29	49
5	20	33	53
6	20	39	59
7	20	47	67
8	20	60	80
9	20	75	95
10	20	95	115

In the above table we get total costs by aggregating total fixed costs (TFC) and total variable costs (TVC). With increase in output, total costs are also increasing. At zero level of output, total cost is equal to total fixed cost which is Rs. 20. When output increases to 2 to 3 units, total costs increases to Rs. 38 and Rs. 44 respectively and so on.

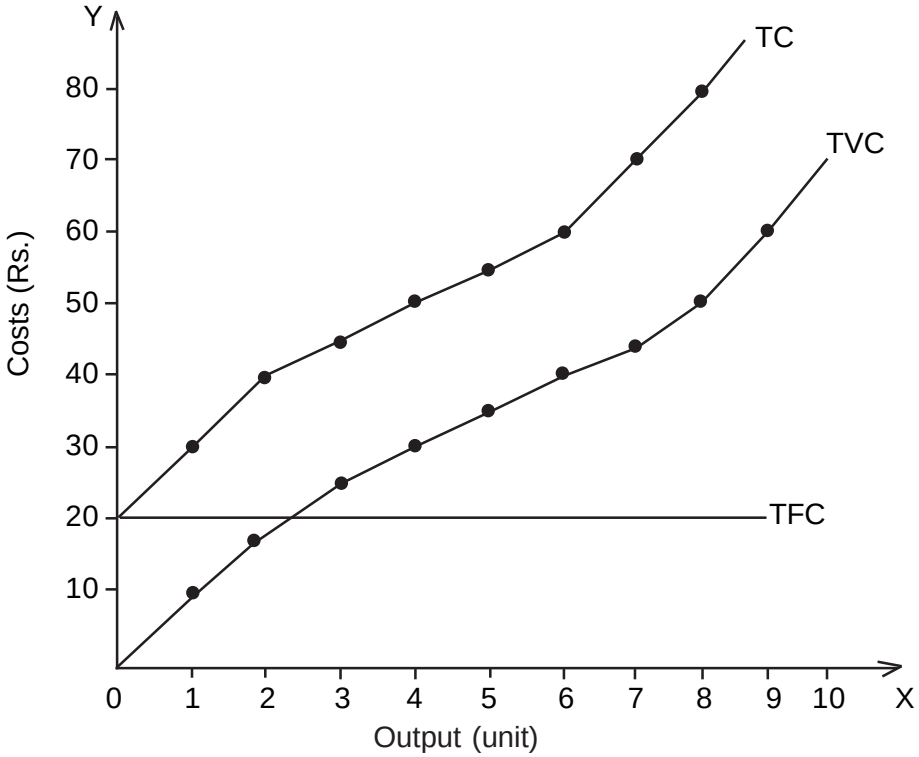


Fig. 5.3: Total fixed costs, total variable costs and total costs curve

Units of output are measured on OX-axis and costs on OY-axis. TFC line represents the fixed costs, TVC is the variable costs and TC is the total costs curve which is the aggregate of TFC and TVC curves. TC curve starts from the point of TFC curve the value of which is Rs. 20. It represents at zero level of output TC = TFC. Difference between total cost and variable cost is uniform and it is equivalent to fixed cost. Therefore, TC and TVC curves are always parallel.

Differences between Fixed Costs and Variable Costs:

i) Fixed cost refers to those costs which cannot be changed in the short-run. But variable cost refers to those costs which can be changed in the short-run.

ii) Fixed cost does not vary with the level of output. On the other hand, variable costs vary with the level of output.

iii) Costs of land, building, machinery etc. are the fixed costs. Costs of raw-materials, casual labourer etc. are the variable costs.

5.6.3 Average Costs

Average cost incurred by a firm is defined as the total cost per-unit of output. It is the total cost of producing one unit of the commodity. We calculate it as–

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

Where, AC = Average cost

TC = Total cost

Q = Output

Let the total cost of 5 units of commodity is Rs. 100.

$$\therefore AC = \frac{100}{5} = 20$$

Average cost is composed of two types of costs.

i) Average fixed cost

ii) Average variable cost

Average Fixed Cost (AFC): AFC is defined as the total fixed cost (TFC) per-unit of output. It is the ratio of TFC to output (Q). Thus.

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

When output is 1 unit, AFC is Rs. 20. When output increases to 2, 3 and 4, the AFC comes down to 10, 6.67 and 5 respectively. So AFC goes on falling with increase in output.

Table 4: Average Fixed Cost

Output (in units)	Total Fixed Cost (Rs.)	Average Fixed Cost (Rs.)
1	20	20
2	20	10
3	20	6.67
4	20	5
5	20	4
6	20	3.33
7	20	2.86

In the figure, AFC is the average fixed cost curve. It slopes downward from left to right. It is clear that with increase in output average fixed cost goes on decreasing.

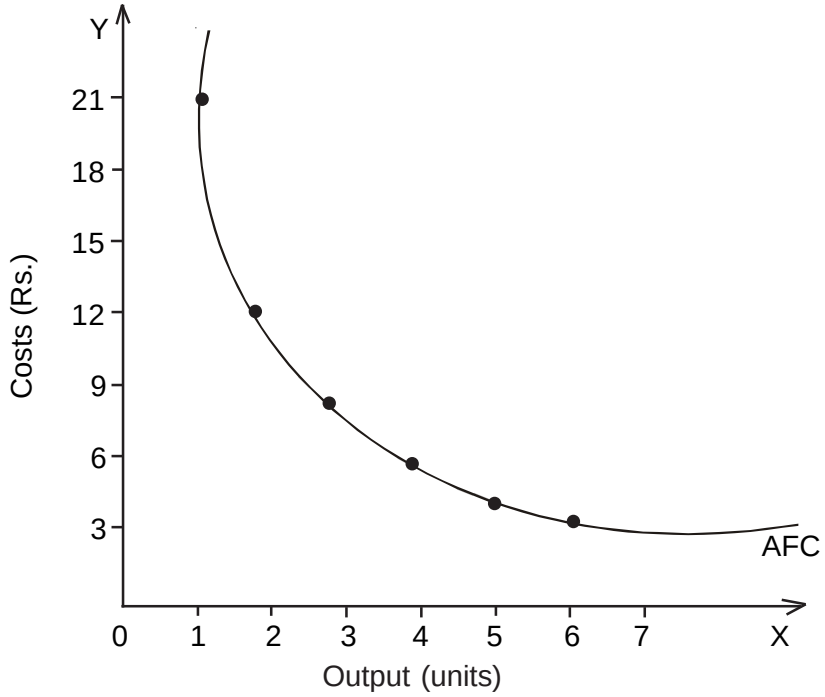


Fig. 5.4: Average Fixed Cost Curve

Average Variable Cost (AVC): Average variable cost is defined as the total variable cost (TVC) per-unit of output (q). It is the variable cost of producing one unit of the commodity. We calculate it as–

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

Table 5: Average Variable Cost

Output	Total Variable Cost (Rs.)	Average Variable Cost (Rs.)
1	10	10
2	18	9
3	24	8
4	29	7.25
5	33	6.6
6	39	6.5
7	47	6.7

In the above table, upto 6 units of output, average variable cost (AVC) has been falling, but it begins to rise from the 7th unit. This is so, because in the initial stages of production law of increasing returns operates which causes costs to diminish. But after a point, law of diminishing returns operates, the variable cost begin to increase.

In figure 5.5 AVC is average variable cost curve. It is a 'U' shaped curve. This is because average variable cost initially falls and then rises after certain level of output.

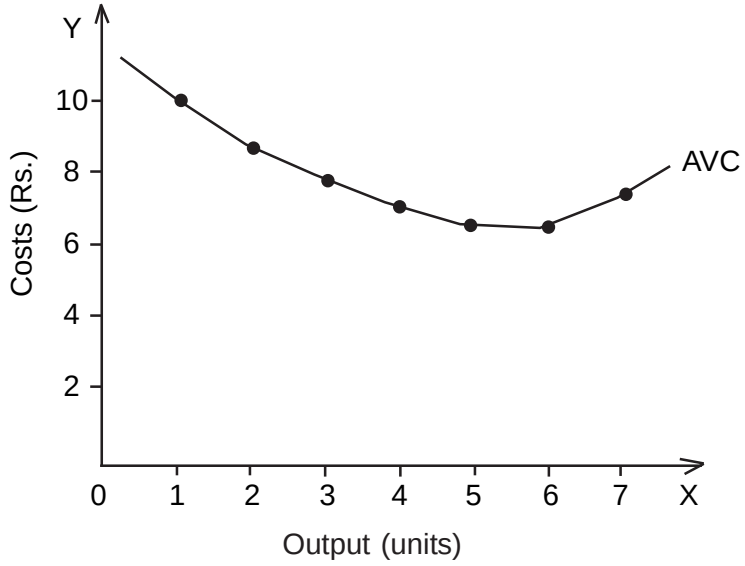


Fig. 5.5: Average Variable Cost Curve

Relationship between average costs, average variable costs and average fixed costs: Average cost (AC) is the sum total of average fixed cost (AFC) and average variable cost (AVC).

AC = AFC + AVC

Table 6: Average Cost

Output (units)	Average Fixed Cost (AFC)	Average Variable Cost (AVC)	Average Cost AC= AFC + AVC
1	20	10	30
2	10	9	19
3	6.67	8	14.67
4	5	7.25	12.25

5	4	6.6	10.6
6	3.33	6.5	9.83
7	2.86	6.7	9.57
8	2.5	7.5	10

In the above table we get the fourth column (AC) by adding the values of 2nd column (AFC) and third column (AVC). AC has been falling upto 7th unit and then rises. Initially, both AVC and AFC decreases as output increases. Therefore, SAC initially falls. After a certain level of output production AVC starts rising and AFC moving in opposite direction. Initially the fall in AFC is greater than the rise in AVC and SAC is still falling. But after a certain level of production, rise in AVC overrides the fall in AFC. From this point onwards, SAC is rising.

In the figure, AC is the average cost curve. It is 'U' shaped. When output increases, average cost initially falls and after a point it begins to rise.

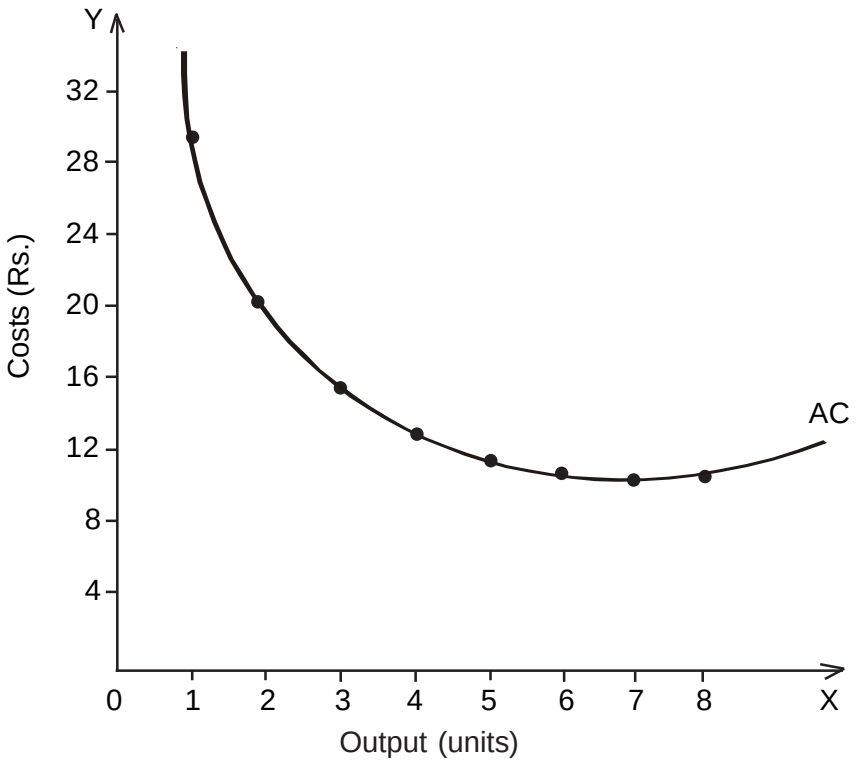


Fig. 5.6: Average Cost Curve

Why is AC curve 'U' shaped?

The AC curve is 'U' shaped because of the operation of the law of variable proportions. In the initial stages of production, law of increasing returns operates and therefore average productivity increases and AC falls. Then after a certain level of output average productivity begins to fall indicates the law of diminishing returns set and AC begins to move upward. Thus as output is increased, AC first falls, reach its minimum and then rises. Hence AC curve becomes 'U' shaped. Minimum point of AC curve indicates lowest per-unit cost of production.

5.6.4 Marginal Costs

There is another important concept of cost namely, marginal cost (mc). It is defined as the change in total cost (TC) per unit change in output. Thus.

$$MC = \frac{\text{Change in Total Cost}}{\text{Change in Output}}$$

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

Where, 'Δ' represents the change of the variable.

Table 7: Marginal Cost

Output	Total Cost	Marginal Cost
0	20	–
1	30	10
2	38	8
3	44	6
4	49	5
5	53	4
6	59	6
7	67	8
8	80	13

Table 7 shows that at 1st unit of output total cost of the firm is Rs. 30. So marginal cost of 1st unit is Rs. 10 $\left(\Delta TC/\Delta Q = 10/1 = 10\right)$. Marginal cost of 2nd unit is Rs. 8 $\left(8/1 = 8\right)$ and so on. It is clear from the table that as production increases, marginal cost falls first and then begins to rise.

In figure 5.7, MC is the marginal cost curve. It is 'U' shaped.

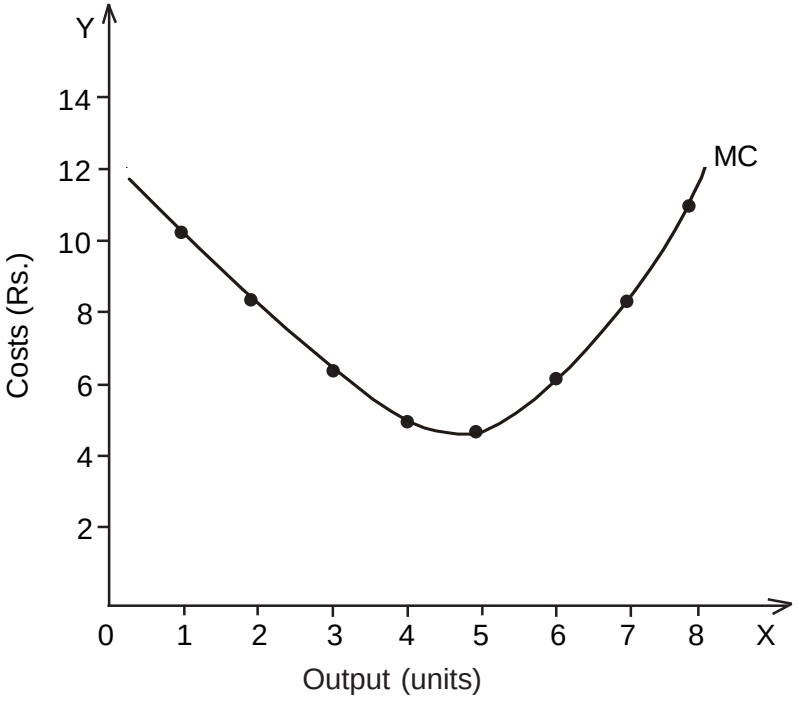


Fig. 5.7: Marginal Cost Curve

MC curve is 'U' shaped. Why?

Marginal cost is the additional cost that a firm incurs to produce one extra unit of output. When production is increased total cost increases at a diminishing rate. It is due to law of increasing returns. A firm enjoys many economies so cost of every additional unit is less than earlier units. Thus MC curve falls.

After a point total cost increases at an increasing rate. It is due to the law of diminishing returns. At this stage, firm suffers several diseconomies. So marginal cost increases. So MC curve assumes 'U' shaped.

Relation between Average and Marginal Costs:

Table 8: Average and Marginal Cost

Output	Total Cost (Rs.)	Average Cost (Rs.)	Marginal Cost (Rs.)
0	10	infinity	–
1	20	20	10
2	28	14	8
3	34	11.3	6
4	38	9.5	4
5	42	8.4	4
6	48	8	6
7	56	8	8
8	72	9	16

In the above table, initially both average cost and marginal cost falls with increase in the level of output, but rate of fall in marginal cost is greater than average cost. When output is 7 unit marginal cost and average cost are equal i.e. Rs. 8. After this level of output average cost rises, marginal cost too rises. But rate of increase in marginal cost is more than that of average cost.

With the help of average cost (AC) curve and marginal cost (MC) curve we can explain the relationship.

The MC curve intersects the AC curve at its lowest minimum point. To the left of the minimum point, the MC is less than the AC and to the right of the minimum point, the MC exceeds the AC. At the lowest minimum point of the AC curve, MC = AC.

In the figure 5.8 AC curve reaches its minimum at Q units of output. To the left of Q, AC is falling and MC is less than AC. To the right of Q, AC is rising and MC is greater than AC. Therefore, MC curve cuts the AC curve at ‘P’ which is the mimimum point of AC curve.

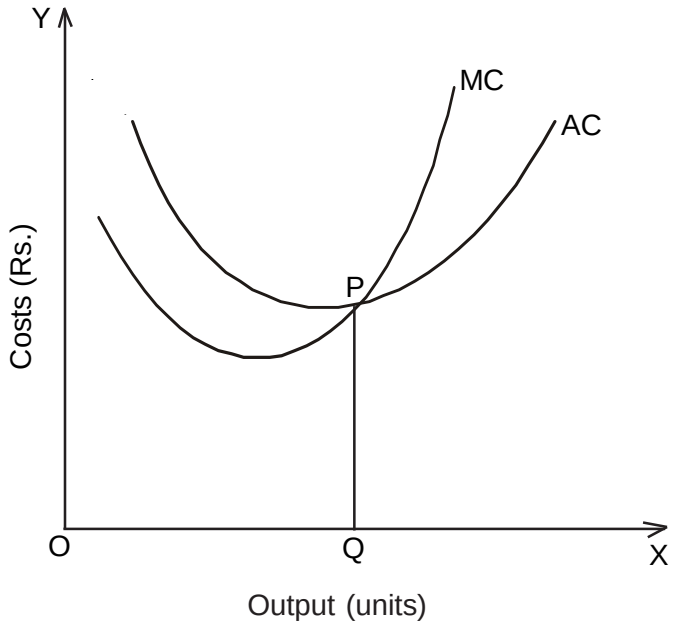


Fig. 5.8: AC and MC Curve

The relationship between average cost and marginal cost can be expressed in the form of four main statements. The statements are given below–

1) When the average cost curve slopes downwards, the marginal cost curve lies below the average cost curve.
2) When the average cost curve is upward rising, the marginal cost curve lies above the average cost curve.
3) When the average cost curve reaches its lowest minimum point, the marginal cost equal average cost.
4) For the first unit of output produced, there is no difference between the average cost and marginal cost.

5.6.5 Marginal, Average and Average Variable Costs

Initially as output increases, Average Variable Cost (AVC) and Average Cost (AC) fall and then rises. The distance between the AC curve and the AVC curve gets smaller as output increases. AC curve lies above the AVC curve with the vertical difference being equal to the value of AFC. The minimum point of the AC curve lies to the right of the minimum point of AVC curve.

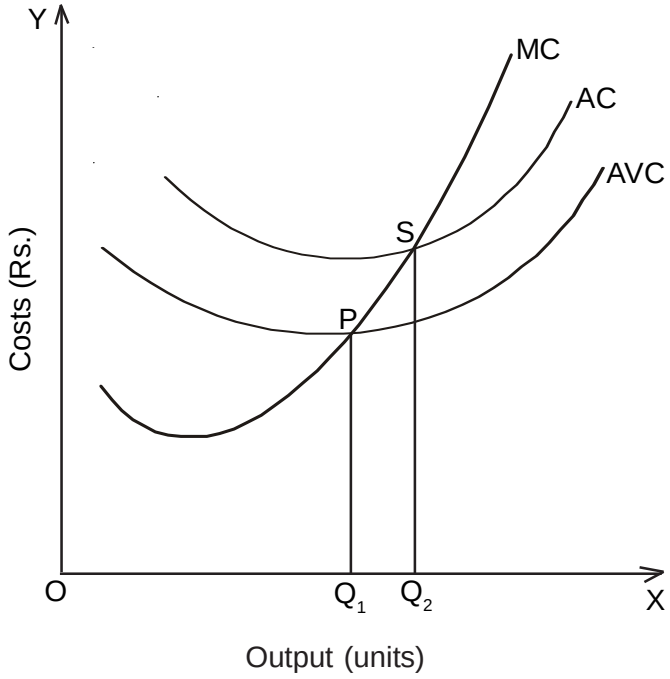


Fig. 5.9: AC, MC and AVC Curves

Marginal cost curve like AC and AVC falls in the beginning and then rises. It intersects the AVC and AC curves at their minimum points P and S respectively. Q_2 is the level of output where AC of the firm is minimum.

Note: AC and AVC curves never intersect each other since AFC can never be zero or negative.



CHECK YOUR PROGRESS

Q.6: Fill in the blanks:

a) Short-run costs are divided into ..... and variable cost.

b) AC = AFC + ...

Q.7: What is the shape of the TFC curve?

.....

.....

Q.8: If TC = 500 and Q (output) = 100, What is the amount of AC?

.....

.....

Q.9: At which point MC curve cuts AC curve?

.....

Q.10: What is the shape of the MC curve?

.....

5.7 LONG- RUN COSTS

The long-run is a period of time during which the firm can vary all its inputs. In the short-run, some inputs are fixed and others are varied to increase the level of output. In the long-run, none of the factors is fixed and all can be varied to expand output. The firm has no fixed cost in the long-run. Accordingly, there is no TFC or AFC curves in the long-run. As there is no distinction between total cost and total variable cost, we simply use the term 'total cost'. There is no distinction between average cost and average variable costs, so it is called long-run average cost, denoted by LAC, where 'L' stands for long-run. The concept of marginal cost is the same and is denoted by LMC. Thus we have three concepts of long-run cost:

i) Total cost
ii) Long-run average cost (LAC) and
iii) Long-run marginal cost (LMC)

5.7.1 Long-run Average Cost (LAC)

Like short-run average cost curve, long-run average cost curve is also 'U' shaped. Factor that explains the 'U'-shape of the average cost is the combination of the economies of scale and the diseconomies of scale. The expansion in the scale of production of a firm in the long-run leads to certain advantages in the form of cost reduction, after a stage, further expansion of the firm gives rise to disadvantages and cost begin to rise.

'U' shape of the LAC curve can be explained with the help of laws of returns to scale that is increasing returns to scale (IRS), and constant returns to scale (CRS) and then by the diminishing rerurns to scale (DRS). Its downward sloping portion corresponds to IRS and upward rising portion corresponds to DRS. At the

minimum point CRS is observed. Hence, LAC has a flat portion in the middle.

The long-run average cost, (LAC) curve of a firm shows the minimum or lowest average total cost at which a firm can produce any given level of output in the long-run. In the long-run, a firm will use the level of input at the lowest possible average cost. Consequently, the LAC curve is the envelop of the short-run average total cost curves. Therefore, the long-run average cost curve is known as the enveloping curve.

In the following diagram SC_1, SC_2, SC_3, SC_4 and SC_5 are five different scales of production. As the firm moves from SC_1 to SC_2 and from SC_2 to SC_3 and so on, it indicates that size of the firm is expanding. The scale of production represented by SC_3 is the most desirable scale because at the lowest point of SC_3 the average cost is the minimum. The firm will prefer this scale in the long-run. As the firm moves from one scale of production to another, the long-run average cost curve, LAC envelops the short-run cost curves. LAC curve is always flatter than the short-run cost curves.

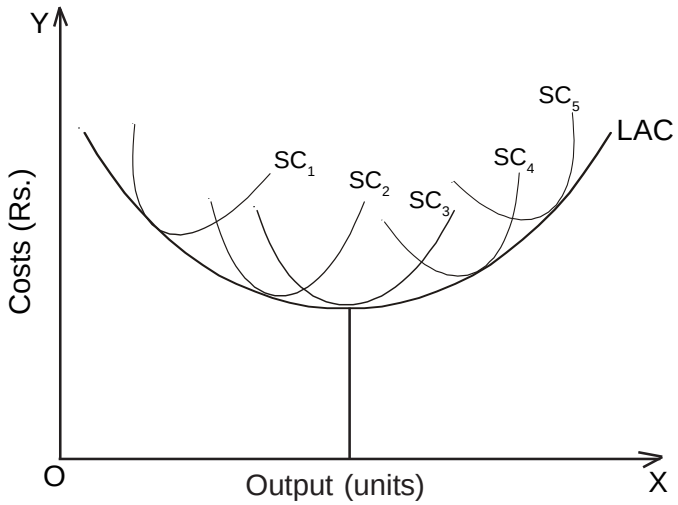


Fig. 5.10: Long-run average cost curve

In the long-run, if the firm neither enjoys the advantages of large-scale production nor suffer from any disadvantages. The LAC will not be 'U' shaped. It will be parallel to the OX-asis. As the minimum cost of each scale of production will be equal to one another, the

LAC curve will be tangent to the lowest minimum points of the short-run average cost curves. This is shown in the figure below–

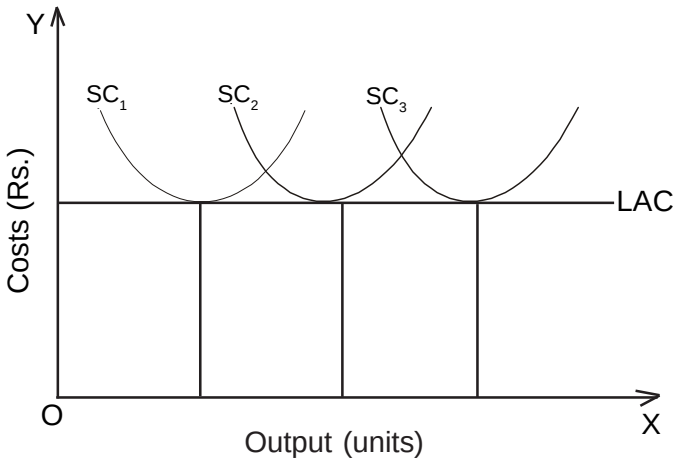


Fig. 5.11: Horizontal average cost curves

In the figure 5.11, LAC is the long-run average cost curve which is a horizontal straight line. It is tangent to the short-run average cost curves SC_1, SC_2 and SC_3.

5.7.2 Long-Run Marginal Cost (LMC)

In the previous section we have discussed about marginal cost and how the short run marginal cost is derived and what relation it has with the short-run average cost curve. Like short-run, long-run marginal cost is also important, so it is useful to know how the long-run marginal cost curve can be driven.

Long-run marginal cost (LAC) curve can be derived from the long-run average cost curve, because the long-run marginal curve is related to long-run average cost curve in the same way as the short-run marginal cost curve is related to short-run average cost curve.

Like long-run average cost (LAC) curve, long-run marginal cost (LMC) curve is also 'U'-shoped. For the first unit of output, both LMC and LAC are the same. As output increases, LAC initially falls and then, after a certain point, it rises. As long as average cost is falling, marginal cost must be less than the average cost. When the average cost is rising, marginal cost must be greater than the

average cost. LMC curve is, therefore U-shoped curve. It cuts the LAC curve from below at its minimum point.

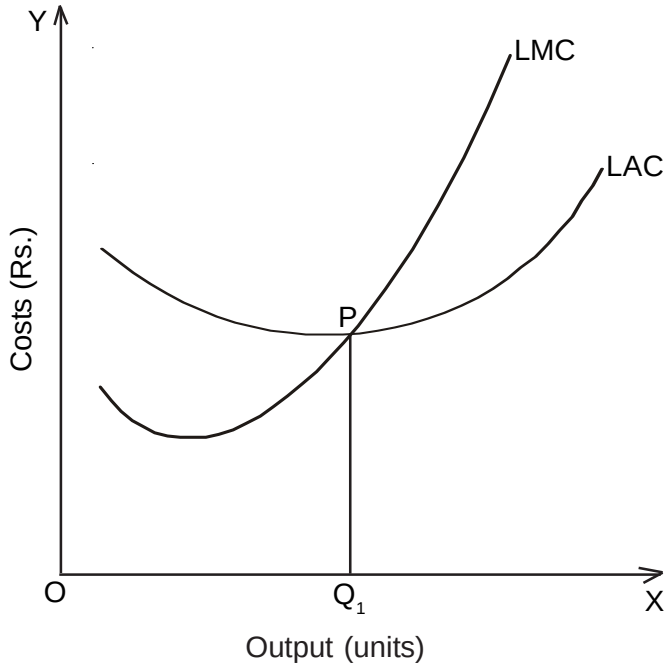


Fig. 5.12: LAC and LMC curves

The above figure shown the shapes of the long-run marginal cost and long-run average cost curves for a typical firm. LAC reaches its minimum at Q level of output. To the left of Q, LAC is falling and LMC is less than theLAC and therefore LMC curve lies below LAC curve. To the right of Q, LAC is rising and LMC is higher than LAC and therefore, LMC curve lies above the LAC curve.

Relationship between LAC and LMC:

i) Since LAC is U-shaped, LMC is also a U–shaped curve.

ii) When LAC falls, LMC lies below LAC and when LAC rises, LMC lies above LAC.

iii) At the lowest point of LAC curve, both LAC and LMC are equal.

iv) LMC always cuts LAC from below at its minimum point.

5.8 MANAGERIAL USES OF COST FUNCTION

Production cost as discussed earlier refers to the amount of expenditure incurred in acquiring inputs. In business firm it refers to the

expenditure incurred to produce an output or provide services. Thus, the cost incurred in connection with raw-material, labour and other heads constitute the overall cost of production.

A managerial economist must have a clear understanding of the different cost concepts for clear business decision making. The main motive of every firm is to earn maximum amount of profit and it depends on the proper management of business. A firm can earn maximum profit by minimizing its production cost. An efficient manager can produce maximum output at lower per-unit cost of production. Output is an important factor which influences the cost.

The cost output relationship (discussed earlier as cost function) plays an important role in determining the optimum plant size. The optimum plant size is defined in terms of minimum cost per-unit of output. In other words, an optimum plant size is given by that value for which average cost is minimum. The estimated cost function can help the manager to take meaningful decision with regard to–

i) determination of optimal plant size.
ii) determination of optimum output for a given plant and
iii) determination of firms supply curve.

In the process of decision-making, a manager should understand clearly the relationship between the inputs and output on one hand and output and cost on the other. The short-run production estimates are helpful to production manager in arriving at a optimal mix of inputs to achieve a particular output target of a firm. This is referred to as 'least-cost combination of inputs' in production analysis. For a given cost, optimum level of output can be find if the production function of a firm is known. Estimation of long-run production function may help a manager in understanding and taking decision of long-term nature such as capital expenditure. Estimation of cost curves will help production manager in understanding the nature and shape of cost curves and taking useful decisions. Both short-run cost function and long-run cost function must be estimated, since sets of information will be required for some important decision. The decision makers can judge the optimality of present output levels and solve the

decision problems from the knowledge of short-run cost function. When considering the expansion or contraction of plant size, knowledge of long-run cost function is important. This is also important for confirming that the present plant size is optimal for the output level that is being produced.

In the earlier section we discussed about different short-run and long-run cost curves. The optimum plant size in the long-run is determined at that level where long-run average cost is minimum. For a given plant, the optimum output level will be achieved at a point where the average cost is the least. This condition can be easily varified for the short-run cost curves.



ACTIVITY

Visit 2-3 firms of your locality and discuss with the manager about their cost structure. Also ask them the production technique they are using and what is the motive of production and how they are trying to reduce the production cost.

.....

.....

.....



CHECK YOUR PROGRESS

Q.11: Write true or false:

a) There is no fixed cost in the long-run.

b) Short-run average cost curve is flatter than long-run average cost curve.

c) LMC curve is U-shaped.

Q.12: Why LAC curve is U-shaped?

.....

.....

Q.13: Who determines the cost function to be used in a business?

.....

.....

Q.14: At which level optimal plant size is determined?

.....

.....



5.9 LET US SUM UP

In this unit, we have discussed the following aspects-

- Cost of production is the payment made to the factors of production for rendering their services in the production process.
- Cost function of a firm shows the functional relationship between cost and output.
- Opportunity cost of any good is the next best alternative good that is sacrificed. It is also known as alternative cost.
- Explicit cost means the cost of those factors of production whose payment is made to the outsiders. On the other hand, implicit cost is the cost of self-owned resources.
- According to time period cost of production are divided into two– short-run cost and long-run cost.
- In short-run there are fixed cost and variable costs. Fixed costs are the cost that a firm pays to the fixed inputs like land, machine etc, Variable costs are the cost of buying variable inputs like raw-materials, wages paid to casual labourer etc.
- Total cost (TC) is the total amount of expenditure incurred by a firm to produce a given level of output. TC = TFC + TVC. TC curve is always upward rising as total cost increases with increase in the level of output.
- Average cost (AC) is the total cost per-unit of output (Q). $AC = TC/Q$. AC curve is U-shaped.
- Marginal cost is the change in total cost per-unit change in output. $MC = \frac{\Delta TC}{\Delta Q}$. MC curve is also U-shaped.
- Cost- output relationship plays an important role in determining optinal plant size. Therefore, a manager should understand clearly

this relationship. The optimal plant size is determined at that level where average cost is minimum.



5.10 FURTHER READING

1) Ahuja, H.L. (2007); *Advanced Economic Theory: Microeconomic Analysis*; New Delhi: S. Chand & Company Ltd.

2) Chopra, P.N. (2008): *Micro Economics*; Ludhiyana: Kalyani Publication.



5.11 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: Production cost is the payment made to the factors of production for rendering their services in the production process.

Ans. to Q. No. 2: The opportunity cost of any good is the next best alternative good that is sacrificed.

Ans. to Q. No. 3: Explicit cost is the cost of those factors of production whose payment is made to the outsiders. Implicit cost is the cost of self-owned resources.

Ans. to Q. No. 4: The cost incurred in terms of money in producing a commodity is the money cost of production.

Ans. to Q. No. 5: Accounting cost only include explicit cost and Economic cost = Accounting cost + Implicit cost

Ans. to Q. No. 6: a) Short-run costs are divided into fixed cost and variable cost.

b) AC = AFC + AVC

Ans. to Q. No. 7: TFC curve is a horizontal straight line or it is parallel to quantity axis.

Ans. to Q. No. 8: Given, TC = 500

Q = 100

$$\therefore AC = \frac{TC}{Q} = \frac{500}{100} = 5$$

Ans. to Q. No. 9: MC curve cuts AC curve at its minimum point.

Ans. to Q. No. 10: MC curve is 'U'-shaped.

Ans. to Q. No. 11: a) True, b) False, c) True

Ans. to Q. No. 12: LAC curve is 'U'-shaped because of economies of scale and diseconomies of scale.

Ans. to Q. No. 13: The manager of the firm determines the cost function to be used in a business.

Ans. to Q. No. 14: The optimal plant size is determined at that level where average cost is minimum.



5.12 MODEL QUESTIONS

Q.1: What is production cost?

Q.2: What is opportunity cost? Give an example.

Q.3: Define explicit and implicit cost.

Q.4: Define total cost, average cost and marginal cost and explain their relationship with the help of a diagram.

Q.5: Why MC curve is 'U'-shaped ?

Q.6: At which point MC curve cuts AC curve ? State the reason.

Q.7: Explain the role of manager in determining the optimal plant size.

*** ***** ***

UNIT 6: MARKET STRUCTURE: PERFECT COMPETITION

UNIT STRUCTURE

6.1 Learning Objectives

6.2 Introduction

6.3 Structure of Market

6.4 Characteristics of Perfect Competition

6.5 Price and Output Determination

6.6 Time Element in Perfect Competition

6.7 Revenue Curves of a Firm

6.8 TR, AR and MR Under Perfect Competition

6.9 Equilibrium of The Firm

6.10 Let Us Sum Up

6.11 Answers to Check Your Progress

6.12 Model Questions

6.1 LEARNING OBJECTIVES

After going through this unit, you will able to:

- know about structure of market
- describe the characteristics of perfect competition
- explain about price and output determination under perfect competition.

6.2 INTRODUCTION

Ordinarily, the term “market” refers to a particular place where goods are purchased and sold. In economics, the term “market” does not mean a particular place but the whole area where the buyers and sellers of a product are spread.

In the words of A. A. Cournot, *“Economists understand by the term ‘market’, not any particular place in which things are bought and sold but the whole of any region in which buyers and sellers are in such fi^ee*

intercourse with one another that the price of the same goods tends to equality, easily and quickly."

Moreover, in economics, a market is not related to a place but to a particular product. Hence, there are separate markets for various commodities. For example, there are separate markets for clothes, grains, jewellery, stock market etc.

6.3 STRUCTURE OF MARKET

The structures of market both for goods market service (factor) market are determined by the following factors–

a) The number and nature of buyers and sellers.
b) The nature of the product.
c) Competition among the firms.

Accordingly, markets are classified into Perfect and Imperfect completion. Perfect competition refers to a market where large number of buyers and sellers with perfect knowledge about the market interact each other for buying and selling a homogeneous product under the environment of free entry and exit.

6.4 CHARACTERISTICS OF PERFECT COMPETITION

Following are the important characteristics of perfect competition–

a) Large Number of Buyers and Sellers: the number of buyers and sellers must be so large that none of them individually is in a position to influence the price and output of the industry as a whole. The demand of individual buyer relative to the total demand is so small that he cannot influence the price of the product by his individual action. Similarly, the supply of an individual seller is so small a fraction of the total output that he cannot influence the price of the product by his action alone. In other words, the individual seller is unable to influence the price of the product by increasing or decreasing its supply.

b) Homogeneous Product: Each firm produces and sells a homogeneous product so that no buyer has any preference for the

product of any individual seller over others. No seller has an independent price policy.

c) **Free Entry and Exit:** The next condition is that the firms should be free to enter or leave the industry. It implies that whenever the industry is earning excess profits, attracted by these profits some new firms enter the industry. In case of loss being sustained by the industry, some firms leave it.

d) **Perfect Knowledge of Market Conditions:** This condition implies a close contact between buyers and sellers. Buyers and sellers possess complete knowledge about the prices at which goods are being bought and sold, and of the prices at which others are prepared to buy and sell.

e) **Absence of Transport Costs:** Another condition is that there are no transport costs in carrying of product from one place to another.

f) **Uniform Price:** No seller has an independent price policy. Commodities like salt, wheat, cotton and coal are homogeneous in nature. He cannot raise the price of his product. If he does so, his customers would leave him and buy the product from other sellers at the ruling lower price.



CHECK YOUR PROGRESS

Q.1: Fill in the blanks:

a) There are ..... numbers of sellers and buyers in perfect competition.

b) The price of a commolity in perfect competition is ..... for all firms.

Q.2: State whether 'True' or 'False':

a) Each firm under perfect competition sells a homogeneous product.

b) Transportation cost is included in perfect competition.

6.5 PRICE AND OUTPUT DETERMINATION UNDER PERFECT COMPETITION

Price of a commodity in perfect competition is determined by the industry. This means, price of a product in perfect competition is determined by the market forces- demand for and supply of the product in the market. In the words of Marshall, "Both the elements of demand and supply are required for the determination of price of a commodity in the same manner as the both blades of a scissor are required to cut a cloth.''

Table 6.1: Price and output determination under perfect competition

Price (Rs.)	Demand (units)	Supply (units)	Impact	Pressure on Price
10	20,000	1,00,000	Excess Supply	Price will fall ↓
8	40,000	80,000	Excess Supply	Price will fall ↓
6	60,000	60,000	Demand = Supply	Equilibrium Price
4	80,000	40,000	Excess Demand	Price will rise ↑
2	1,00,000	20,000	Excess Demand	Price will rise ↑

If we start with a price of Rs. 10, the market demand will be 20,000 units and market supply will be 1,00,000 units. This leads to a situation of excess supply. At this price, some sellers will be unable to sell all the quantity they want to sell. As a result, they will cut down the price in order to attract customers.

As the price falls, the quantity demanded will expand and the quantity supplied contracts. At the price Rs.8 also, there exists excess supply. As a consequence price falls further. This way price of the product will fall upto Rs.6. Here supply balances demand and all the quantity of the product, which all sellers are willing to sell, will be purchased by buyers.

Similarly, if the price is Rs. 2, the quantity demanded exceeds the quantity supplied. At this price the buyers who are willing to buy the product find the quantity offered in the market is not sufficient to satisfy their wants. Some consumers, who have not been able to satisfy their demand, will be induced to bid the price up in the hope of getting more supplies. This action of unsatisfied customers will force up the price in the market. This way price will be increased to Rs. 6.

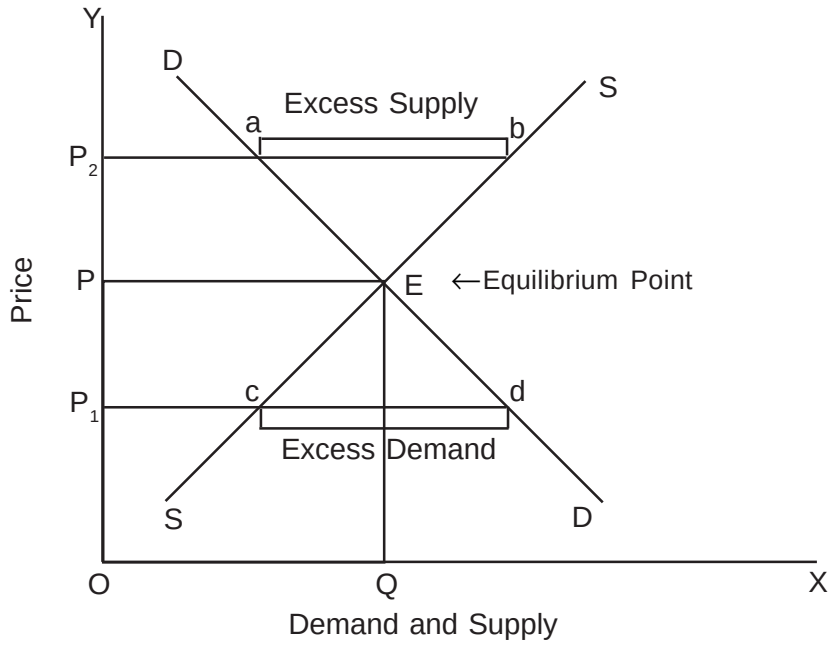


Fig. 6.1

In this diagram, the industry is in equilibrium at point E, where market demand is exactly equal to market supply. OP is the equilibrium market Price and OQ is the equilibrium quantity. At any price below OP, say at OP_1, demands exceeds supply (Case of Excess demand). This excess demand will force up the price. Similarly, at any price above OP, say OP_2, supply exceeds demand (case of Excess Supply). This excess supply will cut down the price.

This, price of the product comes to settle in the market at the level where demand and supply curves intersect each other.

6.6 TIME ELEMENT IN PERFECT COMPETITION

Time is short or long according to the extent to which supply can adjust itself. Marshall felt it necessary to divide time into different periods on the basis of response of supply.

The reason why supply takes time to adjust itself to a change in the demand conditions is that nature of technical conditions of. A period of time is required for changes to be made in the size, scale and organisation of firms as well as of the industry.

Marshall divided time into following three periods on the basis of response of supply to a given and permanent change in demand:

1) Market Period (Very short Period)
2) Short-Run
3) Long-Run

Market Period: The market period is a very short period in which the supply is fixed. This means, no adjustment can take place in supply conditions during market period. In other words, supply in the market period is limited by the existing stock of the good. The maximum that can be supplied in the market period is the stock of the good which has already been produced.

In this period more good cannot be pro-duced in response to an increase in demand. This market period may be a day or a few days or even a few weeks depending upon the nature of the good. For instance, in case of perishable goods, like fish, the market period may be a day and for a cotton cloth, it may be a few weeks.

Short-Run: Short-run is a period in which supply can be adjusted to a limited extent. During the short period the firms can expand output with given equipment by changing the amounts of variable factors employed. Short periods is not long enough to allow the firm to change the plant or given capital equipment. The plant or capital equipment remains fixed or unaltered in the short run. Output can be expanded by making intensive use of the given plant or capital equipment by varying the amounts of variable factors.

Long-Run: The long-run is a period long enough to permit the firms to build new plants or abandon old ones. Further, in the long run, new firms can enter the industry and old ones can leave it. Since in the long run all factors are subject to variation, none is a fixed factor. During the long period forces of supply fully adjust them to a given change in demand; the size of individual firms as well as the size of the whole industry expands or contracts according to the requirements of demand.

The adjustment of supply over a period of time and consequent changes in price is illustrated in the following figure where long-run supply

curve LRS of an increasing-cost industry along with the market-period supply curve MPS and the short-run supply curve SRS have been drawn. Originally, demand curve DD and market-period supply curve MPS intersect at point E and price OP is determined. Suppose that there is a once- for-all increase in demand from DD to D/D/.

Supply cannot increase in the market period and remains the same at OM. Market-period supply curve MPS intersects the new demand curve D/D/ at point Q. Thus, the market price sharply rises to OP_1. Short-run supply curve SRS intersects the new demand curve D/D/ at point R.

The short-run price will therefore be OP_2 which is lower than the new market price OP_1. As a result of the long-run adjustment the price will fall to OP_3 at which the long-run supply curve LRS intersects the demand curve D/D/.

The new long-run price OP_3 is lower than the new market price OP_1 and the short-run price OP_2, but will be higher than the original price OP which prevailed before the increase in demand took place. This is so because we are assuming an increasing-cost industry. If the industry is subject to constant costs, the long-ran price will be equal to the original price. Further, if the industry is subject to decreasing costs, the long-run price will be lower than the original price.

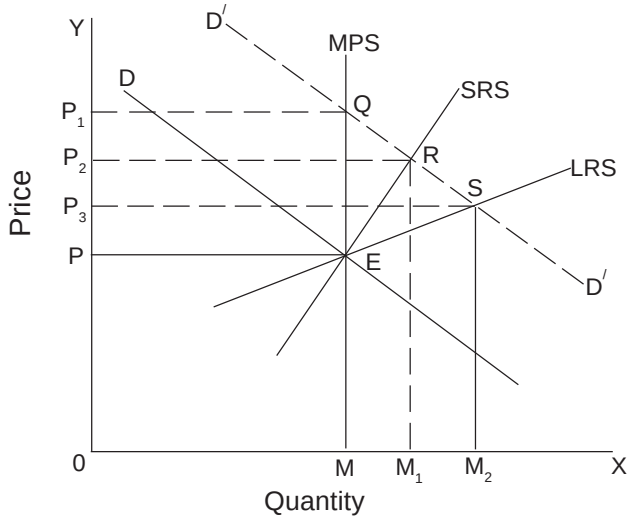


Fig. 6.2

Therefore, Marshall gave equal importance to both demand and supply as determinants of price, though the influence of the two varied in

different time periods. Marshall introduced time period analysis into pricing process to bring out the varying influence of each of two forces over price of the product in different time periods.

6.7 REVENUE CURVES OF A FIRM

Total Revenue (TR): Total money receipts of a firm from the sale of a given output are called total revenue.

TR = Price (P) x Quantity (Q)

Average Revenue (AR): It refers to the revenue per unit of output sold.

$$AR = \frac{TR}{Q}$$

Or, $$AR = \frac{PQ}{Q}$$

Or, AR = P = Price

Marginal Revenue (MR): It is the change in the total revenue which results from the sale of one more (or one less) unit of a commodity.

$$MR = \frac{\Delta TR}{\Delta Q}, \qquad Q = \text{Quantity}$$

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

where, n = number of unit sold.

6.8 TR, AR AND MR UNDER PERFECT COMPETITION

In perfect competition, the price is determined by the market forces supply and demand so that only one price tends to prevail for the whole industry. Thus a firm under perfect competition is a price-taker. Each firm can sell as much as it wishes at the market price. Price remains uniform for all the firms. An individual action can not influence the price of the product.

Table 6.2: TR, AR and MR under perfect competition

Price (Rs.)	Quantity sold (Units)	TR = P.Q	$AR = \frac{TR}{Q} = price$	$MR = TR_n - TR_{n-1}$
10	1	10	10	10
10	2	20	10	10
10	3	30	10	10
10	4	40	10	10
10	5	50	10	10

This is shown in Table 6.2 where AR and MR remain constant at Rs. 10 at every level of output. Consequently AR and MR curves of the firm coincide.

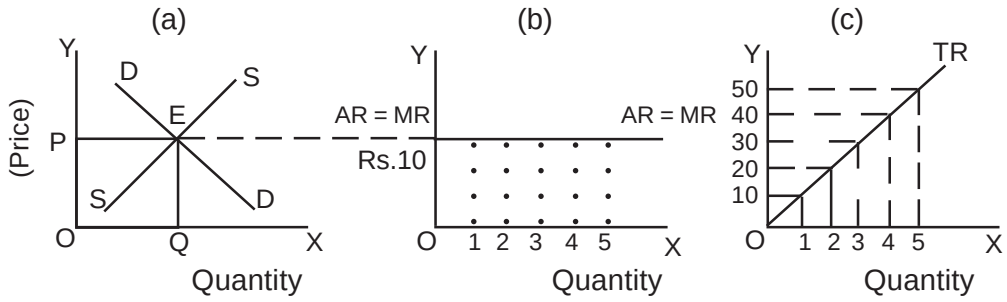


Fig. 6.3



CHECK YOUR PROGRESS

Q.3: Price of a comodity under perfect competition is Rs. 5. calculate TR, AR and MR–

Quantity Sold	AR	TR	MR
1	–	–	–
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	–	–	–

6.9 EQUILIBRIUM OF THE FIRM

Meaning: A firm is in equilibrium when it has no tendency to change its level of output. It needs neither expansion nor contraction. It wants to earn maximum profits. In the words of A. W. Stonier and D. C. Hague, *"A firm will be in equilibrium when it is earning maximum money profits."*

Short-run Equilibrium of the Firm: The short run is a period of time in which the firm can vary its output by changing the variable factors of production in order to earn maximum profits or to incur minimum losses. The number of firms in the industry is fixed because neither the existing firms can leave nor new firms can enter it.

A firm attains equilibrium when the following conditions are fulfilled

a) MC = MR, and
b) The MC curve must cut the MR curve from below at the point of equilibrium.

The price at which each firm sells its output is set by the market forces of demand and supply. Each firm will be able to sell as much as it chooses at that price. But due to competition, it will not be able to sell at all at a higher price than the market price. Thus the firm's demand curve will be horizontal at that price so that P = AR = MR for the firm.

There will be three categories of firms in the short run–

a) Firms Earning Super-normal Profit: A firm under perfect competition may earn super-normal profit when the price (AR) determined by the market forces is grenter than its Average Cost of Production.

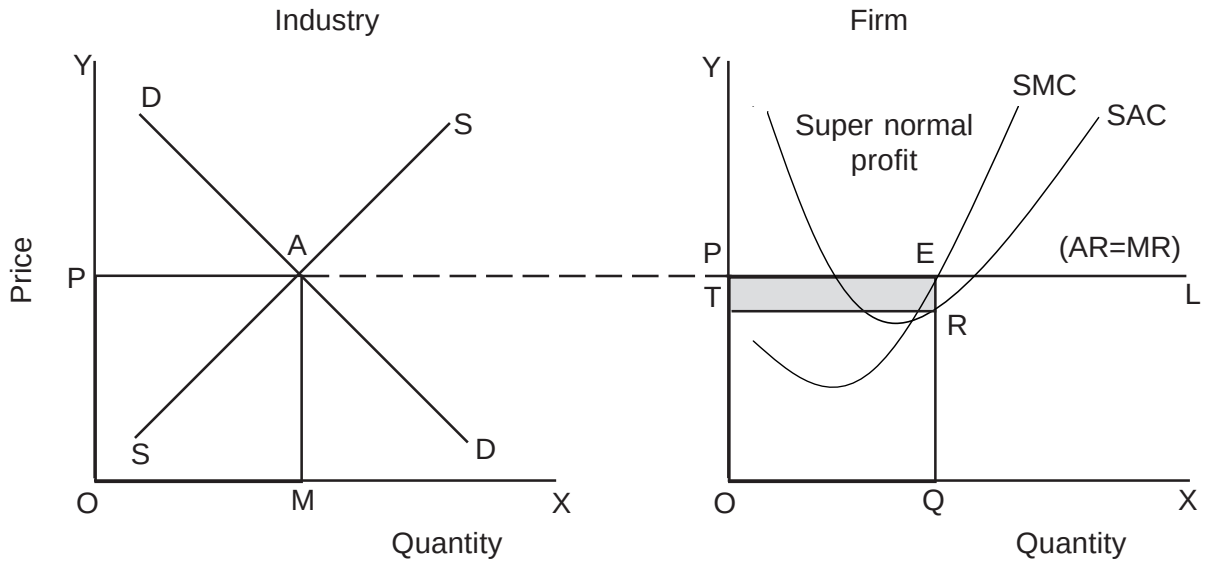


Fig. 6.4

In this diagram, the industry determines the price through market forces demand and supply at OP. This price will remain uniform for all the firms. They can sell any quantity at this price. This, PL line is the AR and MR curves of the firm (also the demand curve of the firm). The firm is in equilibrium at point E where short run MC curve cuts the MR curve from below. At this point the firm produces and sells amount OQ. At this level of output the average cost will be QR or OT. Since AC of the firm is less than AR (OP or QE), the firm earns super normal profit by the amount TPER.

Here,

TR = Price x Quantity = OP x OQ = OPEQ

TC = AC x Quantity = OT x OQ = OTRQ

∴ Super normal profit = OPEQ–OTRQ = TPER

b) Firms Earning Normal Profit: A firm under perfect competition may earn only normal profit when the price determined by the market forces is equal to its average cost (AR = AC).

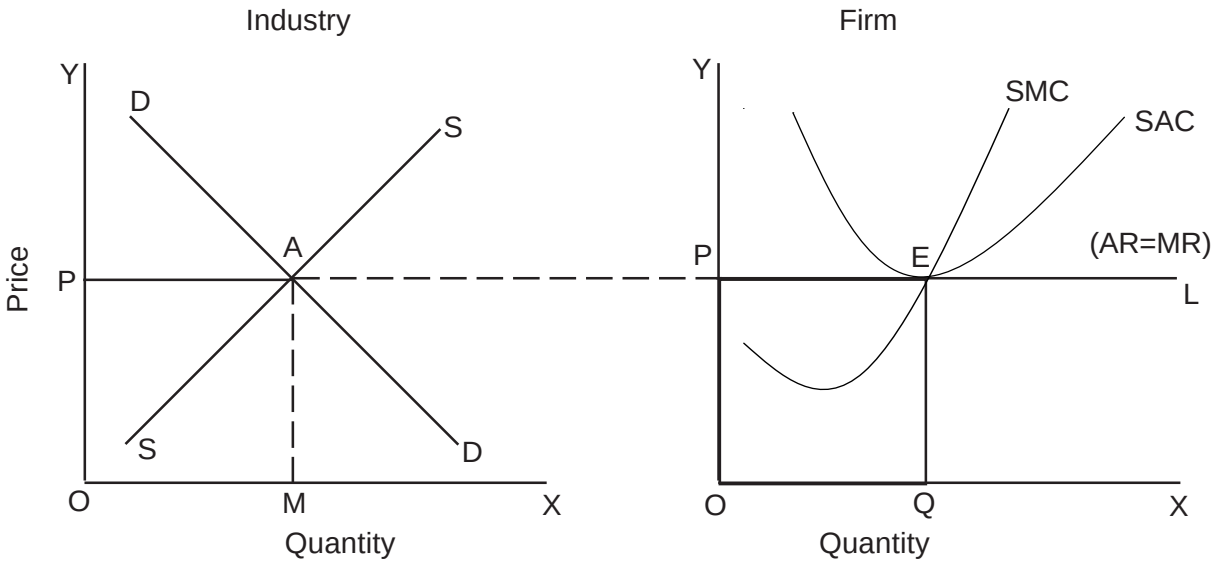


Fig. 6.5

In this diagram, the industry determines the price through market demand and market supply at OP. This price will remain uniform for all firms. The firm (in the Right Panel) is in equilibrium at point E where MR = MC. At this point, AR is equal to the Average Cost of the firm. This means the firm earns only normal profit.

c) Firms Suffering Losses and Shut-Down Point: A firm under perfect competition may also incur loss if the price comes below the short period average cost of the product. However, the firm will continue its operation so long as price is above average variable cost of the product. But if price falls below average variable cost, then the firm will simply shut down and suspend production. This means loss of a firm should not exceed total fixed cost of the firm.

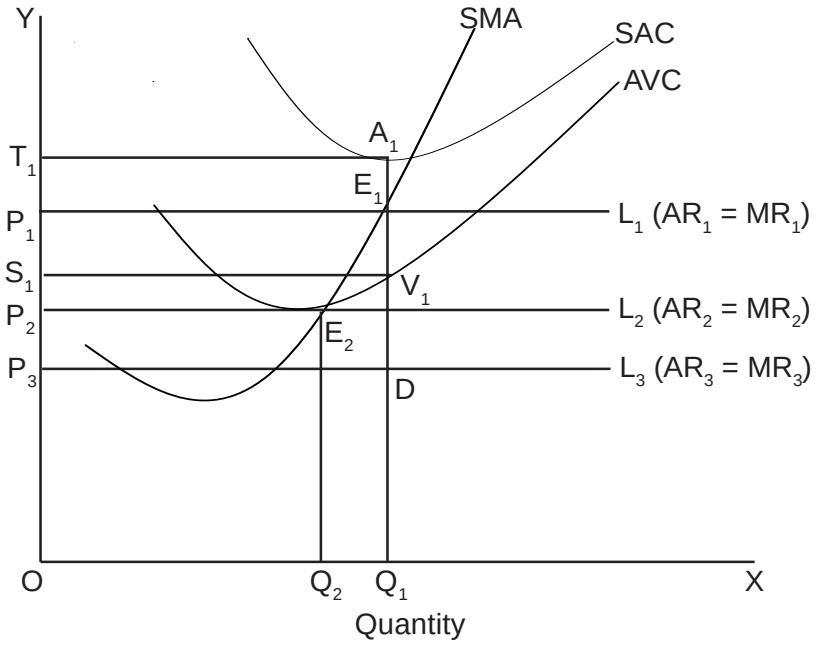


Fig. 6.6

In figure 6.6, when the price in the market is OP_1, the firm will be in equilibrium at point E_1 and produced OQ_1 level of output. Since average cost which is equal to Q_1A_1 is greater than the average revenue or price, which is equal to Q_1E_1, the firm will be making losses equal to $P_1T_1A_1E_1$. But the firm will produce the product continuously at point E_1 because OP_1 is greater than the average variable cost which is equal to Q_1V_1. By operating at OP_1, the firm is covering total variable cost $OS_1V_1Q_1$ and a part of Total Fixed cost ($S_1T_1A_1V_1$). A part of total fixed cost equal to area $P_1T_1A_1E_1$ is not being covered. The firm will operate and bear the loss $P_1T_1A_1E_1$ because by shut down in the short run the firm will have to bear losses equal to the whole fixed costs, the area $S_1T_1A_1V_1$. Thus losses will be smaller if the firm produces. If the price in the market falls to OP_2, the firm will be in equilibrium at point E_2. At this point, losses will be equal to The Total Fixed cost. So the firm operates at price OP_2. But if price falls below OP_2, (Say OP_3), then the firm will simply shut down since the firm will not be able to cover even its variable cost fully. E_2 is the shut down point of a perfectly competitive firm.

d) Long-run Equilibrium of the Firm: In the long-run, it is possible to make more adjustments than in the short-run. The firm can adjust its plant capacity and scale of operations to the changed circumstances. Therefore, all costs are variable in the long-run. Firms must earn only normal profits. In case the price is above the long-run AC curve firms will be earning supernormal profits. Attracted by them, new firms will enter the industry and supernormal profits will be competed away. If the price is below the LAC curve firms will be incurring losses. As a result, some of the firms will leave the industry so that no firm earns more than normal profits. Thus "in the long-run firms are in equilibrium when they have adjusted their plant so as to produce at the minimum point of their long-run AC curve, which is tangent (at this point) to the demand (AR) curve defined by the market price" so that they earn normal profits.

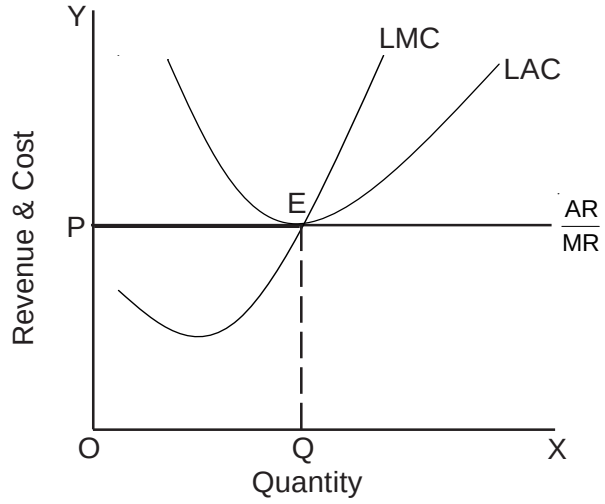


Fig. 6.7

In this diagram, the firm attains equilibrium at point E, where long run MC curve (LMC) cuts the MR curve. Here, OP and OQ are equilibrium price and quantity respectively. The firm can not be in long run equilibrium at a price greater than OP shown in figure 6.6. Because if price is greater than OP then the price line (AR curve) would be some where above the AC where the firm will earn super normal profit. This will attract new firms to enter and compete away this super-normal profit. New firms and expansion of existing firms

would increase supply in the market in the long run. Excess supply will reduce the price to come down to a level where AR = AC. (giving normal profit)

Likevise, the firm can't be in the longrun equilibrium at any price below OP. Price below OP in the longrun means losses for the firm. under such condition some firms would leave the industry. It will reduce market supply thereby inducing increasing the price. Price will increase to a level where AR=AC. Thus, in the longrun All firms earn only super normal profit. At poin E.

Price = AR = MR = LMC = LAC

Thus, the price determined in the longrun is called normal price.



6.10 LET US SUM UP

In this unit we have discussed the following aspects–

- Market does not mean a particular place, but the whole area where the buyers and sellers of a product are spread.
- The structure of market determined by the factors live–
  a) Number and Nature of buyers and seller
  b) The nature of the product.
  c) Competition among the firms.
- Markets one classified into - perfect and imperfect competition.
- The important characteristics of perfect competition–
  a) Large number of buyers and sellers.
  b) Homogenuous product.
  c) Free entry and exit.
  d) Perfect knowledge of market conditions.
  e) Absenree of transport cost.
  f) Uniform price.
- The price under perfect competition is determind by market demand and market supply.
- Both AR and MR curves under perfect competition co-incides and slope horizontal.

- There are three categories of firms under perfect competition in the short run–
  a) Earning super normal profit.
  b) Earning normal profit.
  c) Suffering losses.
- If price falls below AVC the firm attains shout down point.
- In the long run, all firms under perfect competition earn only normal profit.



6.11 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: a) Large, b) Uniform

Ans. to Q. No. 2: a) True, b) False

Ans. to Q. No. 3:

Quantity Sold	AR	TR	MR
1	5	5	5
2	5	10	5
3	5	15	5
4	5	20	5
5	5	25	5
6	5	30	5



6.12 MODEL QUESTIONS

A) Very Short Questions:

Q.1: Under perfect competition AR = ... (MR/TR)

Q.2: What is firms equilibrium?

Q.3: Define a market.

Q.4: Under perfect competition there are ..... number of firms.

Q.5: What is shut down price?

Q.6: What is super normal profit?

Q.7: AR is equal to TR divided by .....

Q.8: What is the condition of equilibrium of an industry?

Q.9: State the conditions of firm equilibrium.

Q.10: What is excess demand?

B) Short Questions

Q.1: Explain three conditions of perfect competition.

Q.2: Explain the concept of excess demand and excuss supply.

Q.3: In the longrun equilibrium of a firm under perfect competition LMC = LMR = LAC = LAR. Explain this with the help of the diagram.

C) Long Answer type Questions

Q.1: Explain with the help of diagram how an individual firm in perfect competition determines equilibrium price and output in the short-run.

Q.2: What is perfect coupetition? Explain the process price determination under it?

*** ***** ***

UNIT 7: MARKET STRUCTURE: IMPERFECT COMPETITION

UNIT STRUCTURE

7.1 Learning Objectives

7.2 Introduction

7.3 Meaning of a Monopoly Market

7.4 Characteristics of Monopoly

7.5 Revenue Curves Under Monopoly

7.6 Price and Output Determination

- 7.6.1 Short-Run Equilibrium
- 7.6.2 Long-Run Equilibrium

7.7 Price Discrimination

- 7.7.1 Degrees of Price Discrimination
- 7.7.2 Conditions and Possibilities of Price Discrimination
- 7.7.3 Price and output Determination under Price Discrimination

7.8 Let Us Sum Up

7.9 Further Reading

7.10 Answers to Check Your Progress

7.11 Model Questions

7.1 LEARNING OBJECTIVES

After going through this unit, you will able to:

- identify a variety of market where small sellers dominate
- appreciate the real world market situation in terms of an analytical framework
- analyses the price output decision undertaken by a single seller
- discover the situation of price discrimination.

7.2 INTRODUCTION

Within a market, some type of competition exists, making it a competitive market. A **competitive market** means that there are a large

number of buyers and sellers of the same output. Competitive markets involve either perfect or imperfect competition. Imperfect competition is the most common type of market structure. By definition, imperfect competition is one that lacks a condition needed for perfect competition. The most common examples of imperfect competition are monopoly, monopolistic competition, and oligopoly.

7.3 MEANING OF A MONOPOLY MARKET

A **monopoly** is a market structure with one seller and multiple buyers. The seller is a price maker that has created large barriers to enter the market. A classic example of a monopoly is Indian Railways. In a monopoly market, factors like government license, ownership of resources, copyright and patent and high starting cost make an entity a single seller of goods. All these factors restrict the entry of other sellers in the market. Monopolies also possess some information that is not known to other sellers. According to D. Salvatore,

"Monopoly is the form of market organisation in which there is a single firm selling a commodity for which there are no close substitutes."

7.4 CHARACTERISTICS OF MONOPOLY

a) **Single Seller:** The producer or seller of the commodity is a single person, firm or an individual and that firm has complete control on the output of the commodity.

b) **No Close Substitutes:** All the units of a commodity are similar and there are no substitutes to that commodity.

c) **No Entry for New Firms:** Monopoly situation in a market can continue only when other firms do not enter the industry. If new firms enter the industry, there will not be complete control of a firm on the supply. As such, whenever a firm enters the industry, monopoly situation comes to an end. There/art, monopoly industry is essentially one-firm industry. This signifies that under monopoly there is no difference between a firm and an industry.

d) **Profit in the Long-Run:** A monopolist can earn abnormal profit even in the long run because he has no fear of a competitive seller. In other words, if a monopolist gets abnormal profits in the long run, he cannot be dislodged from this position.

e) **Losses in the Short Period:** Generally, a common man thinks that a monopoly firm cannot incur loss because it can fix any price it wants. However, this understanding is not correct. A monopoly firm can sustain losses equal to fixed cost in the short period.

f) **Nature of Demand Curve:** Under monopoly the demand for the commodity of the firm is less than being perfectly elastic and, therefore, it slopes downwards to the right. The main reason of the demand curve sloping downwards to the right is the complete control of the monopolist on the supply of the commodity. Due to control on the supply a monopolist makes changes in the supply which brings about changes in the price and because of this demand changes in the opposite direction. In other words, if a monopolist increases the price of the commodity, the amount of quantity sold decreases. Therefore, demand curve (AR) slopes downwards to the right. The nature of demand curve has been shown in the diagram. DD is demand curve, which has a negative slope.

g) **Price-discrimination:** From the point of view of profit a monopolist can change different prices from different consumers of his commodity. This policy is known as price discrimination. He adopts the policy of price discrimination on various bases such as charging different prices from different consumers or fixing different prices at different places etc.

h) **Firm is a Price-Maker:** A competitive firm is a price-taker whereas a monopoly firm is a price-maker. This is because a competitive firm is small compared to market and therefore, it does not have market power. This is not true in the case of a monopoly firm because it has market power. Hence, it is a price maker.



CHECK YOUR PROGRESS

Q.1: State whether True of False:

a) A **monopoly** is a market structure with one seller and multiple buyers.

b) A monopolist can earn abnormal profit even in the long run.

c) From the point of view of profit a monopolist can not change different prices from different consumers of his commodity.

d) Both AR and MR curves slope upward in monopoly market.

7.5 REVENUE CURVES UNDER MONOPOLY

In monopoly market there is only one producer or seller and large no. of consumers. There is lack of production of close substitutable commodities. Price of commodity is determined by the producer. So, firm is price maker and consumers are price taker. To increase the sale of output producer must reduce the price of the commodity. On the basis of this concept we can derive TR, AR and MR curves.

Output sold (Q)	Price (P)	TR = P x Q	AR= TR / Q	MR = ΔTR / ΔQ
1	10	10		
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2
6	5	30	5	0

On the given table, output sold is gradually increasing at equal rate from 1 to 6. About TR, at initial stage, TR increases then remains constant after certain output sold and decreases at increasing rate. AR gradually declines at equal rate as per increasing rate of output sold. About MR, it decreases at constant rate. Given the demand for his product, the

monopolist can increase his sales by lowering the price, the marginal revenue also falls but the rate of fall in marginal revenue is greater than that in average revenue. Thus, the MR curve lies below the AR curve.

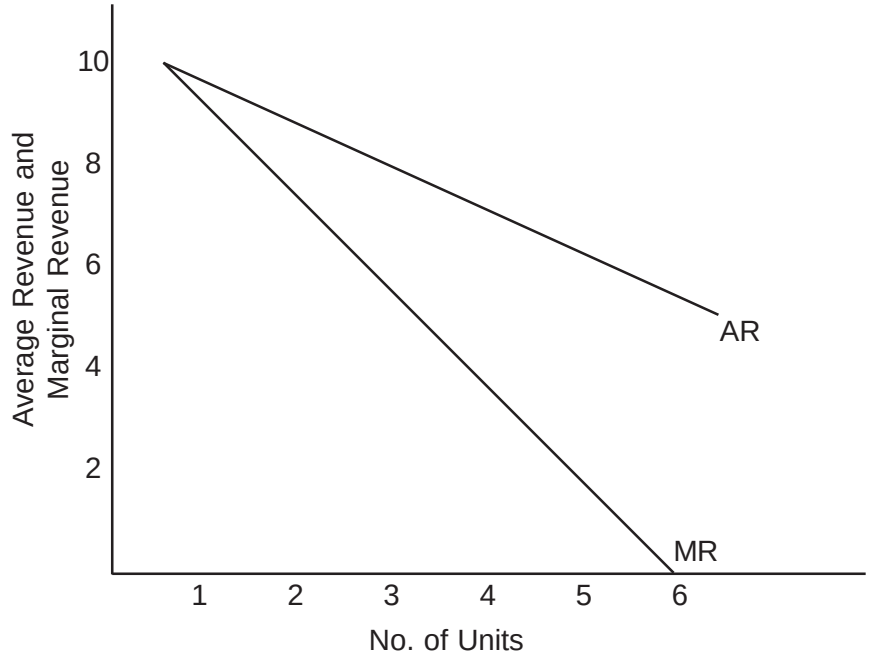


Fig. 7.1

7.6 PRICE AND OUTPUT DETERMINATION IN MONOPOLY

Firms in a perfectly competitive market are price-takers so that they are only concerned about determination of output. But this is not the case with a monopolist. A monopolist has to determine not only his output but also the price of his product. Since he faces a downward sloping demand curve, if he raises the price of his product, his sales will go down. On the other hand, if he wants to improve his sales volume, he will have to be content with lower price. He will try to reach that level of output at which profits are maximum i.e. he will try to attain the equilibrium level of output. How he attains this level can be found out as is shown below.

7.6.1 Short-Run Equilibrium

Conditions for Equilibrium: The twin conditions for equilibrium in a monopoly market are the same as discussed earlier.

i) MC = MR

ii) MC curve must cut MR curve from below.

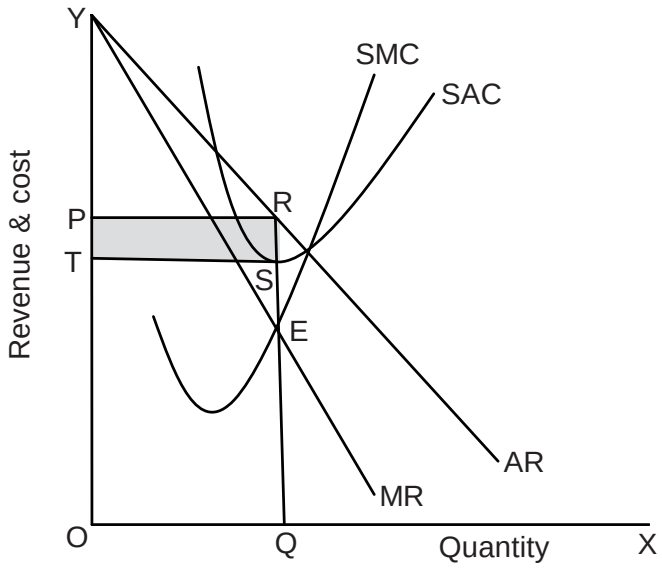


Fig. 7.2

The figure shows that MC curve cuts MR curve at E. That means, at E, the equilibrium price is OP and the equilibrium output is OQ. In order to know whether the monopolist is making profits or losses in the short run, we need to introduce the average total cost curve. Figure 7.2 shows that MC cuts MR at E to give equilibrium output as OQ. At OQ, the price charged is OP (we find this by extending line EQ till it touches AR or demand curve). Also at OQ, the cost per unit is SQ or OT. Therefore, profit per unit is SR or total profit is PRST.

Can a monopolist incur losses?: One of the misconceptions about a monopolist is that he always makes profits. It is to be noted that nothing guarantees that a monopolist makes profits. It all depends upon his demand and cost conditions. If he faces a very low demand for his product and his cost conditions are such that AC >AR, he

will not be making profits, rather, he will incur losses. Figure 7.3 depicts this position.

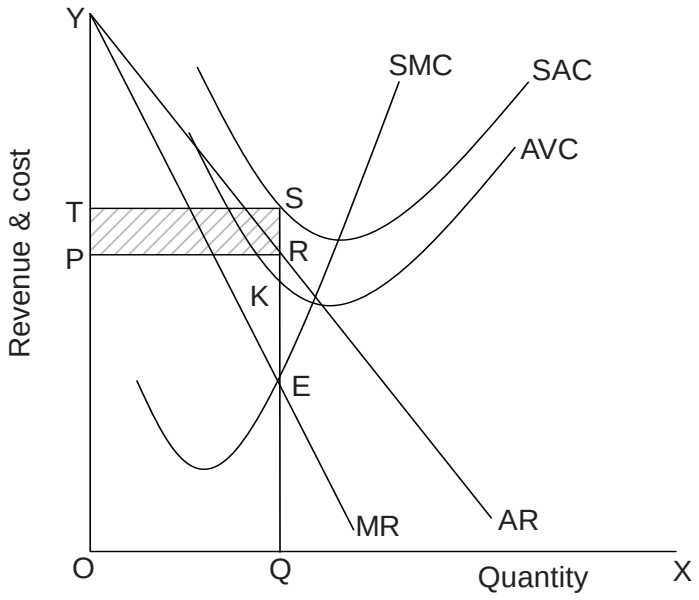


Fig. 7.3

In the above figure, MC cuts MR at E. Here E is the point of loss minimisation. At E, the equilibrium output is OQ and the equilibrium price is OP. The average total cost corresponding to OQ is QS. Cost per unit of output i.e. QS is greater than revenue per unit(QR). Thus, the monopolist incurs losses to the extent of RS per unit or total loss is PTSR. Whether the monopolist stays in business in the short run depends upon whether he meets his average variable cost or not. If he covers his average variable cost and at least a part of fixed cost, he will not shut down because he contributes something towards fixed costs which are already incurred. If he is unable to meet his average variable cost even, he will shut down.

7.6.2 Long-Run Equilibrium

Long run is a period long enough to allow the monopolist to adjust his plant size or to use his existing plant at any level that maximizes his profit. In the absence of competition, the monopolist

need not produce at the optimal level. He can produce at sub-optimal scale also. In other words, he need not reach the minimum of LAC curve, he can stop at any place where his profits are maximum.

However, one thing is certain: The monopolist will not continue if he makes losses in the long run. He will continue to make super normal profits even in the long run as entry of outside firms is blocked.

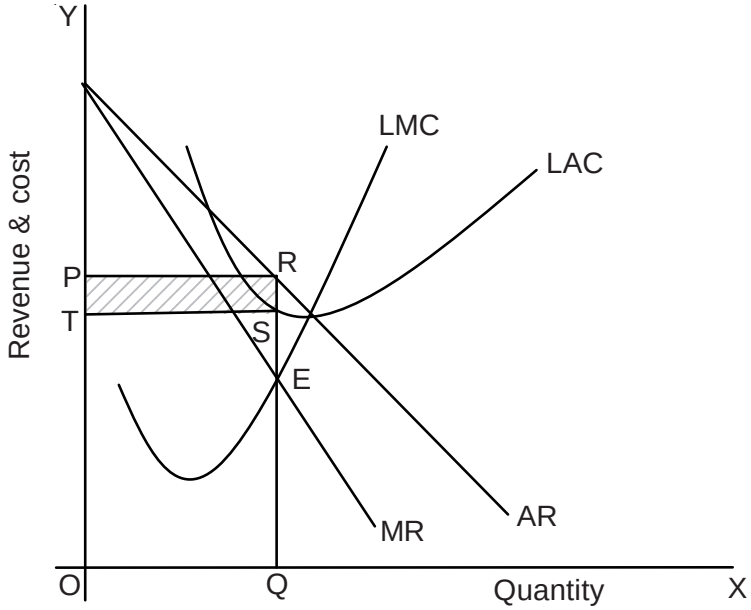


Fig. 7.4



CHECK YOUR PROGRESS

Q.2: Fill in the blanks:

a) The twin conditions for equilibrium in a monopoly market are the same as discussed earlier.

i) MC = ...

ii) MC curve must cut ..... curve from below.

b) The monopolist will not continue if he makes ..... in the long run.

7.7 PRICE DISCRIMINATION

Price discrimination refers to the practice of a seller of selling the same good at different prices to different buyers. A seller makes price

discrimination between different buyers when it is both possible and profitable for him to do so. Price discrimination is not a very common phenomenon. It is very difficult to charge different prices for the identical good from different customers. Frequently, the product is slightly differentiated to successfully practice price discrimination.

In the words of Mrs. John Robinson ***"The act of selling the same article, produced under single control at different prices to different buyers is known as price discrimination".***

Price discrimination may be (a) personal, (b) local, or (c) according to trade or use:

a) ***Personal:*** It is personal when different prices are charged for different persons.

b) ***Local:*** It is local when the price varies according to locality.

c) ***According to Trade or Use:*** It is according to trade or use when different prices are charged for different uses to which the commodity is put, for example, electricity is supplied at cheaper rates for domestic than for commercial purposes.

7.7.1 Degrees of Price Discrimination

a) **1st Degree Price Discrimination:** This type of discrimination, also known as perfect price discrimination, essentially states the monopolist charges the consumer the maximum price that individual is willing to pay for that product. For example- fees charged by the doctors, lawyers etc.

b) **2nd Degree Price Discrimination:** In this type of discrimination the monopolist is actually not able to differentiate between the different types of consumers. This practice creates a schedule of declining prices for different range of quantities. For example- Price charged by the electricity board.

c) **3rd Degree Price Discrimination:** In this type of discrimination the monopolist is actually divides the customers into two or more than two sub-markets and charges different prices from different sub-markets. For example– home market and foreign market.

7.7.2 Conditions and Possibilities of Price-Discrimination

There are four main types of situation:

a) ***When consumers have certain preferences or prejudices.*** Certain consumers usually have the irrational feeling that they are paying higher prices for a good because it is of a better quality, although actually it may be of the same quality. Sometimes, the price differences may be so small that consumers do not consider it worthwhile to bother about such differences.

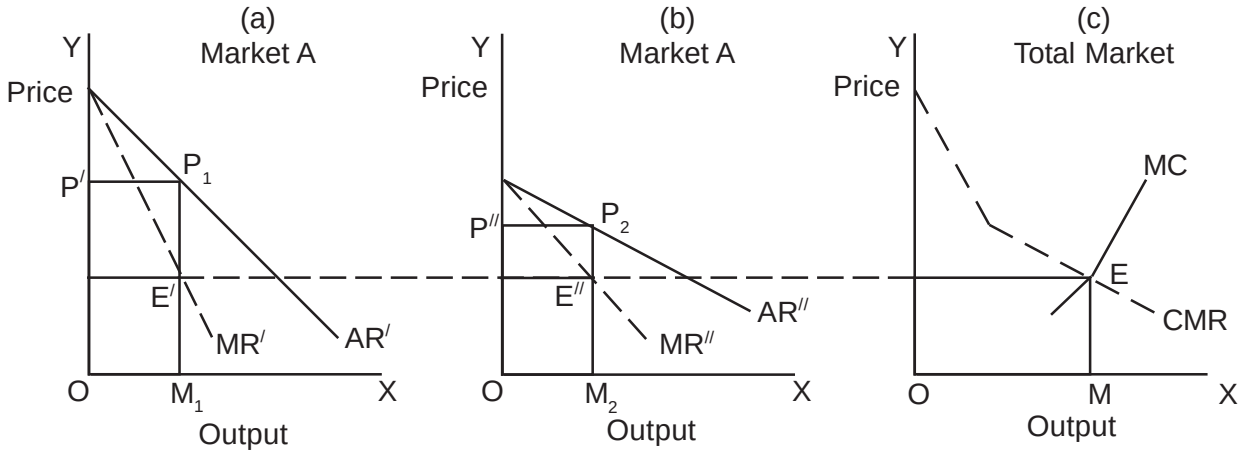
b) ***When the nature of the good is such*** as makes it possible for the monopolist to charge different prices. This happens particularly when the good in question is a direct service.

c) ***When consumers are separated by distance or tariff barriers.*** A good may be sold in one town for Re. 1 and in another town for Rs. 2. Similarly, the monopolist can charge higher prices in a city with greater distance.

d) ***The elasticities of demand in different markets must be different.*** The market is divided into sub-markets. The sub-market will be arranged in ascending order of their elasticities, the higher price being charged in the least elastic market and vice versa.

7.7.3 Price Determination under Price Discrimination

First of all. the monopolist d;ti Ides his total market into sub-markets. In the following diagrams, the monopolist divides his total market into two sub-markets, i.e., A and B:



Price Discrimination in Monopoly

Fig. 7.5

The monopolist has now to decide at what level of output he should produce. To achieve maximum profit, he will be in equilibrium at output at which MR = MC, and MC curve cuts the MR curve from below. In the above diagram (c) it is shown that the equilibrium of the discriminating monopolist is established at output OM at which MC cuts CMR. The output OM is distributed between two markets in such a way that marginal revenue in each is equal to MC. Therefore, he will sell output OM_1 in Market A, because only at this output marginal revenue $MR^{/}$ in Market A is equal to ME ($M_1E^{/}$ = ME). The same condition is applied in Market B where $MR^{//}$ is equal to ME ($M_2E^{//}$ = ME). In the above diagram, it is also shown that in Market B in which elasticity of demand is greater, the price charged is lower than that in Market B where the elasticity of demand is less.



CHECK YOUR PROGRESS

Q.3: Fill in the blanks:

a) Price discrimination refers to the practice of a seller of selling the same good at ..... prices to different buyers.

b) There are ..... degrees of Price discrimination.



7.8 LET US SUM UP

In this unit we have discussed the following aspects–

- Monopoly is the form of market organisation in which there is a single firm selling a commodity for which there are no close substitutes.
- ***Characteristics of Monopoly:***
  a) Single seller
  b) No close substitute of the product
  c) No entry for new firms
  d) It earns profit in the long run
  e) May suffer losses in the short period
  f) AR and MR curves slopes downward.
- ***Conditions for Equilibrium:*** The twin conditions for equilibrium in a monopoly market are the same as discussed earlier.
  i) MC = MR
  ii) MC curve must cut MR curve from below.
- Price discrimination refers to the practice of a seller of selling the same good at different prices to different buyers.
- There are four main types of situation:
  a) When consumers have certain preferences or prejudices.
  b) When the nature of the good is such as makes it possible for the monopolist to charge different prices.
  c) When consumers are separated by distance or tariff barriers.
  d) The elasticities of demand in different markets must be different.



7.9 FURTHER READING

1) Ahuja, H.L. (2007); *Advanced Economic Theory: Microeconomic Analysis*; New Delhi: S. Chand & Company Ltd.
2) Chopra, P.N. (2008): *Micro Economics*; Ludhiyana: Kalyani Publication.

7.10 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: a) True, b) True, c) False, d) False

Ans. to Q. No. 2: a) MR, b) Losses

Ans. to Q. No. 3: a) different, b) three

7.11 MODEL QUESTIONS

A) Very short Answer Questions (1 Mark):

Q.1: Define monopoly.

Q.2: Why is a monopolist price-maker?

Q.3: What is price discrimination?

Q.4: Why a monopolist can earn abnormal profit in the long run?

Q.5: What is the slope of AR cuvce in monopoly?

Q.6: What is third degree of price discrimination?

B) Short Answer type Questions (2-5 marks):

Q.1: Mentions two featuress of a monopoly.

Q.2: Devine AR and MR curves in a monopoly market.

Q.3: Explain three characteristics of monopoly market.

Q.4: What are deprces of price discrimination?

Q.5: How does price discrimination become possible?

C) Long Answer type Questions (10 Marks):

Q.1: Explain the importaint characterstics of monopoly.

Q.2: Why the demand curve facing a firm is perfectly clastic under perfect competition but inelastic under monopoly market?

Q.3: Explain the process of determination of price in a monopoly market in short run and long run.

Q4: Explain with the help of a diagram how a monopolish fixes prices in different movent under condition ofprice discrimination.

*** ***** ***

UNIT 8: IMPERFECT COMPETITION: MONOPOLISTIC COMPETITION AND OLIGOPOLY

UNIT STRUCTURE

8.1 Learning Objective

8.2 Introduction

8.3 Characteristics of Monopolistic Market

8.4 Demand Curve of a Firm in Monopolistic Competition

8.5 Price and Output Determination

8.6 Group Equilibrium

8.7 The Theory of Excess Capacity

8.8 Role of Selling Cost

8.9 Oligopoly Market

8.10 Characteristics of Oligopoly Market

8.11 Price Rigidity

8.12 Price Leadership

8.13 Various Pricing Policies

8.14 Let Us Sum Up

8.15 Further Reading

8.16 Answers to Check Your Progress

8.17 Model Questions

8.1 LEARNING OBJECTIVES

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

- discuss the monopolistic competition and oligopoly market
- explain the various pricing policies of firms of these two markets
- explain real market structure and their strategic policies.

8.2 INTRODUCTION

We have discussed the market structure under perfect competition in the earlier unit. Perfect competition is a market where a large number of

sellers carrying a homogeneous product and monopoly is a market of only one seller. However, many small businesses operate under conditions of monopolistic competition.

Monopolistic competition as a market structure was first identified in the 1930s by American economist **Edward Chamberlin**, and English economist **Joan Robinson**.

Monopolistic competition is a type of imperfect competition such that many producers sell products that are differentiated from one another as goods but not perfect substitutes. Markets of products like soap, toothpaste AC, etc. are examples of monopolistic competition.

Monopoly + Competition = Monopolistic Competition

Under monopolistic competition, each firm is the sole producer of a particular brand or "product". It enjoys 'monopoly position' as far as a particular brand is concerned. However, since the various brands are close substitutes, its monopoly position is influenced due to stiff 'competition' from other firms. So, monopolistic competition is a market structure, where there is competition among a large number of monopolists.

Example of Monopolistic Competition: Detergent Market:

When we walk into a departmental store to buy detergent, we will find a number of brands, like Surf-Excel, Ariel, Wheel, Tide etc.

On one hand, the market for detergent seems to be full of competition, with thousands of competing brands and freedom of entry. On the other hand, its market seems to be monopolistic, due to uniqueness of each toothpaste and power to charge different price. Such a market for detergent is a monopolistic competitive market.

8.3 CHARACTERISTICS OF MONOPOLISTIC MARKET

Let us now discuss some of the important features of this kind of market.

1) **Many Sellers:** There are many firms selling closely related, but not homogeneous products. Each firm acts independently and has a limited share of the market.

2) **Product Differentiation:** Product differentiation refers to differentiating the products on the basis of brand, size, colour, shape, etc. The product of a firm is close, but not perfect substitute of other firm. The product of each individual firm is identified and distinguished from the products of other firms due to product differentiation, like Lux, Dove, Lifebuoy, etc.

   The differentiation among different competing products may be based on either 'real' or 'imaginary' differences. Real Differences may be due to differences in shape, flavour, colour, packing, after sale service, warranty period, etc. Imaginary Differences mean differences which are not really obvious but buyers are made to believe that such differences exist through selling costs (advertising).

   Some more examples of Product Differentiation:

   i) Toothpaste: Pepsodent, Colgate, Neem, Close-up, Babool, etc.
   ii) Tea: Brooke Bond, Tata tea, Nameri tea, etc.
   iii) Soaps: Lux, Liril, Dove, Lifebuoy, Pears, etc.

3) **Selling Costs:** Under monopolistic competition, products are differentiated and these differences are made known to the buyers through selling costs. Selling costs refer to the expenses incurred on marketing, sales promotion and adver-tisement of the product. Such costs are incurred to persuade the buyers to buy a particular brand of the product in preference to competitor's brand.

4) **Freedom of Entry and Exit:** Under monopolistic competition, firms are free to enter into or exit from the industry at any time they wish. However, it must be noted that entry under monopolistic competition is not as easy and free as under perfect competition.

5) **Lack of Perfect Knowledge:** Buyers and sellers do not have perfect knowledge about the market conditions. Selling costs create artificial superiority in the minds of the consumers and it becomes very difficult for a consumer to evaluate different products available in the market.

6) **Non-Price Competition:** In addition to price competition, non-price competition also exists under monopolistic competition. Non-Price Competition refers to competing with other firms by offering free

gifts, making favourable credit terms, etc., without changing prices of their own products. Firms under monopolistic competition compete in a number of ways to attract customers.



CHECK YOUR PROGRESS

Q.1: Fill in the blank:

a) Monopolistic competition as a market structure was first identified in by American economist ....., and English economist .....

b) ..... refers to differentiating the products on the basis of brand, size, colour, shape, etc.

c) There are ..... firms selling closely related products in monopolistic market.

8.4 DEMAND CURVE OF A FIRM IN MONOPOLISTIC COMPETITION

Under monopolistic competition, many firms selling closely related but differentiated products makes the demand curve downward sloping. It implies that a firm can sell more output only by reducing the price of its product. Demand curve in monopolistic competition is more elastic compared to monopoly market.

As seen in Figure 8.1 output is measured along the X-axis and price and revenue along the Y-axis. At OP price, a seller can sell OQ quantity. Demand rises to OQ_1, when price is reduced to OP_1. So, demand curve under monopolistic competition is negatively sloped as more quantity can be sold only at a lower price.

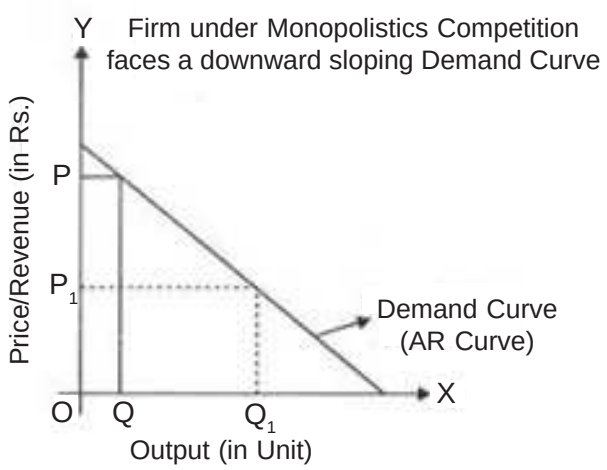


Fig. 8.1

Like monopoly, MR is also less than AR under monopolistic competition due to negatively sloped demand curve. The implication of marginal revenue curve lying below average revenue curve is that the marginal revenue will be less than the price or average revenue. When a firm working under monopolistic competition sells more, the price of its product falls; marginal revenue therefore must be less than price. In Fig. 8.2 AR is the average revenue curve of the firm under monopolistic competition and slopes downward. MR is the marginal revenue curve and lies below AR curve.

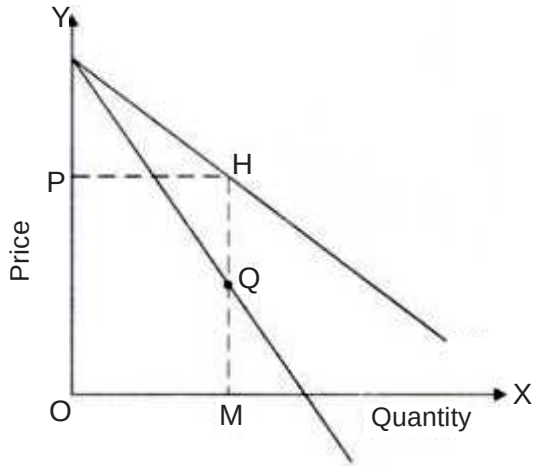


Fig. 8.2

At quantity OM average revenue (or price) is OP and marginal revenue is MQ which is less than OP.

8.5 PRICE AND OUTPUT DETERMINATION

The equilibrium of the firm under monopolistic competition follows the usual analysis in the short-run and long-run.

a) Short-Run Equilibrium: The number of firms will remain unchanged during short-run. Each firm fixes such price and output which maximises its profits in the short run. The equilibrium price and output is determined at a point where the short-run marginal cost (SMC) equals marginal revenue (MR). Since costs differ in the short-run, a firm with lower unit costs will be earning only normal profits. In case, it is able to cover just the average variable cost, it incurs losses.

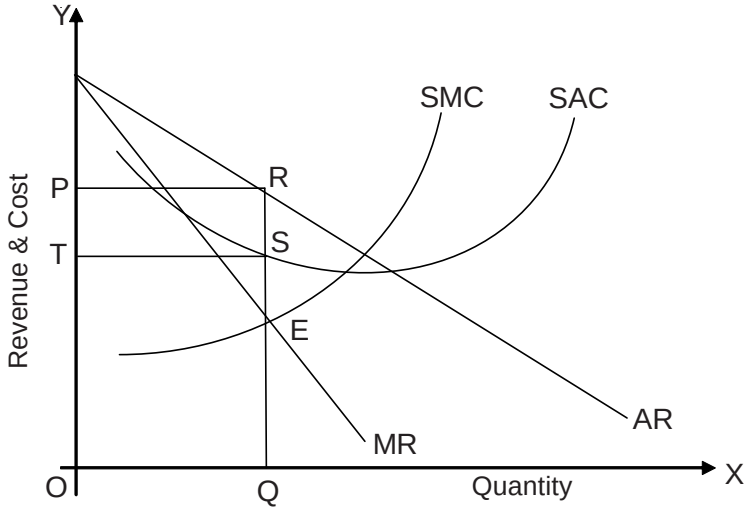


Fig. 8.3

Super-Normal Profit: A firm earns supernormal profit when AR is greater than its AC. In Figure 8.3 the short-run marginal cost curve (SMC) cuts the MR curve at E. This equilibrium point establishes the price QR (= OP) and output OQ. As a result, the firm earns supernormal profit represented by the area PRST.

Normal Profit: A firm earns only normal profit when AR is equal to its AC. Figure 8.4 indicates the same equilibrium points of price and output. But in this case, the firm just covers the short-run average unit cost as represented by the tangency of demand curve D and the short- run average unit cost curve SAC at A. It earns normal profit.

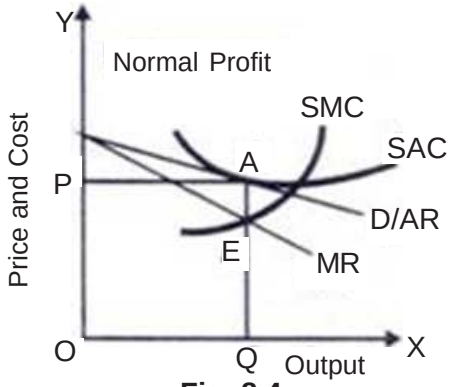


Fig. 8.4

Minimum Loss: Figure 8.5 shows a situation where the firm is not able to cover its short run average unit cost and therefore incurs losses. Price set by the equality of SMC and MR curves at point E is QA which covers only the average variable cost. The tangency of the demand curve D and the average variable cost curve AVC at A makes it a shut-down point.

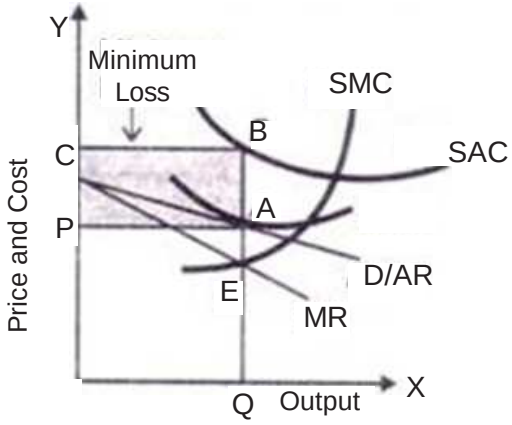


Fig. 8.5

It is not essential that during the short-run all firms charge identical prices and produce the same quantity as shown above. This is to simplify our geometrical presentation. There being product differentiation, identity of prices and quantities cannot be ex-pected.

Each firm acts in accordance with its own short-run costs and equates its SMC curve with the MR curve. However, this does not mean that the firm fixes a very different price from the other producers. Since its product has close substitutes, its price will have to approximate to the prices of the other firms producing a similar product.

b) Long-Run Equilibrium: In the long run, there is entry and exit of firms in a monopolistic competitive industry and the adjustment process will ultimately lead to the existence of only normal profits. This is a realistic assumption in the long-run where, no firm can earn either super-normal profits or incur losses because each produces a similar product.

If firms in the monopolistic competitive industry are earning super-normal profits, new firms will be attracted into the group. With the entry of new firms, the existing market is divided among more sellers so that each firm will sell lesser quantities of the product than before. As a result, the demand curves faced by individual firms shift down to the left. At the same time, the entry of new firms will increase the demand and hence the price of factor-services which will shift the cost curves of individual firms upward.

This two-way adjustment process of lowering the demand curve and raising the cost curves will squeeze out super-normal profits. Thus, each firm will be earning only normal profits in the long-run as shown in Fig. 8.6. In the figure, all firms are in long-run equilibrium at point E where (1) LMC = MR, and (2) LMC cuts MR from below and the LAC curve is tangent to the AR curve at point R. Since price QR = LAC at point R, each firm is earning normal profits and no firm has the tendency to enter or leave the industry.

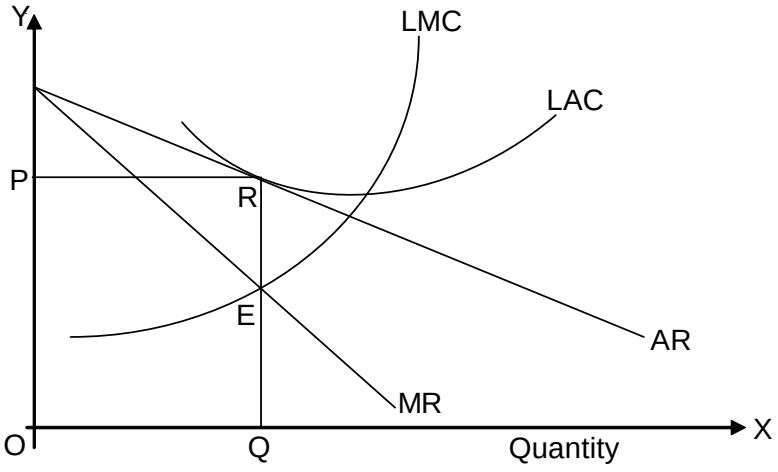


Fig. 8.6



CHECK YOUR PROGRESS

Q.2: State whether True or False:

a) Demand curve in monopolistic competition is more elastic compared to monopoly market.

b) All firms under monopolistic competition earn super-normal profit.

c) A firm earns only normal profit when AR is equal to its AC.

d) The MR curves lies above the AR curve under mono-polistic market.

8.6 GROUP EQUILIBRIUM

Group equilibrium relates to the equilibrium of the "industry" under a monopolistic competitive market. The word "industry" refers to all the firms producing a homogeneous product. But under monopolistic competition the product is differentiated. Therefore, there is no "industry" but only a "group" of firms producing a similar product.

Prof. Chamberlin's group equilibrium analysis is based on the following assumptions:

1) The number of firms is large.
2) Each firm produces a differentiated product which is a close substitute for the others' product.
3) There are a large number of buyers.
4) Each firm has an independent Price policy and faces a fairly elastic demand curve, at the same time expecting its rivals not to take any notice of its actions.
5) Each firm knows its demand and cost curves.

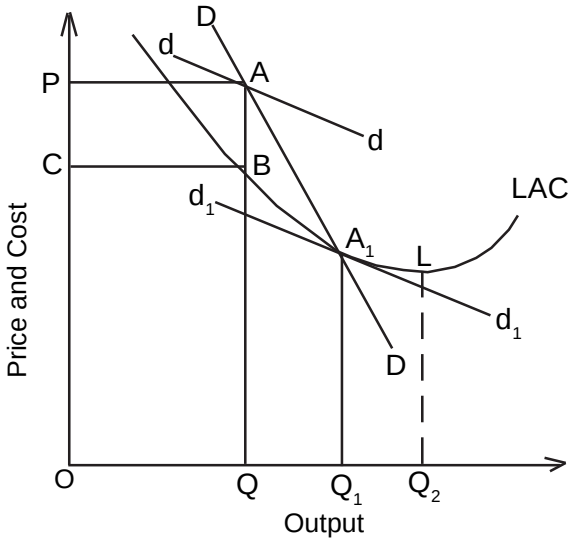


Fig. 8.7

Given these assumptions and the two types of demand curves DD and dd, Chamberlin explains the group equilibrium of firms. He does not draw the MR curves corresponding to these demand curves and the LMC curve to the LAC curve to simplify the analysis.

Figure 8.7 represents the long-run equilibrium of the group under monopolistic competition. Adjustment of long-run equilibrium starts from point A where DD and dd curves intersect each other so that QA is the short-run equilibrium price level at which each firm sells OQ quantities of the product.

At this price-output level, each firm earns PABC super-normal profits. Attracted by super-normal profits, new firms enter the group. Regarding DD as its own demand curve, each firm applies a price cut for the purpose of increasing its sales and profits on the assumption that other firms will not react to its action.

But instead of increasing its quantity demanded on the dd curve, it moves along the dd curve. In fact, every producer thinks and acts alike so that the dd curve "slides downwards" along the DD curve. This downward movement continues until it takes the shape of the d_1d_1 curve and is tangent to the LAC curve at A_1. This is the long-run group equilibrium position where each firm would be earning only normal profits by selling OQ_1 quantities at Q_1A_1 price.

8.7 THEORY OF EXCESS CAPACITY

The doctrine of excess capacity is associated with monopolistic competition in the long-run and is defined as "the difference between ideal (optimum) output and the output actually attained in the long-run."

In figure 8.7 Each firm will be of the optimum size and operate the optimum scale represented by the LAC curve. But it will not produce the optimum output because the minimum point L of the LAC curve is to the right of its point of tangency$A_{1.}$ The reason is the d_1d_1 curve is not horizontal but downward sloping. Thus each firm will be of optimum size and have Q_1Q_1excess capacity.

Prof. Chamberlin's explanation of the theory of excess capacity is different from that of ideal (optimum) output under perfect competition. Under perfect competition, each firm produces at the minimum on its LAC curve and its horizontal demand curve is tangent to it at that point. Its output is ideal and there is no excess capacity in the long run.

It's Significance: The concept of excess capacity is of much practical significance. It demonstrates an untraditional possibility that an increase in supply may lead to a rise in price. The "wastes of competition" which were hitherto a mystery have been unfolded. They pertain to monopolistic competition rather than to perfect competition, as was wrongly implied by the earlier economists.

It establishes the truth of the proposition that perfect competition and increasing returns are incompatible and proves without any shadow of doubt that falling costs ultimately lead to monopoly or monopolistic competition.

8.8 ROLE OF SELLING COST

Under monopolistic competition, products are differentiated and these differences are made known to the buyers through selling costs. Selling costs refer to the expenses incurred on marketing, sales promotion and advertisement of the product. Such costs are incurred to persuade the buyers to buy a particular brand of the product in preference to competitor's

brand. Due to this reason, selling costs constitute a substantial part of the total cost under monopolistic competition.

There is a fundamental difference between selling cost and production cost. Production cost includes all the expenses incurred in making the product and transporting it to the customer. On the other hand, selling cost include all the expenses incurred to change the consumer's preference.

Average Selling Cost is the selling cost per unit of the product. The figure 8.8 represents equilibrium of a firm with fixed selling cost.

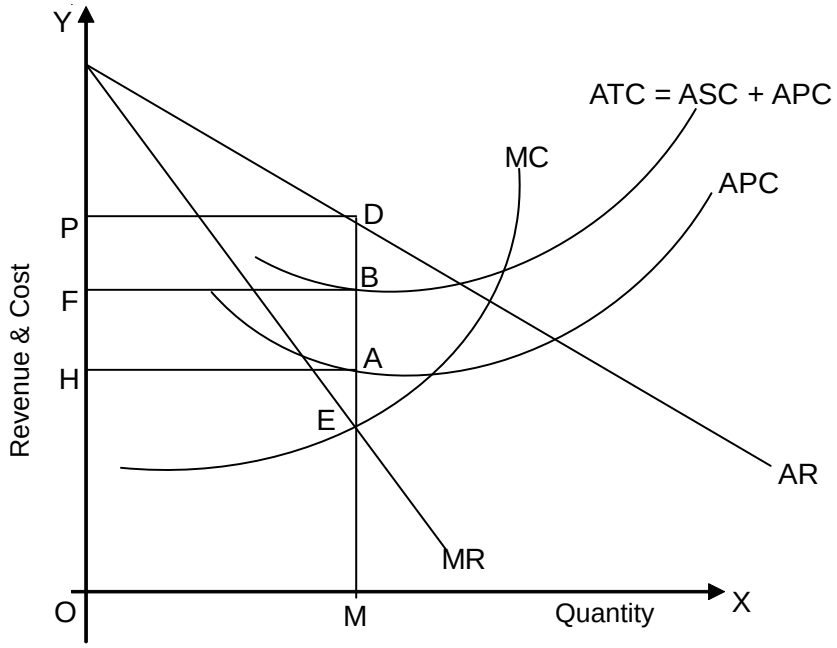


Fig. 8.8

The firm is in equilibrium at point E where MR curve intersects the MC curve. At this point per unit profit will be AR – ATC (ASC + APC) = MD – MB (AB + MA) = BC. Total profit will be BD x OM= FPDB.



CHECK YOUR PROGRESS

Q.3: Choose the correct answer:

1) In Monopolistic market there is no "industry" but only a "....." of firms producing a similar product–

a) Firm b) Seller c) producer d) Group

2) Excess capacity is defined as "the difference between ..... and the output actually attained in the long-run''.
   a) Optimum b) Minimum
   c) Maximum d) all the above
3) Average Total Cost = Average Selling Cost + ...
   a) Average Fixed Cost b) Average Variable Cost
   c) Average Production Cost d) None of the above

8.9 OLIGOPOLY MARKET

The term oligopoly is derived from two Greek words: 'oligi' means few and 'polein' means to sell. Oligopoly is a market structure in which there are only a few sellers (but more than two) of the homogeneous or differentiated products. So, oligopoly lies in between monopolistic competition and monopoly.

"Oligopoly refers to a market situation in which there are a few firms selling homogeneous or differentiated products.''

Example of Oligopoly: In India, markets for automobiles, cement, steel, aluminium, etc, are the examples of oligopolistic market. In all these markets, there are few firms for each particular product.

DUOPOLY is a special case of oligopoly, in which there are exactly two sellers. Under duopoly, it is assumed that the product sold by the two firms is homogeneous and there is no substitute for it.

Types of Oligopoly:

1) **Pure or Perfect Oligopoly:** If the firms produce homogeneous products, then it is called pure or perfect oligopoly. For example– cement, steel, aluminum and chemicals producing industries.
2) **Imperfect or Differentiated Oligopoly:** If the firms produce differentiated products, then it is called differentiated or imperfect oligopoly. For example, passenger cars, cigarettes or soft drinks.
3) **Collusive Oligopoly:** If the firms cooperate with each other in determining price or output or both, it is called collusive oligopoly or cooperative oligopoly.

4) **Non-collusive Oligopoly:** If firms in an oligopoly market compete with each other, it is called a non-collusive or non-cooperative oligopoly.

8.10 CHARACTERISTICS OF OLIGOPOLY MARKET

The main features/Characteristics of oligopoly are elaborated as follows:

1) **Few Firms:** Under oligopoly, there are few large firms. Each firm produces a significant portion of the total output. There exists severe competition among different firms. For example, the market for automobiles in India is an oligopolist structure as there are only few producers of automobiles.
2) **Interdependence:** Firms under oligopoly are interdependent. Interdependence means that actions of one firm affect the actions of other firms. A firm considers the action and reaction of the rival firms while determining its price and output levels. A change in output or price by one firm evokes reaction from other firms operating in the market.
3) **Non-Price Competition:** Under oligopoly, firms are in a position to influence the prices. However, they try to avoid price competition for the fear of price war. They follow the policy of price rigidity. Price rigidity refers to a situation in which price tends to stay fixed irrespective of changes in demand and supply conditions. Firms use other methods like advertising, better services to customers, etc. to compete with each other.
4) **Barriers to Entry of Firms:** The main reason for few firms under oligopoly is the barriers, which prevent entry of new firms into the industry. Patents, requirement of large capital, control over crucial raw materials, etc, are some of the reasons, which prevent new firms from entering into industry. Only those firms enter into the industry which is able to cross these barriers.
5) **Role of Selling Costs:** Due to severe competition ‘and inter-dependence of the firms, various sales promotion techniques are

used to promote sales of the product. Advertisement is in full swing under oligopoly, and many a times advertisement can become a matter of life-and-death. A firm under oligopoly relies more on non-price competition.

6) **Nature of the Product:** The firms under oligopoly may produce homogeneous or differentiated product.
   i) If the firms produce a homogeneous product, like cement or steel, the industry is called a pure or perfect oligopoly.
   ii) If the firms produce a differentiated product, like automobiles, the industry is called differentiated or imperfect oligopoly.

7) **Indeterminate Demand Curve:** Under oligopoly, the exact behaviour pattern of a producer cannot be determined with certainty. So, demand curve faced by an oligopolist is indeterminate (uncertain). As firms are inter-dependent, a firm cannot ignore the reaction of the rival firms. Any change in price by one firm may lead to change in prices by the competing firms. So, demand curve keeps on shifting and it is not definite, rather it is indeterminate.



CHECK YOUR PROGRESS

Q4: Fill in the blank:

a) Oligopoly refers to a market situation in which there are a ..... firms selling homogeneous or differentiated products.

b) If the firms produce differentiated products, then it is called ..... oligopoly.

c) Firms under oligopoly are .....

d) The demand curve under oligopoly market is .....

8.11 PRICE RIGIDITY

In many oligopolistic industries prices remain sticky or inflexible, that is, there is no tendency on the part of the oligopolists to change the price even if the economic conditions undergo a change. Many explanations

have been given of this price rigidity under oligopoly and most popular explanation is the so-called kinked demand curve hypothesis.

The kinked demand curve hypothesis was put forward independently by Paul M. Sweezy, an American economist, and by Hall and Hitch, Oxford economists.

The demand curve facing an oligopolist, according to the kinked demand curve hypothesis, has a 'kink' at the level of the prevailing price. The kink is formed at the prevailing price level because the segment of the demand curve above the prevailing price level is highly elastic and the segment of the demand curve below the prevailing price level is inelastic.

Each oligopolist believes that if he lowers the price below the prevailing level, his competitors will follow him and will accordingly lower their prices, whereas if he raises the price above the prevailing level, his competitors will not follow his increase in price. Each oligopolistic firm believes that though its rival firms will not match his increase in price above the prevailing level, they will indeed match its price cut. These two different types of reaction of the competitors to the increase in price on the one hand and to the reduction in price on the other make the portion of the demand curve above the prevailing price level relatively elastic and the lower portion of the demand curve relatively inelastic.

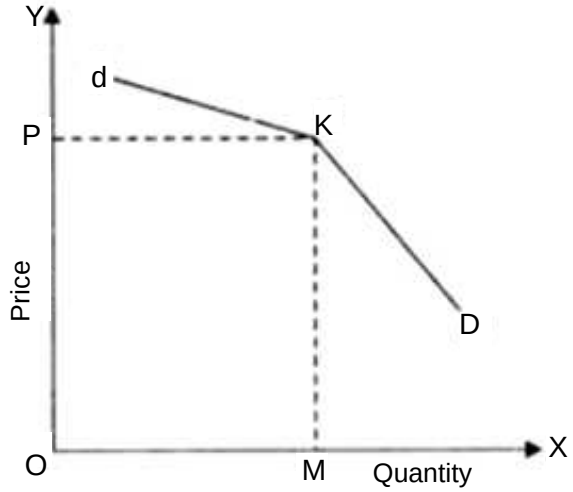


Fig. 8.9

A kinked demand curve dD with a kink at point K has been shown in Figure 8.9. The prevailing price level is OP and the firm is producing and

selling the output OM. Now, the upper segment dK of the demand curve dD is relatively elastic and the lower segment KD is relatively inelastic. The prevailing price is OP at which kink is found in the demand curve dKD. The price P will tend to remain stable or rigid as every member of the oligopoly will not see any gain in lowering it or in increasing it. It should be noted that if the prevailing price OP is greater than average cost, more than normal profits will be made.

Further, it is worth mentioning that the oligopolist confronting a kinked demand curve will be maximising his profits at the current price level. For finding the profit-maximizing price-output combination, marginal revenue curve MR corresponding to the kinked demand curve dKD has been drawn. It is worth mentioning that the marginal revenue curve associated with a kinked demand curve is discontinuous, or in other words, it has a broken vertical portion.

The length of the discontinuity depends upon the relative elasticities of two segments dK and KD of the demand curve at point K. The greater the difference in the two elasticities, the greater the length of the discontinuity. In Figure 8.10 marginal revenue curve MR corresponding to the kinked demand curve dKD has been drawn which has a discontinuous portion or gap HR.

Now, if the marginal cost curve of the oligopolist is such that it passes anywhere, say from point E, through the discontinuous portion HR of the marginal revenue curve MR, as shown in Fig. 8.10, the oligopolist will be maximizing his profits at the prevailing price level OP, that is, he will be in equilibrium at point E or at the prevailing price OP. Since the oligopolist is in equilibrium, or in other words, maximising his profits at the prevailing price level, he will have no incentive to change the price.

Furthermore, even if there are changes in costs, the price will remain stable so long as the marginal cost curve passes through the gap HR in the marginal revenue curve. In Figure 8.10 when the marginal cost curve shifts upward from MC to MC' (dotted) due to the rise in cost, the equilibrium price and output remain unchanged since the new marginal cost MC' also passes from point E' through the gap HR.

Fig. 8.10

8.12 PRICE LEADERSHIP

Price leadership is an important form of collusive oligopoly. Under it, one firm sets the price, others follow it. Price leadership also comes into existence either through tacit or formal agreement. But as the formal or open agreement to establish price leadership is generally illegal, price leadership is generally established as a result of informal and tacit understanding between the oligopolists.

Price leadership is of various types—

1) **Low Cost Firm:** There is a price leadership by a low-cost firm. In order to maximise profits the low-cost firm sets a lower price than the profit-maximizing price of the high-cost firms. Since the high-cost firms will not be able to sell their product at the higher price, they are forced to agree to the low price set by the low-cost firm. Of course, the low-cost price leader has to ensure that the price which he sets must yields some profits to the high-cost firms— their followers.
2) **Dominant Firm:** There is a price leadership of the dominant firm. Under this one of the few firms in the industry may be producing a very large proportion of the total production of the industry and