Uttar Pradesh Rajarshi Tandon
Open University

M.COM-203
Managerial Economics

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Block

1

INTRODUCTION

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UNIT-1

MANAGERIAL ECONOMICS AND ECONOMIST

Structure

1.0 OBJECTIVES

After studying this unit you should be able to:

- What is Managerial Economics?
- Write the difference between managerial economics and pure economics
- How is managerial economics related to statistics?
- Explain the discounting principle of managerial economics
- Describe any five responsibilities of managerial economics
- State the meaning of managerial economist.

1.1 INTRODUCTION

Managerial economics is the systematic application of traditional economics which assists in rational decision making and forward planning process of business management. Managerial economics is also understood to refer to business economics or applied economics or theory of firm. In economics, we include the analysis of theoretical aspects of economic events which are generally based on certain hypothetical assumptions, whereas actual business is related to practical aspects of economic analysis. Managerial economics fill the gap between the economic theories and practical behaviour of the business. It lies at the border line of economics and business management and act as bridge between these two branches of knowledge. This modern and specific branch of knowledge is also known by different nomenclature as Theory of the Firm, Economics of Enterprise, Economic Analysis for Business Decisions, Economic of Business Management etc. After second world war, the subject of managerial economics is gaining popularity and its study is becoming very significant in the courses of Commerce, Management, Accounting, Engineering etc. According to famous economist **Prof. Robbins,** human resources are limited whereas needs and usage are unlimited. Resources can be utilized in various forms. Thus, for best optimum form of utilization, we have to select the best. In any business organization the prime function of manager are decision-making and forward planning. The practical use of economic theories for decision-making and forward planning in the atmosphere of uncertainty is managerial economics. Thus, it can be described as a stream of study that engulfs economic theory as well as with the principles of management. This is the basic reason for the fast popularity, which this discipline is getting in the competitive world of management, day by day. This modern branch has attracted the serious attention of corporate sector towards it. The globalization and meltdown of this century has brought new challenges for managerial economics and in this state the role of economist and managerial economists is getting significant in all over the

world. The managerial economics is taking place of economics in 21st century importance is growing very fastly.

1.2 CONCEPT OF MANAGERIAL ECONOMICS

Managerial economics is that specific branch of general economics which joins the economic theories and business behaviour. This is the micro part of economic science which is used in solving practical problems of business. Business economics in made up of two words *i.e.* business and economics. Business is meant to that human activity which is performed with the prime objective to earn optimum money. Hence, business is a practical activity. The second world economics is of the theoretical character and studies the optimum uses of resources. The business economics analyses the various theories of economics of implement them to practical usage so as to smoothen the decision-making and forward planning. Some of the important definitions are as below.

1. According to **Spencer & Siegelman,** "Business economics is the integration of economic theory with business practice for the purpose of facilitating decision-making and forward planning by management." It means that the integration of economics and business is made in business economics or managerial economics for facilitating managerial decision-making and forward planning process for accomplishment of the organizational objectives.

2. In the words of **Joel Dean,** "The purpose of managerial economics is to show how economic analysis can be used is formulating business policies." This definition depicts that managerial economics attempts to use the economic analysis in planning policy formulation.

3. In the views of **Prof. Hague,** "Managerial economics is concerned with using logic of economics, mathematics and statistics to provide effective ways of thinking about business decision problems." The most important function of management is decision-making and managerial economics helps in solving the problems concerned with deciding through the use of economic theories and statistical tools.

4. As per **Malcolm P. McNair and Richard S. Meriam, "**Business economics consists of the use of economic modes of thought to analyse business situation." This definition states that the implementation of economic methods of thinking for the study of business events and atmosphere is managerial economics.

5. According to **Haynes, Mote and Paul, "**Managerial Economics is economics applied in decision-making. It is a special branch of economics bridging the gap between abstract theory and managerial practice." This means managerial economics is the branch of general economics which is used in the decision-making process. It this definition the emphasis is given on the use of various tools of economic analysis for solving the business problems.

6. **Norman F. Dufty** seems to be in agreement regarding the definition with Haynes, Mote & Paul in his word, "Managerial economics includes that portion of economics known as the theory of firm, a body of theory which can be of considerable assistance to the businessman in his decision-making." In this, a very significant statement has been given that managerial economics can also be termed as theory of the firm.

In the all above definitions, there is difference in word formation but the basic elements are same. The essence of all the definition is same. We can summaries as, "Managerial economics ascots as a bridge between economic theories and business behaviours so that optimum help can be obtained for decision-making and forward planning of managers." There is emphasis on the resource allocation problem so that optimization of solution to the problem of business world may be possible.

1.3 CHARACTERISTICS OF MANAGERIAL ECONOMICS

Based on the above definitions, managerial economics has the following characteristics.

1. **Micro- Economics:** Economics is divided under two categories known as, Micro-economics and Macro-economics. Micro-economics mainly studies the economic behaviour of the individual unit which may be a person, a particular household a particular firm whereas Macro-economics studies all the units combined together or aggregates. Micro-economics deals with a small part of the economy which may be a firm or a person because that study uses to be rather more realistic. The nature of the managerial economics is micro-economics. It studies the activities of a business organization rather than whole economy. The studies related to macro factors are only given due consideration in managerial economics.

2. **Coordination of theory and practice:** Managerial economics includes the analysing the theories of economics and implementing them for practicality the business world always has to bear the loss arising out of the conflict between economic generalist and professonalists but the managerial economics bridges this gap of conflict between them.

3. **Pragmatic:** Managerial economic is not based on the hypothetical assumptions of general economics. The theories of pure economics are generally unrealistic and based on certain assumptions. They work when other things remain equal. But, in practical life, these other things are not always equal but keep on changing. The business economics is based on real experiences and helps to solve business relegated problems in better way.

4. **Helpful in decision-making and planning:** The main aim of business management is to help managers in decision-making and planning. Managerial economics plays a significant role in taking decision of best alternative choice and forward planning regarding uncertain future.

5. **Prescriptive:** Managerial economics is prescriptive and not descriptive this does not explain the problem rather it suggests the solution regarding what to do and what not to do.

6. **Both science and art:** Managerial economics is used a systematic branch of knowledge of thus, it is science on the other hand, this suggests the method for choosing the best, hence it is also art.

7. **Case study Method:** The teaching of managerial economics would be less fruitful through the traditional lecture system. This subject is suitable and best to be taught through case study method in Universities, Colleges and educational institutes so that students could be able to take decisions as managers no the basic of real incidents.

1.4 NATURE OF MANAGERIAL ECONOMICS

The nature of any subject depicts that it is a science or art or both, and again if it is a science then it is positive science or normative science.

As a Science: Science means organised knowledge. Science must have four characteristics; (a) Systematic study of facts, (b) Specific principle rules and theories, (c) Cause and effect relationship among theories, and (d) Universal acceptability of rules. In managerial economics also there is as systematic analysis and study of facts. It has various principles and theories which are characteristics by cause and effect relationship and universal applicability. Managerial economics has some specified theories which are applicable in almost all the situations. Although managerial economics is as science it is not a nature or physical science it is because of the fact that is it deals with human entities and behaviour. It is not as curate as physics or chemistry rather it is a developing social science. Hence, there is no doubt that it is as science, but we have to decide whether it is a positive science or normative science. A positive science answers about "What is?" and normative science includes study "What should be?" Positive science includes the study of realistic situations whereas normative science includes decision taking about the merits and demerits of these situations.

For example in case of death due to poison, positive science states that poison causes death. But normative science states that taking poison is dangerous, thus, a man should never take it, or man should take proper care involves deciding about 'do or do' rather than releasing the economics events. This states about the steps that to be taken for optimum utilization of resources. This is similar to the situation in which the real cause for disease of a patient is derived as pathologist but the remedies to cure are referred by a physician. Like a physician, business economic provides the solution to the business problem and not to simply describe the events. Managerial economics is of prescriptive nature rather than descriptive. It emphasizes more on the ends than resources. It would be more appropriate to keep business economics in the category of normative science rather than positive science.

As an Art: The art is related to the 'know how' of any task art is a behavioural knowledge and it tells the best method for doing any work. Science gives theoretical knowledge whereas art trains about the behavioural activities. Art and science are complementary to each other. The systematic knowledge is science and systematic application of that knowledge for solving practical problem is art. Art teaches us to perform a work in an effective manner. Art is having the ability to answer the question of " how?" This teaches us to do the works is the best way. The managerial economics helps the manager to accomplish the desired goal and method optimum utilisation of resources. This help in choosing the most profitable usage of limited resources of the firm in the uncertainty. It solves the problem relation to production, cost demand, finance and profit etc. Thus, it is clear that business economics or managerial economics is an art also.

It may be concluded that managerial economics is the ultimate combination of normative science and art. In managerial economics, there is deep analysis about 'what should be done?' and 'how to be done?' so some economists also termed it as 'scientific art'.

1.5 SCOPE OF MANAGERIAL ECONOMICS

Managerial economics is a modern and developing stream. Therefore it involves various contradictions in the ideology given by various economists. Its study material and scope is also increasing day by day. Still following aspects are included is the domain of the managerial economics:

1. **Demand Analysis and Forecasting:** The ultimate aim of every business is to sell which leads to profit so decisions taken by business managers mostly depends on demand or sales forecasting. The analysis and pre-determination of demand is the starting or beginning point of business decision and planning. It includes the analysis of law of demand, curve, demand elasticity, factors determining the demand types of demand and demand forecasting.

2. **Cost and Production Analysis:** Every firm is associated with production of specific goods or services. For the profit management and control cost and production analysis is very vital. The cost analysis is done in monetary units while production analysis is in physical units. Thus the scope of cost analysis is wider than production analysis. It includes the study of costing along with its classification the relationship between cost and production linear programming, law of production, cost control and minimisation economies of scale and diseconomies of scale etc.

3. **Price Analysis:** Decision related to pricing policy and applications are significant part of business economics. The main source of income of any business is pricing. The market expansion and success of a business are based on profitable price decisions. The price analysis includes price decision, price policy, price discrimination and price forecasting in various

competitive states. This category includes understanding of pricing and output decision under conditions of perfect competition, monopoly imperfect competition, duopoly oligopoly etc.

4. Profit Management: Profit management is the integral part of managerial economics. The long term goal of every business is fair profit earning which is essential for the success. Profit is the difference between input (cost of production) and output (cost of sales). But there is always a state of uncertainty in the case of profit margin. The understanding of nature and characteristics of profit, profit policy, profit planning and profit forecasting are the main areas of profit management. So in business economics, profit planning through break-even analysis is also studied.

5. Capital Management: Business requires capital investment in plant, machinery, building, copyright etc. Capital investment decisions involve huge money which generally includes study of time factor that is they have to invest for long run. A minor fault in decision-making can bring problem for even the existence of the whole business. Capital related decisions are taken by top management because of its seriousness. These decisions include cost of capital, rate of return, choice of investment proposals sources of capital and capital budgeting.

Besides the above five areas, operation research has also been include in business in the recent years. The various quantitative techniques of operations research like linear game theory, inventory models network analysis through PERT and CPM and decision theory etc. are considered as part of modern managerial economics.

1.6 DISTINCTION BETWEEN MANAGERIAL AND PURE ECONOMICS

Though managerial economics is the specific filed of economics, it differs from economics in several ways. Some of them can be categorized as following:

1. Scope: Economics is a broad area of knowledge which includes economics analysis of both micro and macroeconomics. On the other hand managerial economics is micro economics, whose area is narrower than macroeconomics.

2. Science: Economics is both normative and positive science but managerial economics is mainly normative science. Actually, managerial economics lies in the group of social science or humanities.

3. Theory and Practice: Economics includes the study of economics theories whereas managerial economics includes the study of both economic theory and its practical aspects.

4. Importance of Assumption: The economic theories are based on various assumptions whereas in managerial economic most of the

assumptions get lost in the practical applicability. It is mainly based on real experiences.

5. **Principles of Distribution:** In economics the study of various theories of wages, rent interest and profit are done under the principal of distribution. In managerial economics, only profit theory of distribution is studied.

6. **Economic& Non-economic aspects:** Economics in its pure form limits its work-area to economic aspects only but business economics puts emphasis on problems related to social and political along with economic aspects.

7. **Origin:** Economics is an ancient subject, its existence can be found even in Vedic era also. But managerial economics is relatively modern and its origin is after second world period.

8. **Knowledge of Other Subjects:** Economics generally does not involves the study of other subject at the time of theoretical analysis but managerial economics essentially requires study of accounting, statistics, mathematics etc. due to practical nature of analysis.

1.7 IMPORTANCE OF MANAGERIAL ECONOMICS

Managerial economics plays a very significant role in managerial decision making process. Choosing the best method in alternative ways of doing is known as decision-making. The problem arises because of the scarcity of resources. The scarce resources obviously have alternative uses and wants of any business are unlimited thus the most important want is satisfied firstly and then others. Some of the wants happen to be unsatisfied also. So, the basic problem of managers is "problem of choice." We have to take decisions so that there could be optimum utilization of scarce resources for maximum profit. Managerial economics helps is tasking decisions in the state of uncertainty. Decisions are taken with the help of comparative analysis of practical situation and problem in the light of methods and tools of statistics, mathematics accounting etc. Following are the main points of importance of managerial economics.

1. **Predicting Economic Quantities:** Prediction about cost demand, capital profit, price production etc. are made in managerial economics. In the state of uncertainty the quantitative representation of behavioural problems helps managers to take decision and future planning. The various data are converted as information form managerial decision making. Managerial economics helps the manager as in formation box and radar.

2. **Estimating Economic Relationship:** The relative relationship of price and demand cost and output quantity, advertisement and sales risk and profit are estimated in managerial economics. The elasticity of

demand, cost production relationship etc. facilitates prediction, future planning and decision making power.

3. **Helpful in Understanding External Forces:** Managers have no control over the external economic conditions as national income, trade cycle employment, foreign trade, price inflation industrial licensing, government tax etc. Still can make arrangement while taking decision if are aware of their effects. The managerial decision are not only based on internal environment but also external environment factors managerial economics help in understanding and environmental and arranging the external forces and factors.

4. **Coordination between Economics Principle and Practices:** In managerial economics various economic theories are studied and brought under the area of practicality. There is no place of imagination of theorist in managerial economics and it facilitates solving the real and actual problems due to practical approach. It coordinates between economic principles and practices.

5. **Other Importance:** Managerial economics has other importance also as:

   (i) It helps in deciding business policies.

   (ii) It is used in cost control and reduction.

   (iii) It facilitates forecasting of demand.

   (iv) Various managerial functions as planning, directing motivating, controlling, organizing and coordinating can be performed effectively with the help of business economics.

1.8 RLATIONSHIP OF MANAGERIAL ECONOMICS WITH OTHER DISCIPLINES

The rise and growth of managerial economics has been possible because of the collaboration and assistance of various streams of knowledge during major long duration of past decades. Its domain is characterized by the major interference of economics, statistics, operations research, accounting, etc. even today also. A managerial economist has to obtain help from these subjects in order to find out optimum solution to complex economics problem. Managerial economics relationship with other branches of knowledge is explained as below:

(a) Managerial Economics and Economics: Economics is the mother of managerial economics, commerce and management. Its relationship is not only strong, it can be better termed as a part of heat of economics also. Economics has two parts micro and macro. Micro economics is the source of the concepts, analysis and techniques of managerial economics. The various concepts of micro economics like law of demand, elasticity of demand, marginal and average cost long term and short term cost market and its forms are used in managerial economics

with some alteration. The limited use of pure and macro economics is also made in managerial economics. According to a recent survey of in U.K., following concepts are very useful and applicable in the field of managerial economics:

(1)Elasticity of demand (2) Opportunity cost (3) Consumption nature (4) Marginal product (5) Multiplier (6) Speculation objective (7) Production Multiplier (8) Balanced growth (9) Liquidity preference.

(b) Managerial Economics and Statistics: Statistics can be useful for managerial economics in following ways:

(1) In managerial economics the collection, classification tabulation and analysis of quantitative data is necessary which is impossible without the help of statistics.

(2) In managerial economics, for forecasting the sales, cost and profit various statistical techniques as interpolation extrapolation probability time series etc. are openly used.

(3) The statistical methods are necessary for testing the validity for conclusions of managerial economics. Conclusions are valid if they are proved on the practical grounds of reality.

(4) The probability theory of statistics is an effective tool to tackle uncertainties of economics.

(c) Managerial Economics and Mathematics: There is close relationship between managerial economics and mathematics. Mathematics economics is measureable by its nature. A managerial economics should have the knowledge determinants, matrix, algebra, differential and integral calculus. In western countries also the operations research is very popular, after second world war, especially in United States of America, and operations research, is closely related to managerial economics. In operation research, operations research, mathematical techniques are used to solve business problems. The various aspects of operations research as linear programming, PERT, CPM, game theory, Markov analysis, inventory models etc. are widely used in managerial economics.

(d) Managerial Economics and Accounting: Both are closely related to each other. Accounting profession is related to book keeping of monetary exchange. The main sources of necessary information for decision making of managerial economist are Profit and Loss Account and Balance Sheet. The details of sales demand, supply production and cost of a firm are obtained form accounting. The growing relationship of 'Management Accounting' a specific branch of accounting and managerial economics is to be considered in this regard. The main function of management accounting is to provide data which is used in finding solution to managerial and business problems. Various tools of management accounting and finance like cost of capital, capital budgeting, ratio analysis marginal costing, etc. are widely used by modern managerial economics.

1.9 METHODOLOGY OF MANAGERIAL ECONOMICS

Managerial economics is that branch of knowledge in which economics principles are integrated with business management. Therefore, for the study of subject matter of business economics, the management and economics related different methods are systematically used. The various methodology of business economics are given as (a) Deductive Method,(b) Inductive Method, (c) Case Study Method, and (d) Econometric Method.

1.9.1 Deductive Method

In this method, efforts are made to find out particular truth based on general truth. For example, it is a general truth that the demand of commodities falls with the rise in its price. Mango is a particular commodity; its demand would decrease with increase in price. In this way, particular conclusion is find out. This method is easy, clear, specific universal and non-partial but the conclusion made through method may be far from the reality. This is based on the imaginary assumption of 'Ceteris paribus' but in reality Ceteris is never paribus.

1.9.2 Inductive Method

This method is just opposite to deductive method. In deductive finding out particular truth is based on general truth (i.e. from particular to general) whereas in inductive method finding out general truth is based on particular truth (from general to particular). For examples, Ram, Shyam, Sachin and Saurabh buy more commodities at the time of fall in price. It is a particular truth; a general conclusion can be that price decrease leads to increase in demand. This method is realistic as it is based on experimenting and observation but it is also full with errors of partiality, complexity and limited scope.

1.9.3 Cases Study Method

The case study method is very popular in managerial economics study. It was formulated by the Professors of **'Harvard Business School'** of USA and thus is also termed as 'Harvard Approach'. This includes less concentration on traditional lecture system and more and more encouragement to active participation of students is given in the class. The students are given real or hypothetical cases related to business world so that they may found conclusion based on group discussion among themselves. The student is not a spectator and gives his arguments in active way on that particular case. The aim methods in this category are as follows-

(1) **Plenary Session:** In this the students start any topic for discussion the other students raise their opinion argue on that topic. At the end conclusion is drawn based on that discussion. This method does not provide every student to take sufficient time to their views.

(2) **Syndicate Discussion:** In this method this students groups is divided in various syndicated. Every syndicate has 8-10 students, who discuss particular case and find out conclusion. Then, representative from each syndicate presents his conclusion in front of all the group. The role of instructor or teacher is mainly for arranging the discussion in the syndicate.

(3) **Role Playing:** In this method every member is given the role of different person related to the case and they have to give their opinion according to the role assigned. This method is very useful for discussion.

(4) **Individual Exercise:** In this every student is given different case on which he has to provide his individual observation and findings in form of report. The instructor provides brief report on them through proper debate.

(5) **Incident:** In this method the instructor provides the background knowledge and initial primary points about any event or incident and asks for question regarding other necessary information required the discussion is done after getting satisfied with the answers given by the students.

CASE ANLYSIS PROCEDURE

There is no specific procedure for case analysis and it differs according to the students and incidents. Still, the following procedure is accepted in most of the cases:

(a) Identifying the central problem related to the case.

(b) Arranging the important facts proofs and information regarding the central problem.

(c) Thinking about the alternative option related to the problem.

(d) Comparative study of various alternatives.

(e) Choosing the best alternative for solution.

ADVANTAGES OF CASE STUDY METHOD

(1) The students learn to use the theoretical knowledge in solving the practical problems.

(2) Students get informed about the complex realistic situations.

(3) Students are able to differentiate between right and wrong decisions and get aware of the possible solution.

(4) Development of decision-making skill in students with cooperation of other will be possible.

(5) Students are able to recognize the specific and minute aspects of the problem.

LIMITATIONS OF CASE STUDY METHOD

(1) Lack of sufficient and good case material.

(2) It involves lot of time

(3) Limited study is possible through this method.

(4) The availability of the appropriate case for study difficult on the ground of accuracy and suitability.

1.9.4 Econometric Method

According to **Prof. J.K Mehta,** econometrics is the combination of pure economics principles, mathematics and statistics. **Tinburger** has rightly said that econometrics is like table tennis game where economics is on one side and statistics at another and mathematics acts as ball. In econometrics efforts are made to find out best possible decision based on mathematical and qualitative techniques. Linear programming game theory PERT and CPM, inventory model etc. help in this. This method is very useful but less understanding by most of the people due to its complex nature. Econometrics was started in 1920 but it is still in initial growth stage. In 1930, econometric society was established and it is publishing very useful journal on this subject.

1.10 FUNDAMENTAL PRINCIPLES OF MANAGERIAL ECONOMICS

There are some basic principles of economics which help managers in decision-making. **Haynes, Mote** and **Paul** have given five basic principles as below:

(1) **Opportunity Cost Principle :** There can be alternative uses of any product or service. Use of one alternative means forego other alternative opportunity."Opportunity cost of a particular product or service is the value of the foregone alternative product or service that resources used in its production could have produced" said **Leftwitch.** For example, opportunity cost of money invested in any business is that amount of interest that can be obtained from investing elsewhere.

(2) **Marginal or Incremental Principle:** The change in the total of any quantity of any resource usage due to a one-unit change or increase is measured by marginal principle. But, some resources can not be changed exactly by one unit and various resources are indivisible. In these circumstances, incremental principle is used. The incremental principle is applied to business decision which involve a large increase in total cost total revenues Incremental cost and incremental revenue are the two important part of it. The increase in cost due to such decision is called incremental cost and increased in revenues is called incremental revenue. According to this principle, that successful decision would considered to

be taken so that there is more increase in incremental revenue compared to incremental cost In case of alternative options the highest increase in incremental revenue would be considered to be best.

(3) Principle of Time Perspective: The long-term and short tern effect of any decision on cost and revenue is also considered in managerial economics there should be an optimum balance between long-term and short-term effect for any appropriate decision. It is quite possible that any decision is profitable in short term but proves to be dangerous in long-term. A manager should make analysis of the long term and short term effects and assess the time perspective of decisions.

(4) Principle of Discounting: It is a matter of common sense that the value of one rupee of present time would be more than the value of one rupee to be received in future. If there is a choice to receive gift of Rs.100 today or after one year the sure answer would be today. This happen because of two reasons: First, future is uncertain and there is also a possibility of non-happening of any event in future *i.e.,* one may not be getting in future Second reason is that the investment interest can be obtained if the money is received today. If the rate of interest is 10% the value of Rs.100 of today would accumulate to Rs.110 after one year. In principle of discount, the amount of money is calculated which would be equal to Rs.100 at the present interest rate. The formula for calculation is a follows.

$$\text{Present Value} = \frac{\text{Rs 100}}{\text{1+\% Rate of interest}}$$

$$= \frac{100}{1+10\%} = \frac{100}{1+\frac{10}{100}} = \frac{100}{\frac{110}{100}} = \text{Rs. 90.90}$$

In other words, if Rs.90.90 of today is invested and the percentage rate o interest is 10% then he interest would be Rs.9.10 and the total money after one year would be Rs.100 This principle states that if there is possibility of affecting of cost and revenue in future due to any decision then these values should be decided by discounting on their present value.

(5) Equi-Marginal Principle: This principle states that available resources of production should be so allocated between the alternative usages that the marginal utility derived from each unit is same According to it a consumer distributes his expenditure among different goods and services in a way that the marginal utility obtained from each unit is same to reach in the position of equilibrium. The total amount of accumulated usage is the maximum according to **Marshall,** "It a person has a thing which he can put to several uses, he will distribute among these uses in such a way that it has same marginal utility for if it had a greater marginal utility in comparison to other he would be gained by taking some of it second use and apply it to the first."

1.11 MANAGERIAL ECONOMIST

A managerial economist is one who helps the managers for decision making and forward planning through analysis business and managerial economics. He provides the expert advice to top level management in economic perspective by his knowledge and specialisation of managerial economics. Almost in every country the managerial economists are appointed and their valuable contributions are taken for betterment of business and economy as a whole. In developed countries, countries especially in USA and UK the big corporate are appointing one or more managerial economists. In India also the importance of these persons are increasing gradually with the growth of management science and its expansion the big business houses like Tata, Birla, Hindustan Lever, DCM etc. are taking the help of these managerial economist.

1.11.1 Role Of Managerial Economist

A business can be assumed to be a boat in uncertain ocean and if the sailor of the boat is inexperienced and less qualified then is always danger of sinking. A managerial economist makes the manager aware of these uncertainties through his prediction at time. The main function of business economist is to specify the internal and external factors and give suggestions regarding their effect and impact to the managers so that appropriate decisions could be taken. A managerial economics has to perform following roles:

(A) **Analysis of external Factors:** The external elements are out of control of managers, these are also known as "Business Environment" Although there is no control of manager on external factors but its knowledge is important for them. External factors cannot be changed but appropriate arrangements in the decisions of management can be made according to the external factors. The main external factors are: trade cycle, national income, employment government policy and regulations international business trends inflation etc. The managerial economist provides accurate and prompt information to the managers so that decision making and future planning can be made more effective.

(B) **Analysis of Internal Factors:** The internal factors are in full control of the manager. These activities take place within the business so these are also called "Business Operations". The elements involved are the following: pricing, investment, cash, inventory, advertisement etc. Every firm is independent to take decision regarding them. Like where to invest? how much to invest? what should be the price of commodity? how much to spend on advertisement? etc. A managerial economist play a significant role in assisting the managers to take decisions regarding sales budgets inventory price, wages cash etc. He gives suggestions to top level management related to internal factors.

(C) **Specific Functions:** A managerial economist also performs specific function for managers Government and financial institutions etc. They have to provide their expertise based assistance on various matters as required by the authorities. The common functions in this category are.

1. Sales forecasting,
2. Market research,
3. Analysis of capital projects,
4. Production programs,
5. Analysis of agricultural functions,
6. Advices on foreign exchange,
7. Suggestions regarding raw material and
8. Suggestion on public relationship.

(D) **To Provide Economics Intelligence:** The managerial economists provide information related to pure economics to the managers like competitive price, tax import export duty etc. Basically the subject matter in various publication large number of information. The managerial economist provides the appropriate information regarding relevant subject matter through his knowledge and professional expertise.

1.11.2 Responsibilities Of Managerial Economist

A managerial economist has the following responsibilities:

1. **To earn reasonable profit on capital employed:** Profit earning is the main aim of every business. It is the responsibility of a managerial economist that he should be helpful in increasing the profit earning capacity of the organisation. Now-a-day, the excessive profit gives rise to other problems like criticism government restriction and regulation also. Thus, the appropriate profit should be emphasis in place of excessive profit. Managerial economist should provide his services keeping the appropriate profit in mind.

2. **To make accurate forecasting:** The business activities are very much based on the prior decisions which are based on forecasting. Thus, it is the managerial economist's responsibility to successfully forecast through deep analysis of business circumstances. He should warn the mangers regarding the future risk and possible circumstances. He should regularly forecast the business nature and turning point and inform the managers about them.

3. **To inform the management for errors:** It is the duty of the managerial economist to inform the managers immediately regarding any error founds by him. The managers would be able to

make amendments in decision so made A business economist should never hesitate in providing information of any error. Also the errors in his own decision should be immediately correct with the help of the managers. Else, in long run the accuracy of every decision will be affected.

4. **Wide Contacts:** A managerial economist should have a wide range of contacts so that the useful economic information can be provided to the managers on time. He should be an active member of business and social committees. His success is measured in terms of obtaining necessary, complex and confidential information with speed.

5. **To make the status respectable in the firm:** It is also the responsibility of the managerial economist to make a respectable position in the firm for himself through hard work. He should have the quality of performing task with perfection and promptness. For explaining the situation, he should use minimum technical words and use easy and intelligent language so that manager could easily understand.

To conclude it is clear in a developing country like India where the managerial economics services are considered to be a luxury, a business manager should discharge his duty with hard work and justify his position. In present 21st Century the responsibilities of business economist are getting crucial.

1.12 SUMMARY

Managerial economics is a specific branch of general economics which joins the economic theories and business behaviour. This is the micro part of economic science which is used in solving practical problems of business. The business economics analyses the various theories of economics for implement them to practical usage so as to smoothen the decision-making and forward planning. Managerial economics is the ultimate combination of normative science and art. In managerial economics, there is deep analysis about 'what should be done and how to be done?' Managerial economics is termed as 'scientific art'. Managerial economics plays a very significant role in managerial decision making process. Managerial economics is that branch of knowledge in which economics principles are integrated with business management. A managerial economist is one who helps the managers for decision making and forward planning through analysis business and managerial economics. A managerial economist makes the manager aware of these uncertainties through his prediction at time. A developing country like India where the managerial economics services are considered to be a luxury, a business manager should discharge his duty with hard work and justify his position.

1.13 Key Words

Business Economics: Is a field in applied economics uses economic theory and quantitative methods to analyse business enterprises and the factors contributing to the diversity of organizational structures and the relationships of firms with labour, capital and product markets.

Normative Science: A science that tests or evaluates and not merely describes or generalizes facts.

Opportunity Cost: The cost of an alternative that must be forgone in order to pursue a certain action.

Analysis: Is the process of breaking a complex topic or substance into smaller parts to gain a better understanding of it.

Decision Making: Is the cognitive process resulting in the selection of a course of action among several alternative scenarios.

1.14 TERMINAL QUESTIONS

1.14.1 Essay Type Questions

1. Define Managerial Economics and briefly explain its characteristics, nature and scope.
2. "Managerial Economics is both science and are. It is prescriptive not descriptive." Justify this statement and outline the scope and importance of managerial economics.
3. Who is a managerial economist? Throw light on his role and responsibilities in business management.
4. How is managerial economics related to other branches of Knowledge? Explain the methodology of managerial economics.
5. Discuss the role and responsibilities of managerial economist towards his organisation.
6. Explain and illustrate the nature, scope and importance of managerial economics.
7. Briefly point out the meaning and importance of managerial economist.

1.14.2 Objective Questions

1. Managerial Economics is ……

   (a) Pure Science (b) Complete Science

   (c) Social Science (d) Natural Science

2. The fundamental principle of managerial economics is.....

(a) Opportunity Cost (b) Time Perspective

(c) Equi-Marginal (d) All above

3. The methodology of managerial economics is…….

(a) Deductive Method (b) Inductive Method

(c) Econometric Method (d) All above

4. Managerial economics mainly helps the firm in decision-making and…

(a) Planning (b) Communication

(c) Leadership (d) Motivation

Ans. 1. (c), 2. (d), 3. (d), 4. (a)

UNIT-2

UTILITY

Structure

2.0 OBJECTIVES

After studying this unit you should be able to:

- Critically review the cardinal approach of utility measurement.
- Explain the meaning and characteristics of utility.

Introduction

- Explains with the help of diagram the relation between marginal utility and total utility.
- What are the criticisms of marginal analysis of utility? Briefly explain.
- State the meaning of cardinal and ordinal approaches of utility measurement?

2.1 INTRODUCTION

The economists analyse the consumer behaviour through two principles known as utility analysis and indifference curve analysis. Utility analysis is the oldest method and usually known as **Prof. Marshall's** demand principle. Modern economists study the consumer demand with the help of indifference curve analysis.

2.2 INTRODUCTION OF UTILITY

Utility is a term used by economists to describe the measurement of "useful-ness" that a consumer obtains from any good.. The utility of any object or circumstance can be considered. In simple words it means the property of any goods or service to satisfy any human want. That property, ability and characteristics of any commodity which can fulfil any particular human want is called as utility of that commodity. Some examples include the utility from eating an apple, from living in a certain house, from voting for a specific candidate, from having a given wireless phone plan. In fact, every decision that an individual makes in their daily life can be viewed as a comparison between the utility gained from pursuing one option or another.

According to **Prof. E. Waugh,** "To the economist utility is the ability to satisfy human wants."

According to **Thomas,** "Utility is that property of a commodity which is inside it, for the satisfaction of human needs."

This way the want satisfying property gives the birth to utility. Utility is a psychological concept dependent on the mental makeup of a consumer. For example one person may be more satisfied with a blue tie as compared to another person who does not like blue colour. Different people have different utility with the same product or commodity. Utility is subjective phenomenon and remains in the individual mind and that are the reason for different utility for different people for the same commodity.

2.3 CHARACTERISTICS OF UTILITY

It is necessary to understand following characteristics for complete understanding of utility concept:

1. **It is a psychological phenomenon :** The utility can only be felt. It is related to the inner emotions of the individual. Utility depends on mental makeup of consumer. It can only be known through introspection. It is totally invisible and is not having any physical entity.

2. **It is a relative term :** The utility changes according to place, time, fashion and taste of consumer. For example, bread is useful for a hungry man but for a person who is not hungry, it does not have any utility. It is affected by time and place also. Similarly, blanket is useful is winter and not in summer.

3. **Utility exists both in useful and harmful commodities :** Milk, butter, fruits, vegetables, eggs etc. are called useful commodities whereas liquor, cigarette, drugs etc. are harmful for the health. In economics both harmful and useful commodities have utility. A harmful product like liquor may be useful for drunker because it gives utility and high degree of satisfaction to him.

4. **Utility does not depend on actual consumption :** Utility and Satisfaction are two different terms. Utility means expected satisfaction' rather than 'actual satisfaction'. A consumer anticipates the utility while purchasing of a commodity whereas satisfaction is obtained by actual consumption of the commodity. Expected satisfaction or utility depends on intensity of desire of the consumer.

2.4 MEASUREMENT OF UTILITY

Utility is based on mental makeup of the individual. It is intangible and dynamic. This utility cannot be measured physically and directly. But there are two popular methods for indirect measurement of utility:

(a) Cardinal approach and (b) Ordinal approach. Both the approaches have been taken from mathematics.

2.4.1 Cardinal Approach

Marshall & some other economists have basically suggested to measure utility by money related scale. The price which the customer is ready to pay for any commodity is the measure of utility of that particular commodity. For example, if Ram is ready to pay Rs.10 for a book, we may say that the utility of pen is equal to Rs.4 and the utility of the book is Rs.10. This way the utility is measurable. The economists who believe in such concept are called cardinality. 1,2,3,4 etc. are cardinal numbers. These numbers clarifies that 4 is twice equal to 2, their difference is 2 and sum is 6. According to this approach utility can be provided in cardinal number and quantitative measurement is possible this way the measurement and comparison between the utility of two commodities become possible.

Criticism : Some economists like **Hicks, Allen Pareto** etc. do not agree with the Marshall's Cardinal approach. According to them, utility is not measurable. Following are the reason for this type of criticism:

(1) The **authentic measurement** of utility is not possible Scientists have not invented any instrument like utility meter to measure utility. Utility is measured in terms of money, the value of which is not constant and certain. It keeps on changing. The authentic measurement of money is not possible like kilogram, kilometre, inches and feet etc. as utility is a psychological phenomenon.

(2) Utility is **different for different people.** The utility of same commodity may be more for a poor man and less for a rich man. The income fashion, interest and nature of customers differ. Also the utility of one commodity may be measured accurately when it different according to persons interest and time.

Due to the above criticism ordinal approach has been accepted in place of Marshall's cardinal approach.

2.4.2 Ordinal Approach

Hick and **Allen** have rejected the cardinal measurement of utility but not the whole concept of utility. Hicks has given the concept of indifference curve analysis in place of utility analysis in which there in no need of utility measurement. In ordinal approach, only compares on is made among different utilities. This approach only the compares on is made among different utility. This approach suggests how to arrange various utility in a systematic way and does not measure the utility (1^{st}, 2^{nd}, 3^{rd}, 4^{th}) first, second, third, fourth etc. are ordinal number. They only tell about the order and not the difference. For example, the utility arrangement of a shirt is greater than orange but how much greater it can not be said. The customer arranges the commodities according to price and importance of those commodities.

It doesn't mean that the cardinal approach for utility measurement of Marshall is inacceptable. There is definitely a conflict between old and new concept but money measuring rod is used for measuring money. Though, they are rough and imperfect. In economics literature both the concepts peacefully exist together even today.

2.5 TYPES OF UTILITY

Utility is of two types: marginal utility and total utility. Apart from these two, there is the concept of a average utility also, by which average of utility is measured. In that we divide the total utility by number of units consumed.

2.5.1 Marginal Utility

Marginal utility is the utility derived from an additional unit of any commodity. We may also say that marginal utility is utility derived from the marginal unit consumed. It means the satisfaction you derive out of using a commodity. For example, if the total marginal utility is 30. In the words of **K.E. Boulding,** "Marginal utility refers to the extra utility added by one extra last unit of a good."

In simple way $MU = TU_{n+1} - TU_n$

So, Marginal utility= Total Utility of n+1 units- Total utility of n units Marginal utility of 3 types: positive, zero and negative. The marginal utility resulting from the consumption of units of product starts from positive and the total utility increases with the addition in units. It starts form positive and the total utility increases with the addition in units. It reaches to a point of highest satisfaction where marginal utility becomes zero and total utility becomes constant. After this point increase in consumptions leads to negative marginal utility and total utility becomes constant. After this point increase in consumptions leads to negative marginal utility and total utility starts decreasing.

It can be say that in normal way marginal utility is of three types can be illustrated as below:

No of units of Apple	Marginal Utility	Total Utility
1	50 (positive)	50
2	40 (positive)	90
3	20 (positive)	110
4	15 (positive)	125
5	5 (positive)	130
6	0 (zero)	130
7	-5 (negative)	125
8	-10 (negative)	115

In the above table, as consumer consumes more units of commodity, his total utility increase but the marginal utility falls with the every additional unit. As per the table the marginal utility is positive till the consumption of 5^{th} unit. The utility of sixth unit is zero and this is the point of satiety or point of saturation. If the consumer intake the additional

units of seventh and eighth, it generates negative marginal utility. This example can be shown through diagram as below:

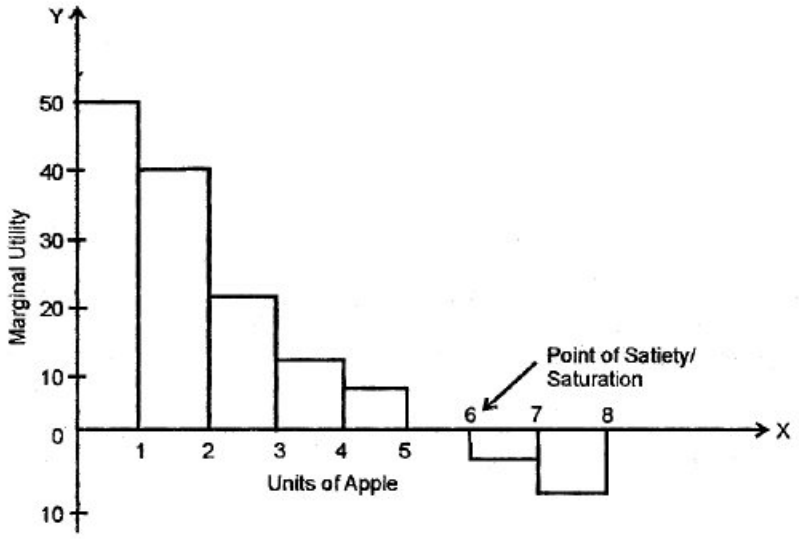


Diagram-1

In the diagram OX line depicts apple units and OY the marginal utility. It shows that the utility till the fifth unit is positive. Sixth unit's consumption gives zero utility and it is the point of satiety. Additional unitsconsumption give negative marginal utility which is shown on lower part of OX line.

2.5.2 Total Utility

The aggregate of marginal utility derived from the various units of commodity is called total utility According to **A. L. Meyers,** "Total utility is the sum of the marginal utilities associated with the consumption of the successive units." It means that if a person is consuming some units of any commodity, his total utility will be the sum of individual utility derived from each unit of the commodity.

It is clear from the above example and diagrams that:

(i) As the consumption of unit of apple increases total utility increases but with diminishing rate. Initially, it increases by 40 point then by 20, 15 and 5 respectively.

(ii) The total utility stop rising after the fifth unit and the total utility of sixth unit is equal to the total utility of fifth unit. This is called point of satiety.

(iii) Total utility after sixth unit's consumption, decreases because of negative marginal utility. In diagram 2, the total utility derived from apple utilisation is shown in ABCDEFGH points. The total utility stop increasing after sixth unit and the consumer get the maximum total utility. That is why point 'F' is called 'point of satiety'. Subsequently, the total utility starts diminishing after this point.

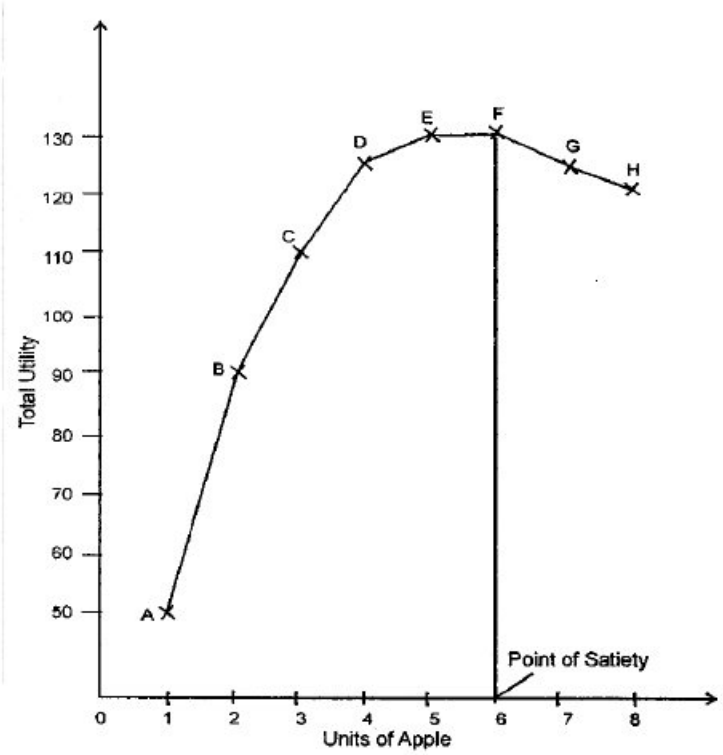


Diagram-2

2.6 RELATIONSHIP OF MARGINAL AND TOTAL UTILITY

There is a close relationship between marginal utility and total utility. The marginal utility shows the rate of change in total utility whereas the total utility shows the sum of marginal utility. In other words, marginal utility can be measured from total utility curve and total utility can be measured from marginal utility curve.

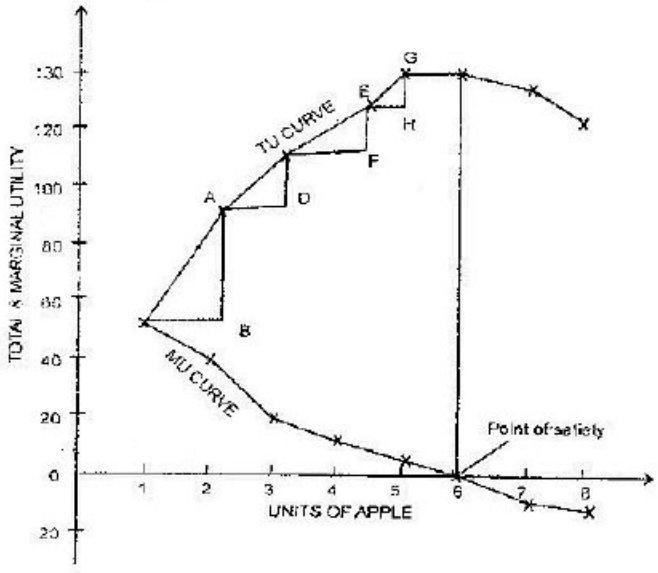


Diagram-3

Introduction

Diagram 3 clarifies that marginal utility can be measured from total utility. The marginal utility obtained from second unit is AB. In the same way CD, EF,GH are marginal utilities from subsequent units. But marginal utility is diminishing as AB> CD> EF> GH. On the other hand, total utility can be obtained from marginal utility.

The following relationship is clear from the diagram between marginal and total utility:

(1) When marginal utility is positive, the total utility increases with diminishing rate. It happens till fifth unit of apples.

(2) When marginal utility is zero, the total utility is maximum and constant. The sixth unit consumption of apple is the point of satiety, where total utility is maximum.

(3) After this point of saturation (after sixth apple) the consumption of additional unit of apple gives negative utility and the total utility starts falling.

Thus, we can say that there is an interrelated and close relationship between the marginal utility and total utility, because when marginal utility is positive total utility increases and it is maximum when marginal utility is zero and when the marginal utility is negative total utility starts falling.

2.7 MARGINAL ANALYSIS

2.7.1 Significance of Marginal Analysis

The term marginal is used almost everywhere in economics because it helps in determining the position of equilibrium. It is used in all the five branches or area of economics such as consumption, production, exchange (price principle), distribution and public finance. The former Head of Economics Department of Allahabad University, **Prof. J. K. Mehta** has very rightly mentioned the importance of marginal analysis that, "Almost the entire economic structure is based on concept of marginal utility". Different important considerations of marginal analysis or marginal utility in various areas are following:

(a) In Consumption: Consumption's law of diminishing marginal utility, consumer's surplus, law of equi-marginal utility, law of demand are based on marginal concept. It has been explained below:

(i) Marginal utility concept states that as we increase the consumption of the commodity marginal utility decreases. In other words, the use of more units leads to decrease in marginal utility and this is the base for law of diminishing marginal utility.

(ii) Every individual wants to obtain the maximum satisfaction by limited resources and he takes the help of marginal utility for this. Customer can achieve this objective by spending the limited resources in a way so that the marginal utility in spending each element is equal. This is called law of equi-marginal utility.

(iii) The principle of consumer surplus is also based on the concept of marginal utility. The utility obtained from the marginal unit of any commodity is equal to the price of that commodity, but the consumer gets more utility on the consumption of units prior to the marginal unit. He gets surplus on the units prior to marginal unit.

(iv) Law of demand is based on law of diminishing marginal utility and this law of diminishing marginal utility is based on the concept of marginal utility. In this way, law of demand is also based on marginal utility concept.

(b) **In Production :** Any manufacturer will manufacture the commodity up to the point where the cost of manufacturing the last unit is equal to the price to be obtained from that commodity. For example, the quantity of land will be used only upto the point when the cost of purchasing the last unit of this land is equal to the revenue received on it. If it does not happens one resource is replaced by another resource. This law of substitution of production is actually the another form of law of equi-marginal utility.

(c) **In Exchange :** In the area of exchange or price determination of commodities the contribution of marginal utility is significant. An individual pays the price of the commodity which is equal to marginal utility of that commodity. Marginal utility has the nature of being equal to price of commodity. The consumer will continue purchasing the commodity till its marginal utility gets decline to the price equal to the commodity. Thus, on equilibrium point the marginal utility is equal to the price of commodity.

(d) **In Distribution :** Remuneration of the factors of production is dependent on their marginal production. The rent, wages, interest and profit for the land, labour, capital and entrepreneur are based on their respective marginal productivity.

(e) **In Public Finance :** In the area of public revenue or public finance, the government want, to spend the income in such a way so that there is maximum advantage to the public. For this purpose, the concept of marginal utility is used. The government make its expenditure on various items in such a way that the marginal utility derived to the public is equal. This way, the concept of the excess taxation for rich is derived from the marginal utility. The utility of money is less to rich and more to poor. Thus government imposes more tax on rich section and less on poor section of the society.

2.7.2 Assumptions of Marginal Analysis

Marginal analysis is based on following assumptions:

(1) All the units of commodity are homogeneous.

(2) The consumer always works and thinks in rational way.

(3) If a minute change occurs in price then the demand and supply also get regularly changing.

(4) On a particular time, the necessities are unchangeable or unaffected.

(5) The income of a person is constant at the given time of consumption.

(6) There are large number of buyers and sellers of the commodity in the market.

2.7.3 Limitations of Marginal Analysis

Marginal utility has been criticised due to its impractical and ambiguous assumptions in following ways:

(1) The continuity assumption between demand and supply relationship is not correct. In real life, minute changes in the prices of durable goods such as radio, fan, television, cycle etc. do not always lead to change in demand and supply.

(2) To consider all the units of commodity as homogeneous is not correct. In practical life, all the unit of a commodity are not always same.

(3) The assumption that a customer always acts in rational and intelligent way, is not correct. In real life, the custom, emotion, taste, preference habits etc. have a significant impact on consumer behaviour.

(4) The assumption of constant income is wrong and unrealistic. The income and wants of a consumer keep on changing.

(5) The quantitative measurement of utility is not always correct. Marginal utility is a psychological phenomenon and depends on mental makeup of consumer. Different views can exist for the same commodities for different persons; even the same consumer can have different opinion for the same product in different time durations.

According to above criticisms, marginal analysis may not have same place in macro economics as in micro economics. Though, it provides significant help in various aspects of economics.

2.8 SUMMARY

Utility is a term used by economists to describe the measurement of "useful-ness" that a consumer obtains from any good. It means the property of any goods or service to satisfy any human want. That property, ability and characteristics of any commodity which can fulfil any particular human want is called as utility of that commodity. Utility is a psychological concept dependent on the mental makeup of a consumer. According to cardinal approach utility can be provided in cardinal number and quantitative measurement is possible this way the measurement and comparison between the utility of two commodities become possible. In ordinal approach, only compares on is made among different utilities. Utility is of two types: marginal utility and total utility. Marginal utility is the utility derived from an additional unit of any commodity. The aggregate of marginal utility derived from the various units of commodity is called total utility.

2.9 KEY WORDS

Marginal Utility : Net increase in Total Utility with the consumption of one additional unit of goods or services.

Total Utility: Over all amount of satisfaction achieved by a consumer.

Indifference Curve : Diagram depicting equal levels of utility (satisfaction) for a consumer faced with the various combinations of goods.

Average Utility : Utility derived from the one unit of commodity.

2.10 TERMINAL QUESTIONS

2.10.1 Essay Type Questions

1. What is the concept of utility? Explain its features and methods of measurement.
2. "Utility is ordinal concept and not a cardinal concept." In the light of this statement elucidate the measurement of utility.
3. State the meaning of marginal utility and total utility Prove that when a commodity's marginal utility is zero, the total utility is maximum. Give diagram also.
4. Explain the relation between marginal utility and total utility with the help of diagram. Discuss critically the importance of marginal analysis is Economics.

5. "Utility signifies neither usefulness nor satisfaction but the intensity of desire for a thing." Discuss and explain total and marginal utility with the help of suitable diagrams.

2.10.2 Objective Questions

1. Who was the propounded of cardinal approach of utility?

   (a) Marshall (b) Hicks

   (c) Allen (d) None of above

2. Which of the following is/are correct attributes of utility?

   (a) Expected satisfaction

   (b) Relative

   (c) Psychological

   (d) All of ahoy

3. Total utility is maximum when marginal utility is……...

   (a) Zero (b) Positive

   (c) Negative (d) None of above

4. Who has propounded the indifference curve analysis?

   (a) Marshall (b) Adam Smith

   (c) J. K. Mehta (d) None of the above

Ans. 1. (a), 2. (d), 3. (a), 4. (d).

UNIT-3

LAW OF DIMINISHING MARGINAL UTILITY

Structure

3.0 OBJECTIVES

After studying this unit you should be able to:

- Explain the meaning of Gossen's first law.
- Why does Law of Diminishing Marginal utility operate?
- What are the various assumptions and exceptions of law of diminishing utility?
- How has Adam Smith described the diamond- water paradox in context to utility?

3.1 INTRODUCTION

Man can only fulfil his few wants among unlimited wants due to limited resources. In starting the wants may be very strong but with increase in the consumption of units these wants get weaker. This experience has been consociated as law of diminishing marginal utility in economics. The German economist **H.H. Gossen** has firstly used this law and thus, it is also called as Gossen's first law. Later the economists like

Introduction

Bentham, William Stanley Jevons and Marshall have presented its scientific explanation.

3.2 MEANING OF THE LAW OF DIMNISHING MARGINAL UTILITY

A principle stating that as the quantity of good consumed increases, eventually each additional unit of the good provides less additional utility--that is, marginal utility decreases. Each subsequent unit of a good is valued less than the previous one. The law of diminishing marginal utility helps to explain the negative slope of the demand curve and the law of demand. One of the main characteristics of utility are that as an individual purchases more units of any commodity its utility starts decreasing. Some of the important definitions regarding law of diminishing marginal utility are as below:

1. According to **Marshall,** "The additional benefit which a person derives from 'given increase of a stock of a thing diminishes, other things being equal, with every increase in the stock of that he already has." This depicts that the utility obtained from subsequent units of commodity gets diminishes, when other things are equal.

2. "As a consumer increases the consumption of any one commodity, keeping constant the consumption of all other commodities, the marginal utility of the variable commodity must eventually decline." As said by **K.E. Boulding.**

It is clear from **Boulding's** definition that when a commodity is consumed on a particular time or the consumption of other commodity is assumed as constant, the marginal utility of consumption will decline.

3. In the words of **Thomas,** "The utility of additional supplies of a commodity diminishes with every increase in the available stock of it. Moreover, total utility increases but at a diminishing rate until eventually any further increments of the commodity may have disutility."

Thomas has specified that increase in the supply of commodity leads to decrease in utility and total utility increases with decreasing rate. Later, when marginal utility is negative, total utility falls.

4. According to **Chapman,** "The more we have of a thing, the less we want additional increments of it or the more we want not to have additional increments of it." Chapman is also agreed with the statement that more commodities lead to reduction in its desire and less commodities lead to its more liking.

According to this law, the marginal utility depends on its quantity. This law is based on the fact that only a particular want can be satisfied at a particular time. The utility of first unit of commodity is more and reduces the intensity of its need. The utility derived from second unit of commodity is less than the first one and this continuation of consumption

leads to point of satiety. The utility obtained after this point is negative or can be considered as disutility.

It is clear from the table that increase in the consumption of units of apple results in decrease of marginal utility. This illustration can be described by diagram also. The upper fart of diagram 1 shows total utility and lower part shows marginal utility. The use of apple till fifth unit leads to increase of total utility but with diminishing rate because marginal utility is decreasing. Sixth unit marginal utility gets zero and total utility becomes constant after reaching to the maximum point. Sixth unit is the point of satiety. After this marginal utility become negative and total utility starts declining.

Clarification by table and diagram:

The following imaginary table explains the utility obtained from consumption of apples:

Unit of Apples	Marginal Utility	Total Utility
1	7	7
2	6	13
3	4	17
4	2	19
5	1	20
6	0 (Point of Satiety)	20
7	-1	19
8	-2	17

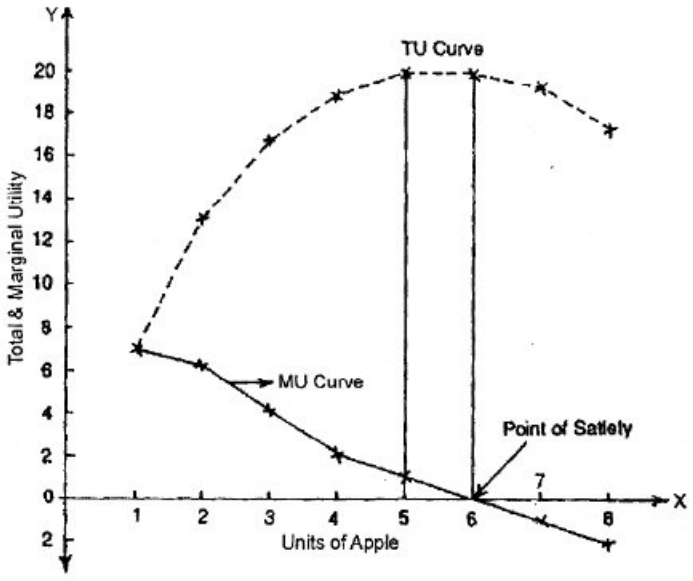


Diagram-1

In conclusion, we can say:

1. Positive marginal utility till the fifth unit results in rise in total utility.
2. Total utility is maximum at sixth unit when marginal utility is zero.
3. Total utility starts diminishing in seventh and eighth unit when marginal utility is negative.

3.3 REASONS FOR THE LAW

Prof. Boulding has given two reasons for diminishing marginal utility as given below:

1. **Commodities are not perfect substitutes:** In reality, the commodities are imperfect substitutes of each other. Commodities can be used in proper proportion. For example, a definite quantity of butter is used with a definite quantity of bread. If quantity of butter is increased by taking same quantity of breads, the marginal utility which is generated would he negative in relation to the units of butter.
2. **Satiability of particular wants:** A particular want can be satisfied at a particular time. We cannot use any commodity to the infinity. The consumer reaches to the point of satiety by consuming the product where utility is zero and total utility is maximum. Thus, the wants get satisfied at a point and successive consumption obtains disutility.

3.4 ASSUMPTIONS OF THE LAW

Marshall and some other economists have used the word 'other things being equal' is the definition of this law This means that this law has some assumptions in which this law is applicable otherwise, not. The main assumptions are following:

1. All the units of commodity should be homogenous in quality and quantity
2. Units of commodity and the size should be proper and accurate.
3. There should not be any difference in time and place in consumption of commodities.
4. There should not be any change in value of commodities during consumption period.
5. There should not be any change in the mental makeup of the consumer.

6. The income, fashion, interest and behaviour of consumer should be constant.

7. The value of the different substitutes of commodities should also remain constant.

3.5 EXCEPTIONS OF THE LAW

Following are exceptions of this law:

1. **Small Units :** If the units of commodity for consumption are very small, the law of diminishing marginal utility does not operate. For example, if the glass of drinking water or the cup of the tea is very small, the utility of successive units of consumption will rise instead of decline. But, this exception is not correct as this law's assumption states that the units of commodity should be of proper size.

2. **Intoxicant Commodities :** It is stated that the law of diminishing marginal utility does not apply on the intoxicant items as liquor consumption. The utility derived from second, third and fourth peg of liquor provides more utility then the first one. But, this exception also is not correct as there should not be any change is mental makeup of consumer for implementation of this law. In addition, a careful observation also depicts that after a certain point the utility of liquor also declines for drunker and gets negative. This is the reason why a drunker stops its consumption after a point.

3. **Rare Commodity :** This law does not apply in case of rare commodity Old coins or stamps collection is good example of this. The more accumulation, the more is the utility derived from it to the collector. Similarly this law does not apply on hobbies and luxurious items. But, this exception is also not correct on the ground that the units are not homogeneous in these cases such as stamps and coins.

4. **For a Miser Man:** This law is also not applicable for miser person. The utility derived from the accumulation will not fall for him, in fact it would rise. However, it is for short-term only, in long run this law does apply on him.

5. **Interesting Commodities: Prof. Taussig :** has stated that the interest of interesting book, melodious Song, beautiful poems and good cinema does not get reduce. People demand 'once more' recital of the poem or song in concerts, repetition of a song through tape recorder which clarifies this concept that utility increases with the additional usage. But, after a point the utility of these commodities also get decline.

6. **Various Use of Commodity :** The law of diminishing marginal utility studies the single use of commodities. If the water is used only for washing clothes, the utility will decline with addition in units. But, after use of two bucket water if we change its use to drinking water, its utility will definitely rise in comparison of washing clothes.

7. **Initial Stage :** In case of initial consumption stage of a commodity the utility derived from new unit consumption is more. For example, in case of bread, the second bread's consumption utility may be higher then the first unit's consumption but, after a point the law of diminishing marginal utility does apply.

Thus, we may conclude that this law is universal and most of its exceptions are false. The modern scientists have accepted this fact that with the change in assumptions it is quite possible there is rise in utility in initial stage of consumption of commodity but after a point it will definitely fall. Thus, the word 'after a point' is used by modern economists for application of this law. The law of diminishing marginal utility is completely true and universal when other things remain unchanged.

3.6 IMPORTANCE OF THE LAW

Law of diminishing marginal utility is the represented of human nature. The law of diminishing marginal utility is one of the basic laws of economics. It is the strong base for various laws of consumption. It is this law which tells us why demand curves slope downwards. As the consumer buys more of a thing, its marginal utility to the consumer falls, Therefore, the consumer will be prepared to buy more quantity of the good only when the price of the good falls so as to be equal to the reduced marginal utility. Thus, the law of demand, owing to which the demand curve slopes downwards, is based upon the law of diminishing marginal utility of a good.

As law of diminishing marginal utility applies to money too, this forms the basis of the theory and practice of taxation. It is a common knowledge that the value of money to a rich man is not so great as it is to a poor man. All governments have taken note of it and they have based their system of taxation on it. There is a system of progressive taxation in the case of incomes according to which higher incomes are taxed at higher rates. Thus the theory and practice of taxation is based upon the law of diminishing utility.

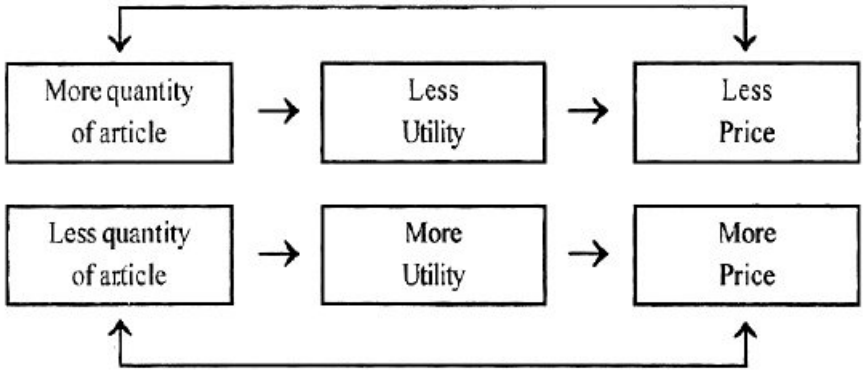
The advocates of socialism also take their stand on the law of diminishing utility. They advocate economic equality because the sacrifice of the rich will not be as great as the benefit to the poor. This is so because the utility of money to the rich is less than to the poor.

This law also explains the familiar "diamond-water paradox". Diamonds command high price because of their high marginal utility, which is due to scarcity. Water, on the other hand, is in abundant supply so that its marginal utility is low and hence it has low price. Thus, the law of diminishing marginal utility explains why diamonds are high-priced as compared with water, even though the latter is indispensable for life

This law states that after a point when the wants of the individuals are satisfied, they reduce or stop the demand for that commodity. The importance of this law can be summarised as below:

1. **In the area of Consumption :** When the supply of a commodity is more, its utility is less for the consumer. Therefore, the producer places the factors of the production to the production of other commodities after a certain point. This way, the different type of commodity is produced. In this relation, **Prof. Taussig's** statement must be observed that, "It is this fact of diminishing utility that explains the growing variety in the articles produced and the growing complexity of productions and consumption." This law encourages the new production.

2. **Basis for Law of Demand :** The law of demand is directly related to this law. According to law of demand the demand, for a commodity increases when its price decreases and falls when its price rises and the demand curves show falling downward. Why? Its reason is that when more and more units of commodity are bought its utility falls. Thus, consumer is ready to buy more and more units only at lower price. In reverse, consumer gets more utility with less units of commodity thus, he is ready to pay higher price. Thus, root of law of demand lies in law of diminishing marginal utility.



3. **Base for Law of Equi-marginal Utility :** Every consumer wants maximum satisfaction from his limited resources. Hence, he replaces one commodity to another. When the utility gets reduced after consumption of some units of commodity, he stops its intake and starts using another commodities. The consumers keep on transferring their income from one use to another use till the marginal utility of income from every use becomes equal. The law of equi-marginal utility has been developed with the help of law of diminishing marginal utility, which is helpful in maximisation of total utility.

4. **Importance in Consumer's Surplus :** The theory of consumer's surplus is also based on law of diminishing marginal utility. The consumer buys the product's unit till the point when the marginal utility of the unit of product is equal to its price. The utility derived from the units preceding to marginal unit is more whereas price is same for all the units. The excess utility such obtained is called consumer's surplus.

5. **Significance in Taxation :** This law is significant for revenue generation process of government also. Due to excess money, its utility is less for rich persons and more for poor who have scarcity of it. Therefore,

government imposes more tax to rich and less on poor. This law is basis for progressive tax system of government and helps in justified distribution of wealth in economy as a whole.

6. **In Price Determination of Commodities :** This law is helpful in price theory also. The articles whose supply are more, generally their utility and price are less. If the supply of commodity be less then, there would be definitely be growth in its utility and price.

7. **Diamond Water Paradox :** The price of any commodity is determined according to the marginal utility and not its total utility. **Adam Smith** has given diamond water paradox as an example. The utility of diamond is less but price is very high. On the contrary, price of water is nil or negligible though its utility is very high. Reason for this is the total utility of diamond may be less but its marginal utility is very high because of relative scarcity and thus, price is also high. The total utility of water is infinite but its marginal utility is zero due to its every-where availability, thus its price is also low. In other words, the relationship of price of a commodity is with its marginal utility and not with total utility.

It is clear from above discussion that the law of diminishing marginal utility has extensive theoretical and behavioural significance. It is a universal truth which operates in real life also. In the view of **Cairncross**, "This law not only apply on bread, butter, train journey, a hat of any person etc. commodities but also on explanations of economists, speeches of politicians, and dubious aspects of suspense novels equally."

3.7 SUMMARY

Law of diminishing marginal utility is represented the human nature. According to the law of diminishing marginal utility, the marginal utility depends on its quantity. This law is based on the fact that only a particular want can be satisfied at a particular time. This law states that after a point when the wants of the individuals are satisfied, they reduce or stop the demand for that commodity. The law of diminishing marginal utility helps to explain the negative slope of the demand curve and the law of demand. One of the main characteristics of utility are that as an individual purchases more units of any commodity its utility starts decreasing. The law of diminishing marginal utility is completely true and universal when other things remain unchanged. The law of diminishing marginal utility has extensive theoretical and behavioural significance. It is a universal truth which operates in real life.

3.8 KEY WORDS

Diminishing Marginal Utility : is the diminishing return.

Consumer Equilibrium : The state of balance achieved by an end user of products that refers to the amount of goods and services they can purchase.

Substitute Goods : Goods that take the place of another good.

Complementary Good : Combination of two goods which cannot be used separately or individually.

3.9 TERMINAL QUESTIONS

3.9.1 Essay Type Questions

1. Explain fully the Law of Diminishing Utility with if there some exceptions to this law? Explain them.
2. "As more and more units of a commodity are used, so the total utility increases at a diminishing rate." Analyse critically the Law of Diminishing Utility under the light of this statement. Does this law have any real exceptions? If yes, them describe.
3. Explain the Law of Diminishing Marginal Utility. What are its limitations and importance in Economics?
4. Critically examine the Law of Diminishing Utility. Why does this law operate? How is this law related with the law of demand?
5. "As a consumer increases the consumption of any one commodity, keeping constant the consumption of all other commodities, the marginal utility of the variable commodity must eventually decline." Examine critically.

3.9.2 Objective Questions

1. The another name of Goosen's first law is:
   (a) Law of diminishing marginal utility
   (b) law of returns
   (c) Law of equi-marginal utility
   (d) Revealed preference theory
2. Diamond-water paradox of utility was explained by:
   (a) Adam Smith (b) H. H. Gosse
   (c) Bentham (d) Marshall
3. On which of the law of diminishing marginal utility does not operate :
   (a) Stamps' collection (b) Intoxicating commodities
   (c) Small units (d) All above

Introduction

4. Which laws are based on law of diminishing utility?

(a) Law of demand

(b) Consumer's surplus

(c) Law of equi-marginal utility

(d) All the above

Ans. 1. (a), 2. (a), 3. (d), 4. (d).

UNIT-4

LAW OF EQUI-MARGINAL UTILITY

Structure

4.0 OBJECTIVES

After studying this unit you should be able to:

- Name any five limitations of the law of equi-marginal utility
- What is Gossen's second law? Describe briefly.
- Briefly explain :- $\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_c}{P_c}$
- What are the applications of the principle of substitution in economics? Briefly discuss.

4.1 INTRODUCTION

The Law of Equi-Marginal returns states that a rational consumer will spend his/her income so that the ratio of marginal utility to the price will be the same for all goods consumed. The law of equi-marginal utility states that a rational person in order to get a full pleasure distributes his expenses on purchase of different goods in such a way that marginal utility

of last Rs. Spent in each direction is the same. It is called a law of satisfaction because we substitute more useful goods to less useful goods. Law of equi-marginal utility is one of the significant laws of economics which is based on daily experiences. It has various names as law of substitution, law of maximum satisfaction, law of consumption, law of economy, law of Indifference etc. It is also called Gossen's second law because it was propounded by H.H. Gossen, an economist of Astria, in the nineteenth century. Law of diminishing marginal utility is called Gossen's first law. This law is also called as law of proportionality due to its modern explanation. This law presents traditional approach of consumer equilibrium.

4.2 EXPLANATION OF THE LAW

Human wants are unlimited but the resources to satisfy these wants are limited. Therefore, it is the problem for every individual to choose the sequence in which these wants are to be satisfied to get maximum utility. The consumer has to distribute his resources in such a way so that utility obtained from last units of different articles are same. Only then, maximum satisfaction objective can be obtained.

In the words of **J.R. Hicks,** "The utility will maximise when the marginal unit of expenditure in each direction bring the, same increments of utility."

Marshall has given the definition for this law as, "If a person has a thing which he can put to several uses he will distribute it among these uses in such a way that it has the same utility in all, for if it had a greater marginal utility in one use then another he would gain by taking some of it from second use and applying into the first."

This definition given by Marshall is very significant and is in the relation to commodity but if money is used in place of commodity it applies on it also. Money is an article which can be utilised for different purposes. When a consumer spends his money on any article, its utility, decreases as per law and after some stage he realises that he can get more satisfaction by spending additional money in other articles. In this case he stops buying product whose marginal utility is low, and starts purchasing other article having higher marginal utility then previous article at that time. He transfers higher utility commodity in place of lower utility article. It is the best method of spending so that marginal utility derived from the last unit of money spent on all the article is same in each case.

4.3 ASSUMPTIONS OF THE LAW

Like the other laws of economics this law is also based on some assumptions. The main assumptions are as following:

1. Consumer is a rational human being who thinks in economic sense before spending for obtaining maximum satisfaction.

2. The income, interest, fashion and behaviour of consumer are constant at a particular time duration.
3. The marginal utility of money is same.
4. Consumer spends his money in small amounts.
5. Utility can be measured in money scale measurement.
6. There is no change in the prices of the goods.
7. The income of consumer is fixed.
8. The marginal utility of money is constant.

Explanation of the law with example and diagram

We can illustrate the explanation of this law with a diagram. Suppose, a consumer has ten rupee which he wants to spend in two commodities, wheat and sugar (only two commodities have been taken for convenience but more than two commodities can also be taken for study). The utility derived from spending one rupee each on both the items are given in the table as below:

Unit of money (Rs.)	Marginal utility of wheat	Marginal utility of sugar
1	22 (1)	18 (3)
2	20 (2)	16 (5)
3	18 (4)	14 (7)
4	16 (6)	12 (9)
5	14 (8)	10
6	12 (10)	8
7	10	6
8	8	4
9	6	2
10	4	0

Certainly, the consumer will spend first rupee on wheat because he gets utility equal to 22 units which is higher than 18 units of sugar. He will spend his second rupee also on wheat. He can spend his third rupee on wheat or sugar because utility in both the cases are same as 18 units. Suppose, he spends third rupee on sugar and forth rupee on wheat similarly, he will spend fifth rupee on sugar sixth on wheat, seventh on sugar, eighth on wheat, ninth on sugar and tenth on wheat. Consumer will spend six rupees on wheat and four rupees on sugar. The rupees spent have been shown in brackets. Through spending in such way, the marginal

utility derived from the spending in last units (ninth and tenth) of both the item are equal. This way, consumer gets the maximum satisfactions. This theory can be implemented to more than two commodities in similar way.

In diagram-1, the money units are shown on OX line and the obtained marginal utility is shown on OY line. Two lines are drawn on diagrams which represent marginal utility of wheat and sugar. Spending Rs.6 on wheat and Rs.4 on sugar gives same marginal utility in both the case that is 12 units. If customer changes the sequence of spending and spends Rs.7 on wheat and Rs.3 on sugar, increase in the utility will be 10 units, where as the loss will be equal to 12 units. This way loss is high in comparison to gain and there will be decline in total utility. Consumer will get maximum satisfaction if he spends six unit on wheat and four units of money on sugar and marginal utilities are equal in both the case. It is a memorable fact that consumer has to equalise marginal utilities of articles to get maximum satisfaction.

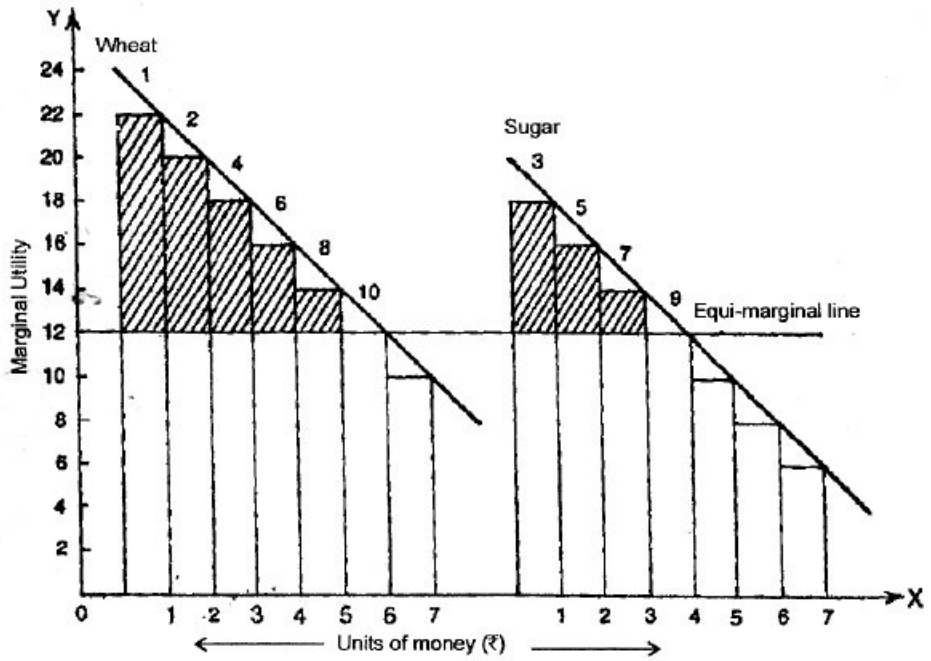


Diagram-1

4.4 MODERN INTERPRETATION OF THE LAW

Modern economists analyse law of equi-marginal utility in an upgraded way, which is called law of proportionality. The modern explanation of law is made in the ratio of marginal utilities of various commodities and their prices. The consumer wants to keep the marginal utility of unit of commodity same to get maximum satisfaction. On the second hand, he also takes care so that the prices of commodities are in ratio of obtained marginal utilities.

In the previous explanation there is no consideration about different prices of wheat and sugar whereas the consumer cannot take any

decision about quantity to be bought unless he knows respective prices. It is the extended form of law that the consumer will spend his money in different commodities in such a way that ratio between marginal utility of first commodity and its price is same as ratio in second and third commodities marginal utility and their respective prices. Consumer equilibrium obtained can be described as below:

$$\frac{\text{Marginal Utility of Commodity A}}{\text{Price of Commodity A}} = \frac{\text{Marginal Utility of Commodity B}}{\text{Price of Commodity B}} = \frac{\text{Marginal Utility of Commodity C}}{\text{Price of Commodity C}} \text{ etc.}$$

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_c}{P_c} \text{ etc}$$

Due to the equal ratio in each case between the marginal utility of commodity and its price, this law of equi-marginal utility is called, law of proportionality by modern economists.

4.5 SCOPE OF THE LAW

Law of equi-marginal utility has significant role in economics. This law is applicable in all the five categories of economics-consumption, production, exchange, distribution and public revenue. According to Marshall, "The application of the principle of substitution extends over almost every field of economic enquiry." This law is called the base for economics. It emphasises on human behaviour of satisfying unlimited wants by limited resources. The importance of this law is as below:

1. **In the Area of Consumption :** This law helps the consumer in satisfying unlimited wants through limited resources. The maximum satisfaction to consumer will be obtained when marginal utility obtained from different commodities are same. Consumer can make proper arrangement for present and future needs with the help of this law. In other words, the act of best distribution between consumption and saving can be made by this law.

2. **In the Area of Production :** Every manufacturer wants to earn maximum profit with minimum cost of production. A comparison is made between marginal productivity of resources and their prices to minimise the cost of production by the producer. Every producer calculates the marginal productivity of various resources such as land, labour and capital etc. and replaces the costly resources with cheaper resources. This replacement is done till the stage when the ratio between marginal productivity of various resources and their prices are equal. When this law is used in production, it is known as substitution law of production. Producer's equilibrium will be achieved in condition when:

$$\frac{\text{Marginal Producitiuity of Resource A}}{\text{Price Resource A}} = \frac{\text{Marginal Productiuity of resource B}}{\text{Price of Resource B}}$$
$$= \frac{\text{Marginal Productiuity of Resource C}}{\text{Price of Resouce C}}$$

3. In the area of Exchange : Law of equi-marginal utility is very helpful in exchange and price determination. Consumers pay the maximum price of the commodity which is equal to its marginal utility. The exchange of commodities between two persons is carried on till the marginal utilities of both the commodity are equal for every price. When exchange starts the utility of both the commodities individually is more than utility derived from other commodity. With the progress of this exchange, the quantity of nearby commodity get lesser and quantity of other gets more. Thus, the utility of nearby goods increase and other goods utility decrease then a point comes where utility for both are equal. Suppose, a customer takes rice in exchange of wheat. It means rice has more utility then wheat. As he purchases more and more rice, its utility falls and a point comes when the marginal utility of both rice and wheat become equal. This way, the exchange of two commodities is done till the marginal utility of both commodities are equal.

4. In Area of Distribution : The problem with distribution is how to distribute the share of each resources in production for the contribution made by them. The rewards of factors of production (rent, wages, interest, profit) are given according to their marginal productivity.

5. In the Area of Pubic Finance : The significant principle of public finance that is maximum social advantage is also based on equi-marginal utility. The objective of every democratic government is maximum social welfare of people. Govt. distributes the expenditure, while spending on various items, so that equi-marginal utility in each expenditure is same. Taxes are levied by the government in way so that burden on different segments of society is same. This law is very important for taxation system and expenditure system also.

Conclusion of these discussions is that this law is applicable in our routine life also. **Prof. Robbins** has rightly said that this law is foundation of economics because it analyses the efforts for satisfying unlimited wants of human being by limited resources. This law is helpful in solving universal problem of unlimited want satisfaction by limited resources.

4.6 CRITICISM OF THE LAW

The main criticisms of law of equi-marginal utility are following:

1. Economic Irrationality : The assumption of this law is that consumer is rational and spends according to utility derived from the commodities every time. But, actually man is not an economic person who

always bothers about calculating as a machine. Most of the individuals spend habitually without any calculation. Thus, this law is less useful in actual life due to non- calculative nature of man.

2. Indivisibility of Goods : Law of equi-marginal utility will be applied if the article for consumption could be divided into small doses or units. Various commodities like car, radio, fan, house cannot be divided into small units nor they can be compared to marginal units of other commodities. For example, marginal utility of car cannot be compared with marginal utility of orange because car cannot be bought into parts.

3. Durability of Products : There are various products which are bought during one budgetary duration (almost one year), whereas its utilisation is made in another duration also. For example, if a customer buys a television set, he can use it for so many years. Thus, he does not only consider the current year utility of TV but also the utility to be received in future years. As a result, it is very difficult to equalise the marginal utility derived from various commodities.

4. Habit, Customs and Fashion : The consumption is also affected by habits, customs and fashion etc. elements. As a result customers also invest in those items which have low marginal utility. The expenditure on lightening in marriage ceremony is done due to customs though utility derived from them is low. Man spends on cigarette, tea, wine etc. because of habit.

5. Ignorance, Laziness and Carelessness : Some time consumers buy expensive and inferior product due to ignorance, laziness or carelessness, which gives low utility.

6. Change in the Price: The price of commodities is always fluctuating in market. Consequently, there is change in its utility also. In the present era of inflation it is very difficult to compare marginal utility of various commodities.

7. Non-availability of Some Commodities : Sometimes useful commodities are not available in market in required quantity and consumer has to purchase low quality goods. This way this law does not operate.

8. Complementary Goods: This law does not apply properly in case of complementary goods, Car and patrol, milk and sugar, pen and ink etc. used together. Complementary goods are not used in each other's place. In this case, it is quite possible that one commodity is useful but the other commodity of complement is not useful, but both of them are bought together.

9. Difficulty in Measurement of Utility : This law is based on measurement of utility. Since utility is a psychological phenomenon, its quantitative measurement is not possible.

10. Change is Marginal Utility of Money : The assumption of this law states that the purchasing power of money is constant. But in reality as

customer spends money, the utility of money increases. As a result, the marginal utility of money rises instead of being constant.

The above criticisms are mainly based on the assumption of law. To check this error, **Prof. Hicks** has described consumer equilibrium by indifference curve analysis. This law is useful for average consumer, although has certain demerits. A consumer follows this law actively or inactively.

4.7 SUMMARY

The law of equi-marginal utility states that a rational person in order to get a full pleasure distributes his expenses on purchase of different goods in such a way that marginal utility of last Rs. Spent in each direction is the same. Human wants are unlimited but the resources to satisfy these wants are limited. The consumer has to distribute his resources in such a way so that utility obtained from last units of different articles are same. Modern economists analyse law of equi-marginal utility in an upgraded way, which is called law of proportionality. The modern explanation of law is made in the ratio of marginal utilities of various commodities and their prices. This law is applicable in all the five categories of economics-consumption, production, exchange, distribution and public revenue. This law is called the base for economics. It emphasises on human behaviour of satisfying unlimited wants by limited resources.

4.8 KEY WORDS

Factors of Production : Describes the important inputs that are used in the production of goods or services in the attempt to make an output.

Complementary Good : Combination of two goods which cannot be used separately or individually.

Factor Payments : Remuneration given to the factors of production is known as factor payments

4.9 TERMINAL QUESTIONS

4.9.1 Essay Type Questions

1. Critically examine the law of equi-marginal utility and explain with the help of a diagram.
2. Explain clearly the equilibrium of a consumer with the help of Utility Analysis. What are its assumptions and limitations?
3. Explain the "Law of Proportionality" in the field of consumption. Point out its limitations also.

4. Write a note on the Law of Substitution and discuss its practical utility.

5. Analyse critically the traditional approach of consumer behaviour.

4.9.2 Objective Questions

1. Which is called Gossen's second law?

   (a) Law of equi-marginal utility

   (b) Law of diminishing marginal utility

   (c) Consumer's surplus

   (d) Revealed preference theory

2. A consumer obtains the maximum satisfaction if he acts according to the law of

   (a) Diminishing marginal utility

   (b) Equi-marginal utility

   (c) Consumer's surplus

   (d) All of the above

3. According to modern interpretation, the is called as law of proportionality.

   (a) Law of demand

   (b) Elasticity of demand

   (c) Law of diminishing marginal utility

   (d) None of the above

4. H.H. Gossen was of the county:

   (a) Austria (b) USA

   (c) UK (d) Germany

Ans. 1. (a), 2. (b), 3.(d) 4. (a)

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Managerial Economics

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2

DEMAND ANALYSIS

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UNIT-5

CONCEPTUAL FRAMEWORK

Structure

5.0 OBJECTIVES

After studying this unit you should be able to:

- What is the deference between demand and wants?
- State the meaning and kinds of demand schedule.
- What is the implication of D = f (P)?
- How has Robert Giffen explained the exception of law of demand?

- Distinguish between change in demand and change in quantity of demand.

5.1 INTRODUCTION

The concept of demand and supply is most ancient and important in economics. Actually whole economics revolve around demand and supply. It is often said that, "Teach a parrot to say demand and supply in reply to every question, and it will be a good economist." Demand analysis is the most useful aspect of economics which includes the study of determinants of demand, law of demand, elasticity of demand and types of demand etc.

5.2 MEANING OF DEMAND

Demand is not the same as desire or need. Demand for a commodity means desire, willingness and ability to pay. In general view, human being's effective desire to purchase any commodity at a particular price and time is called demand. Different economists have defined demand as following:

1. According to **Penson,** "Demand is effective desire. It implies three things: (i) desire to purchase a thing, (ii) means for purchasing it, and (iii) willingness to use these means for purchasing it."

In this definition, effective desire, which is also called wants, has been assumed to be demand. Prof. Penson has given three attributes which are also the characteristics of want. It is conservative definition, in which price and time element has no effect.

2. In the words of **J. S. Mill,** "We must mean by the word of demand the quantity demanded and remember that is not a fixed quantity but, in general, various quantities according to value." This definition is wider in comparison to **Penson's** definition. Demand is worthless without price. The price and quantity are related to demand which is purchased at that price. But, this definition is incomplete due to non-consideration of time element.

3. As per **Benham,** "The demand for anything at a given price is the amount of it, which will be bought at a time at that price." This is an appropriate definition of this concept.

Demand exists on a directive time and price. The three things are necessary for demand:

(I) Effective Desire or Want [It is (a) desire + (b) resource for desire's satisfaction + (c) readiness to pay for resources]

(II) Particular Price

(iii) Particular Time

The demand of any commodity is the effective desire of different quantities of that commodity which a person buys at a particular price and time. Imagination about demand without price and time is worthless.

5.3 DEMAND SCHEDULE

Demand is related to quantity demanded at particular time and price. We can make a table of quantity of commodity demanded at different prices. The table of quantity demanded of commodity at different prices is called demand schedule. Demand schedule is of two types*viz.*,(i) Individual Demand Schedule, and (ii) Market Demand Schedule.

5.3.1 Individual Demand Schedule

This schedule shows the quantities demanded at different prices. How much purchase would be made by a consumer in terms of quantities at different price, is shown by individual demand schedule. Given example may be considered in this regard:

Example of Individual Demand Schedule

Price per Kg. (Rs.)	Demand of Units (Kgs.)
1	1,000
2	800
3	700
4	600
5	400

It is clear from above table that as price of commodity is increasing, its demand is decreasing. When the price of commodity is Rs.1 per Kg. then its demand is of 1,000Kgs. and at Rs.2, Rs.3, Rs.4, Rs.5, its demanded quantity reduces to 800, 700, 600, 400Kgs. respectively.

5.3.2 Market Demand Schedule

We can make market schedule with the help of individual demand schedule. This schedule shows total quantity demanded of a commodity at different prices at a particular time. For example, in a market there are only 3 individuals, the market demand schedule in such case can be made by combining individual demand schedule of them.

Price per Kg. (Rs.)	Individual Demand (Kgs.) X	Y	Z	MarketDemand (Kgs.)
1	100	80	70	250
2	80	70	60	210
3	60	50	50	160
4	50	40	30	120
5	40	30	20	90

It is clear from the above schedule that last column states the total demand of whole market which is made from the sum of X, Y and Z.

Demand Schedule has following characteristics:

1. Demand schedule is made by assuming demand condition as same or the income, interest of consumer, price of substitutes etc. are same.
2. Making imaginary demand schedule is easy but to make actual demand schedule is a complex activity.
3. Market demand schedule is more simple and continuous in companion of individual demand schedule.
4. Demand schedule states the behaviour of individual consumer or market.
5. Demand schedules are greatly affected by time.

5.4 DIFFERENCE BETWEEN INDIVIDUAL AND MARKET DEMAND SCHEDULE

Following are the main difference in them:

1. According to **Marshall**, market demand schedule are more continuous and smooth then individual demand schedule. Its reason is that, an individual can behave in an inappropriate or irregular way but, in case of market demand, the differences in the individual behaviour in group get clubbed.

2. Making individual demand schedule is easy but due to difference in the wealth and individual views, it is difficult to make market demand schedule.

3. The practical significance of individual demand schedule is less, but market demand schedule greatly affects the determination of price policy, taxation policy and monetary policy of the country.

Demand Curve : When demand schedule is presented in diagrammatical form, it is called demand curve or line. This curve is of two type, individual demand curve and market demand curve. The curve based of individual demand schedule is called individual demand line and the demand curve based on market demand schedule is called market demand line.

5.5 CONCEPT OF LAW OF DEMAND

The law of demand is one of the fundamental and popular law of economics. This law states the opposite relationship of price and quantity demanded. There is an inverse relationship between the price of a commodity and its quantity demanded. The increase in the price of commodity gives reduction to its quantity demanded and decrease in price of commodity gives increase in the quantity demanded. The demand changes in the opposite direction to the price. It also states that when market situations remain constant and when prices fall the quantity demanded of a good increases and if the price increases or never falls then the demand for a good falls. The law also states that demand for goods will also fall or rise due to a variety of consumer attitude and monetary factors to include: Change in consumer taste or fashion, Change in general consumer income, Inflation or deflation of economy, Introduction of or anticipation of new technology. This is the law of demand.

In the words of **Marshall**, "There is one general law of demand- the greater the amount is to be sold, the smaller must be the price at which it is offered in order that it may find purchasers. In other words, the amount demanded increases when a fall in price and diminishing when a rise in price."

As per **Samuelson**, "When the price of a goods is raised, less of it will be demanded. People will buy more at lower prices."

It is clear from above definitions that there is a reverse relationship between price of commodity and its demand. Demand changes opposite to the price. This is the reason so that demand curve slopes downward to the right. The relationship between demand and price can also be described in algebraic way as;

$D = f(P)$

Here, D represents demand, P represents price and f represents function. It means demand is the function of price, or demand depends upon price. Demand changes opposite of quantity. But, law of demand is qualitative statement and not quantitative. Law of demand states the quality of change in quantity demanded according to change in price but it does not state how much quantity of demand will change. Like, if there is an increase in price of the commodity by 50% then there will be decrease is quantity but would it be of what %, this can not be stated. Law of demand can be shown through a schedule :

Price per unit (Rs.)	Demand of Mangoes
1	100
2	80
3	50
4	30
5	20

It can also be shown through diagram. In diagram OX line shows the quantity demanded of mangoes and OY line shows price of mangoes. It is convention is economics to shown the horizontal line (OX) the quantity and on the vertical line (OY) the price. DD is demand curve which is downward sloping to right.

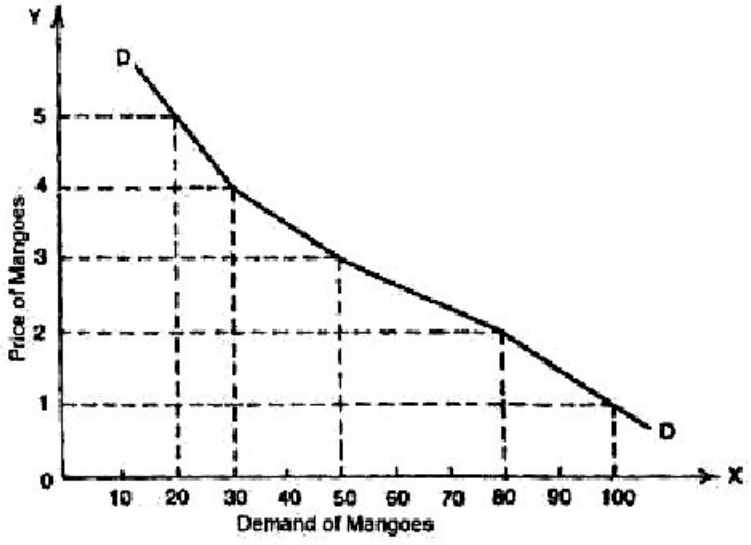


Diagram-1

5.6 ASSUMPTIONS OF TNE LAW

Following are the main assumptions of law of demand:

1. There should not be any change in consumer's interest, nature and fashion.

2. Income of consumer should be constant.
3. There should be no substitutes of commodity available in the market.
4. Price of other related goods should be constant.
5. The commodities which are bought, should not be prestigious goods.
6. There should not be any prospect of future increase in commodity's price.
7. There should be no change in total wealth of the consumer.
8. There should not be any change in population.

5.7 REASONS FOR THE APPLICATION OF LAW OF DEMAND

Most of the demand curves fall downward from left to right. This characteristic states that more quantity on low price of commodity are sold. Due to the inverse relationship between demand and price its slope is negative. But why so? This can be explained through following reasons:

1. **Law of Diminishing Marginal Utility:** Law of demand is based on law of diminishing marginal utility. A customer considers the price of any commodity according to its marginal utility. As per law of diminishing marginal utility, as the quantity is purchased or used by the consumer the utility derived from additional unit diminishes. That is why, consumer will buy more units of commodity only at low price. In reverse, where consumer is getting less quantity of commodity, its utility will be more for him and consequently he will be ready to pay high price. To summaries, consumer buys more commodities at low price and less commodities at high price. That is why, the demand curve slopes downwards to the right.

2. **Income Effect:** The reduction in the price of any commodity is actually same as the increase in the consumer's income. Due to reduction in price, he can buy equal units as previous in lesser expenditure. As a result, there is some saving in income which he can utilise to buy more units of commodities. For example, the price of sugar is reduced by Rs.15 per Kg to Rs.10 per Kg. and if the consumer is using 2 Kg. of sugar, previously he was expending Rs.30 but after change in the price he will be able to buy it by spending Rs.20 only and thus, his income will increase by Rs.30 – Rs.20 = Rs.10. If consumer spends this surplus income on sugar then the demand of sugar will be 2 + 1 = 3 Kg. The extra increase in the quantity demand of sugar is increase in income. In its opposite, the increment in price is equal to reduction in consumer's income and demand decreases.

3. **Substitution Effect:** When price of any commodity is reduced, it means that other substitutes commodities have become costlier in

comparison. Commodity becomes cheaper than substitute goods. Consumer will definitely transfer these cheaper goods in place of expensive commodities. For example, if the price of coffee decreases, people will start substituting coffee in place of tea. In its opposite, when price of any commodity increases and other products are available at same price, consumer will demand more for the commodities which have price unchanged as they are cheaper. Thus, the demand of commodities increases with decrease in its price and its demand will fall with increase in price due to substitution effect.

4. **Change in Consumers' Number:** The non-user of few commodities also starts buying them at the time of reduction in prices. This leads to increase in demand. Alternatively, the consumers who are continuously using any commodities, may stop its consumption with rise in its price, which results fall in demand. The entry or exit of consumer have inverse relationship with demand and price.

5. **Different Uses:** Any commodity may have different usage. If price is high, the commodity so purchased is used for important purposes only, as a result, demand falls. If price of commodity get reduced then it will be used for other additional purposes also, which give rise in demand. For example, potato has various usage; as vegetable, as snacks-chips or as pickle etc. If potato is expensive, people with only utilise it for vegetable purpose. Otherwise it can be used in other purposes if its price is cheaper. Thus, the demanded quantity increases and decreases according to fall and rise in its price.

5.8 EXCEPTIONS OF THE LAW OF DEMAND

Sometimes demand curve is upwards sloping or in other words the rise in price leads to rise in demand rather than fall. Generally, it is the nature of reduction in quantity demanded due to increase in price but its reverse condition is also found. In these exceptional conditions, the demand curve goes upwards which is called exceptional demand curve. It is shown in diagram 2.

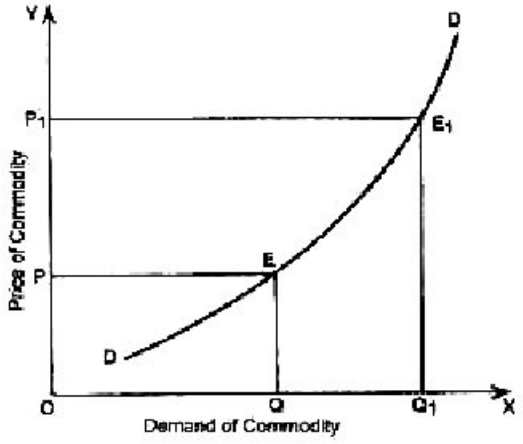


Diagram-2

In diagram 2, DD is an exceptional demand curve which shows relationship between price and demand. If price increases OP_1 from OP then, quantity demanded also increases to OQ_1 from OQ. Here, demand line is rising upward. Such upward sloping demand curves are unusual and quite contradictory to the law of demand as they represent the phenomenon that 'more will be demanded at a higher price and vice versa.' The upward sloping demand curve, thus, refers to the exception to the law of demand. There are a few such exceptional cases, which may be categorised as follows:

1. **Giffen Paradox**: Modern economists consider Giffen paradox as actual exception of law of demand which was given by **Sir Robert Giffen**. It applies in case of certain inferior goods called Giffen goods, when the price falls quite often less quantity will be purchased than before, because of negative income effect and people's preference rises for a superior commodity with the rise in their real income. Hence, law of demand does not operate. This surprising and contradicting condition was firstly realised by British economist **Sir Robert Giffen** is 19th century in the case of Ireland's labourers in the context of potato and meat. Since, Giffen was first to explain this exceptional condition thus, it is called Giffen's paradox. It is important to consider that this exception only applies if the consumer spends most part of total income on inferior items.

The above fact can be concluded by example of maize (inferior goods) and rice (superior goods). Price fall has two effects: substitution effect and income effect. Since, the price of inferior goods is reduced and price of superior goods is unchanged. In this case, cheaper goods (maize) will substitute rice. Due to this substitution effect the rise in demand of maize is result of fall in its price.

But, there is effect of income also apart from substitution effect. The reduction in the price of inferior item, maize, is equal to rise in income of consumer because he, now, can purchase maize of equal quantity through lesser price payment resulting to some money left in consumer's hand. Suppose, he spends this surplus on maize, its demand will rise, such an effect will be called positive income effect, where its demand rises as per law of demand.

However, maize is inferior commodity and customer would like to spend his surplus on superior commodity rather than on extra inferior goods. Eventually demand for maize will fall with reduction in its price. Such an effect is called Negative Income effect. When income effect is negative, demand falls. The total effect on demand depends over the fact whether substitution effect or income effect was more intensive. In case of inferior goods, if negative income effect is more powerful, demand falls with reduction in price of commodity. Reduction in price of Giffen goods brings fall in demand and thus, law of demand does not apply.

2. **Articles of Snob Appeal:** Sometimes, certain commodities are demanded just because they happen to be expensive or prestige goods and have a Snob appeal. These are generally ostentatious articles, and

purchased only by rich people for using them as 'status symbol.' Veblen has termed these goods as 'conspicuous consumption goods.' These commodities are demanded due to the enjoyment they provide to their possessor from the felling that other people envy him/her for possessing these expensive items. Thus, when prices of such articles like diamond, gold etc. rise, their demand also rises. The high prices make the ownership of diamonds and gold more prestigious. As a result, law of demand does not apply to such articles.

3. **Ignorance of the customer regarding quality price relationship** : Many times, consumers buy expensive items in large quantity due to ignorance or lack of awareness. They think that an expensive or high price commodity is of high utility as in case of medicine, usefulness it treated high. Cheaper medicines are demanded low. **Benham** has given an appropriate example for such phenomenon. In 1914, a book of photography was published with price 10 shilling 'pens, prior to 1st world war but, very few copies of this edition was sold. After world war, same book was republished with 3 pounds 3 shilling, this edition was sold largely. So, for high price goods, sometimes, people demand more as they consider it as of high quality and in the contrast if price is reduced they are considered to be of low quality and demand less. In case on prior example of book when it was republished customer might have thought expensive book is suitable for purchase and collection.

4. **Necessities:** In real life, we experience that the demand for compulsory articles does not fall due to increase in their price. Wheat, rice, pulses, milk, sugar etc. are such necessary articles on which law of demand does not apply. The demand is constant though its price is increasing.

5. **Interest in Specific Brand:** If a consumer likes any particular brand or if he is extremely loyal to any brand, he would not decrease its demand on rise in the price. For example, if a customer is habitual of garments and suiting of 'Vimal', he would purchase its similar quantity even on the rise in the price.

6. **Small Commodities:** Some small commodities share very short part of total purchases. For example, match box, salt, toffee, washer etc. Then, spending portion are so small in these times that consumers do not even consider its price. As a result, its demand does not fall with increase in price.

7. **Expectations or Possibility of Price Change:** Whenever there is expectation of price rise, in future, consumers buy and accumulate commodities even at high prices. These are the conditions of war, flood, famine, and earthquake etc. Such conditions are generally found. In its opposite, if there is a possibility of reduction in price, in future, demand is less even on low price. It is commonly seen in speculative markets.

5.9 CHANGES IN DEMAND

In economics, change in demand means increase or decrease in demand. The increase or decrease in demand can be due to various reasons, like, price, consumers' income, their preference, population, promotion and advertisement, climate, prices of related goods, trade cycles, govt. policy etc. Any change in any of the such element except price bring effect, that is called change in demand. Any change, in such element leads to change in demand, demand schedule and demand curve. The increase in demand means more quantity demanded at present price. In reverse, decrease in demand means fall in demand on present price. When there is an increase in demand of commodity then the quantity demanded related to every price would be more then previous and when there is decrease in demand the quantity demanded related to every price would be lesser than previous. This can be explained in table as below:

Change is Demand

Price Per Unit (Rs.)	Basic Demand	Increase in demand	Decrease in demand
1	1000	1500	800
2	900	1200	600
3	700	900	500
4	400	600	300
5	200	400	100

It is clear from the table that there can be increase or decrease in demand even if price remains unchanged.

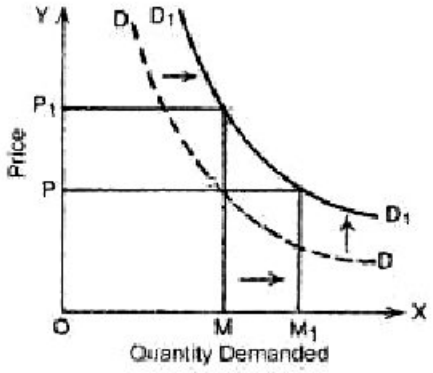


Diagram-3

Increase in demand: In diagram 3, increase in demand has been shown. Initial demand curve is DD. The demand of commodity is OM at OP price. Now the price remains unchanged but there is such change in the element of demand that demand increases and a new curve D_1D_1 forms. Shifting of demand curve to right is called increase in demand. It has two meaning:

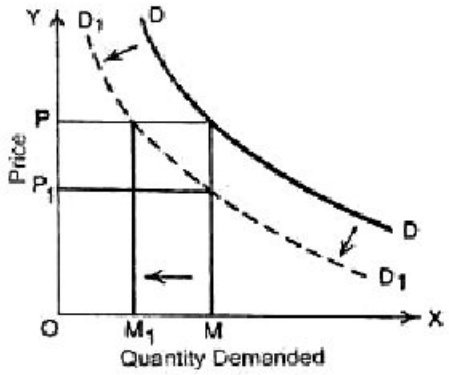
(1) On the same price OP; more quantity OM_1 is demanded.

(2) The same quantity of commodity OM, is demanded at high price OP_1.

Decrease in demand: In diagram 4, decrease in demand is shown. Initial demand curve is DD. Demand of commodity is OM at price OP. Now, when price is as it is, but other elements change leads to decrease in demand to D_1D_1. Shifting of demand curve to left is decrease in demand. It has two meaning:

(1) On original price OP; less quantity of commodity OM1 is demanded.

(2) The same quantity of commodity OM, is demanded at lower price OP_1.



5.10 CHANGES IN QUANTITY OF DEMAND

Demand has a very close relationship with price. Demand increases with reduction in price and decreased with increment in price. The change in quantity demanded due to change in price is called expansion or contraction of demand. Such changes only due to change in price. Consumer's role in such case is passive and whole activity is carried on due to price change.

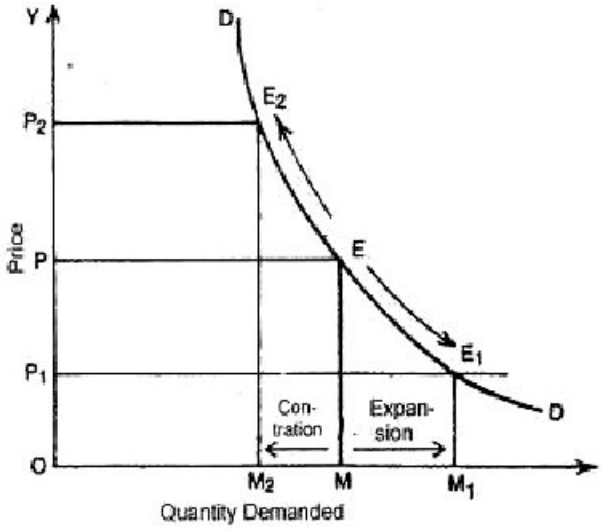


Diagram-5

In given diagram 5, DD is demand curve. As there is reduction in price of commodity its demand increases, when price OP is reduced to OP_1, the demand gets expended to OM_1. At its opposite, when price increases to OP_2 its demand get contracted to OM_2. In this condition MM_1 is expansion of demand and MM_2 quantity is contraction, in demand.

5.11 SUMMARY

Demand analysis is the most useful aspect of economics which includes the study of determinants of demand, law of demand, elasticity of demand and types of demand etc. Demand for a commodity means desire, willingness and ability to pay. The demand of any commodity is the effective desire of different quantities of that commodity which a person buys at a particular price and time. The table of quantity demanded of commodity at different prices is called demand schedule. How much purchase would be made by a consumer in terms of quantities at different price is shown by individual demand schedule. Market schedule shows total quantity demanded of a commodity at different prices at a particular time. When demand schedule is presented in diagrammatical form, it is called demand curve or line. This curve is of two type, individual demand curve and market demand curve. The law of demand states that there is an inverse relationship between the price of a commodity and its quantity demanded. The increase in the price of commodity gives reduction to its quantity demanded and decrease in price of commodity gives increase in the quantity demanded. Most of the demand curves fall downward from left to right. This characteristic states that more quantity on low price of commodity is sold. Due to the inverse relationship between demand and price its slope is negative. In exceptional conditions, the demand curve goes upwards which is called exceptional demand curve.

5.12 KEY WORDS

Demand : Ableness and willingness to purchase.

Supply : Quantity of Product available to consumers.

Giffen Goods : Goods which people paradoxically consume more of as the price rises, violating law of demand.

5.13 TERMINAL QUESTIONS

5.13.1 Essay Type Questions

1. Explain the Law of demand. Why does a demand curve generally slope downwards to the right? Explain the circumstances in which demand curves slope upwards. Give suitable diagrams also.
2. Analys clearly the law of demand and explain the Giffen's Paradox in this connection.

3. "Law of Demand is qualitative not quantitative." Comment and discuss the reasons of exceptional demand curve.

4. Explain with the help of suitable diagram the Law of Demand. Are there some exceptions of this law? Discuss.

5. What do you understand by demand schedule and demand curve? "The demand curve slopes downwards to the right." Explain.

5.13.2 Objective Questions

1. Which of these is not an element of demand?

   (a) Desire (b) Purchasing power

   (c) Rent (d) Willingness to use the money

2. This statement is that law of demand is quantitative.

   (a) True (b) False

   (c) Uncertain (c) Certain

3. In which condition normally there would be exceptional demand curve?

   (a) Prestige goods (b) Small commodities

   (c) Giffen goods (d) All of these

4. Due to change in price if quantity of demand is changed it will be called...

   (a) Expansion contraction of demand

   (b) Increase or decrease in demand

   (c) (a) and (b) both

   (d) Neither (a) nor (b)

Ans. 1. (c), 2. (b), 3. (d), 4. (a)

UNIT-6

DEMAND DETERMINANTS

Structure

6.0 OBJECTIVES

After studying this unit you should be able to:

- Enumerate any five factors affecting the demand.
- How does derived demand differ from autonomous demand?
- Nearly everyone desires a coloured television. Does it mean that demand for coloured television is very large in India?
- How is demand analysis useful in managerial economics?

6.1 INTRODUCTION

Demand is affected by various economic, social and political elements but their individual effects are different. That is why an economist should analyse them as per their importance in any particular situation.

6.2 FACTORS AFFECTING OF DEMAND

The main factors affecting demand are following:

1. **Price of the Commodity:** The most important factor affecting demand is price. There is inverse relationship between price and demand. Demand is more when price decreases and is less when price increases. The quantity of any commodity demanded by any consumer at a particular price is called 'Price Demand'. The price change is fast in agricultural economy and in industrial economy it is comparatively slow. Even the possibility of changes in future in price also affected the demand.

2. **Income:** The demand of commodities also depends on income of individuals. More be the income of individual, more will be the quantity purchased by him. More income means more purchasing power. Generally, demand increases with increase in income and demand decreases with decrease in income. For example, in the planning period, in India, the demand of consumer goods has been increased due to increased income of people. But, it is not necessary that the change in demand of consumer goods is equal to the change in income. The income effect is different on different commodities. The relationship between income and demand is called "Income Demand."

3. **Prices of Related Goods:** The demand of any commodity is also affected by price of other related commodities. Related goods are of two types—Substitute and Complimentary. Substitute goods are those which can be used in place of other basic commodity such as tea and coffee, dalda and pure ghee are close substitutes of each other. When price of tea increases, there is a possibility of increase in demand of coffee and comparatively cheaper commodity coffee will be purchased by consumer more than the tea. Complementary goods are goods which are used with other goods and not independently used. For example, scooter and petrol, pen and ink are complimentary to each other. If the price of pen increases the demand of ink will also decrease. There is a direct relationship of substitute good's price and demand of original good where as reverse relationship between complimentary good's demand and price. The change in demand of any commodity due to change in price of related goods is called 'Cross Demand.'

4. **Taste and Fashion:** There is a significant effect of consumer's taste, habit, fashion and custom on demand. The commodities, in which consumers are more interested, will definitely have increase in demand. The taste and fashion of consumer keep on changing and thus, the demand is also changing. For example, few years ago, the demand of cold drink has risen due to taste of consumer. Technological changes, progress and innovation also change taste and fashion. Like the invention of television has reduced the demand of radio and gramophone, similarly the technological progress in plasma TV and LCD TV have reduced the demand of traditional CRT TVs.

5. Distribution of Wealth: Wealth and distribution of wealth both effect the demand. If the distribution of wealth is equal, the wealth is in hand of majority of people. In this case, the demand for necessary items like wheat, cloth and house will rise. In its opposite, if the distribution of wealth is uneven it will be concentrated in the hands of few rich people and demand for luxurious items as diamond, liquor, jewellery will increase.

6. Religious Ideas and Thoughts: Religious thoughts and conventions also affect demand. The people, who are of religious belief, are mainly living life with lots of discipline like prayers, simple food, simple clothes etc. whereas people who believe in material life want luxurious and comfort giving articles. They do not hesitate even to take loan for fulfilment of their wants and demand for these luxurious commodities rise.

7. Geographical Conditions: Climate and weather conditions directly affect the wants. In a cold country, like Britain individuals demand for warm clothes, wine etc. according to their affordability but, in a hot country, like India demand for such items is limited. In India also, the demand for various commodity changes according to season such as, umbrella in rainy season, woollen cloth in winter and cotton cloth in summer is demanded more.

8. Population: Increase and decrease in population brings increase and decrease in demand. In the countries, which are more populated, have more demand in comparison to the countries which have less population. In the country, where population is increasing, the ratio of children will be more than old aged. Thus, demand for the items like toys, health drinks, schooling equipment etc. will be more. In the opposite side, in the country where population is reducing or its increasing with diminishing rate, will have high ratio of old aged people and low ratio of children.

9. Saving Tendency: In the region or in any country if the individuals are more concerned about saving thus spending less the demand of commodities will fall. In alternate case if customer is affected by consumption culture and save less amount then spending, the demand in such condition will rise,

10. Quantity of money: If the quantity of money and credit is rising in any country there is possibility of increase in demand due to increase in purchasing power of consumers through money expansion. In alternate situation, demand reduces, in case of money contraction. If the banks and financial institutions are providing loans at easy and cheap rates, the price demand of commodities will increase in that country.

11. Trade Cycle: Trade cycles have direct affect on demand. Demand commodities increases in inflation and decreases in period of deflation.

12. Expectations of Changes is Future Prices: If consumers expect rise in price, in future, they buy commodities in large quantity, in present period so that they don't have to pay more price in future. In the same way

if they expect lower commodity prices in future they buy less quantity in present time and demand reduces.

13. Advertising: In the present era of advertising, demand is greatly affected because of it. The demand of those commodity rises whose excessive advertising is done by the business persons. In case of low advertising, there is low demand for such commodity.

14. Government Policy: In democratic countries govt. policy is an important factor affecting demand. If the government levies taxes on any commodity its price rises and demand get hampered whereas govt. subsidy, monetary help and discounting is assistance and tax relied encourage the demand. Govt. takes help of rationing also to ban the demand of some commodities.

6.3 KINDS OF DEMAND

Following are the main types of demand:

6.3.1 Producers' and Consumers' Goods Demand

Such goods which help in the production of other goods, the demand for these commodities is called Producers' Goods Demand. The demand for these commodities are not by the consumers for direct consumption but for manufacturing in factories or for reselling such as raw material, machinery, tool's demand etc. The main features found in this type of demand are:

1. Business buyers are having professional ability who are very sensitive to price and quality for choosing alternative goods.
2. Buyers mainly consider the economic factors while purchasing goods and they are not very much influenced by the advertising and social factors. Professionalism its buy commodity to maximize profit earning,
3. Demand of producers' goods depends on the demand for the commodities manufactured by such buyer.

The goods which are used for consumption of end user consumer, its demand is called Consumers' Goods Demand. For example, demand for watch, cycle, radio, soap etc. The number of consumers to demand for consumer goods is large and market is wide. Its demand is affected by economic and uneconomic factors.

The difference between Producers' Goods and Consumer Goods are following:

1. The buyer of producers' goods is the business manufacturer or profession list whereas buyers of consumers' goods are end user consumers.

2. The number of buyers of producers' goods is small whereas the number of consumers' goods is large.
3. The market for producers' goods is less wider in comparison to consumers' goods market,
4. Seller of producers' goods maintains a personal relationship with buyers of producer goods whereas in case of consumers' goods advertisement and promotional activities are carried on.
5. The buyers of producers' goods deeply analyze the price and quality of goods to be purchased but the buyers of consumers' goods take decision without deep thought, if they have proper income.

Actually the difference between consumers' goods and producers' goods depends on the fact that who is the buyer and what is the purpose of such buying. For example, a pen is a consumers' goods for a student and producers' goods for seller of stationary.

6.3.2 Durable and Perishable Goods Demand

Durable goods are those which can be used for consumption at various time up to a particular time period like furniture, TV, car, refrigerator, machinery etc. The demands for such commodities are called 'Durable Goods Demand'. These goods provide services to various years. The demand analysis for such goods is complex. These items are purchased to replace the old one or new expansion. The reason for replacement is obsoleteness, technological development and modernization. At the time of demand due to expansion need the consumer study and consider the repairing and maintenance cost and availability of special and necessary comforts. For example, consumer take cares the cost of petrol while purchasing car, its maintenance cost and parking cost at home. Generally, the durable goods are used by various people, thus its demand depends on the number, age, income, interest, taste and tradition of members of family. Perishable goods are used only once. The demands for these commodities are called Perishable Goods Demand', like food, soft drinks, medicine etc. The demand for commodities mainly depends on income. The demand analysis of such commodities is simple.

6.3.3 Derived and Autonomous Demand

When the commodity is demanded so that other goods can be manufactured with its help, such demand is called derived demand. The commodity of derived demand acts as resource for production of other commodity. This demand is indirect rather than direct. For example, demand for brick, cement etc. is derived demand because it is used for making house. The commodities, whose demand is not dependent on other commodities and is free, demand for such items is called autonomous demand. The elasticity of derived demand is lesser than elasticity of autonomous demand. When the ratio between demands of two

commodities is definite, it is easy to determine derived demand. In the case of television, as the demand of television increases, the derived demand of antenna will also increase. Where the ratio of basic commodity and dependent commodity is not certain, the determination of derived demand is difficult.

6.3.4 Industry and Company Demand

Industry demand is total demand of any particular industry and company demand is the demand for any particular company. For example, demand sum of all the iron companies is called industry demand and demand for TISCO (Tata Iron and Steel Company) is called company demand. Company demand is a part of industry demand. In case of monopoly, there is no difference between industry demand and company demand. In perfect competition, company demand is a very small part of industry demand. For managerial view, forecasting for both industry demand and company demand is useful. Industry demand has to forecast the company demand. It is necessary to know that company demand is how much part of industry demand, what the possibilities to increase it are and what the status of competitors of the company is.

6.3.5 Price and Income Demand

Price demand is the demand which a customer is ready to buy at different imagined prices in a particular time. Price and demand have inverse relationship. Less demand on more price and more demand on less price is found. Income demand means the quantity demanded of any commodity which a customer is ready to buy at different stages of income. Income demand curve is also called **Engel curve** in the name of famous German economist **'Engel'**. Some commodities are such whose demand increases with increase in income, they are called superior commodities. These are commonly comfort giving and luxurious commodities. Some other commodities are such whose demand decreases with increase in income. These goods are called inferior commodity. In case of maize, the demand by consumer decreases with rise in income.

6.3.6 Substitution and Complimentary Demand

Substitution demand is of those items which are used in place of other commodities like tea and coffee, cooking gas and kerosene oil etc. There is a direct relationship between price of substitute goods and demand of original goods. Increase or decrease price of one commodity results in increase or decrease in quantity demanded of other item. Complimentary demands are demand of those goods which are used with other commodities and not independently, like bike and petrol, pen and ink, bat and ball, milk and sugar etc. In case of complimentary goods, if there is an increase in the price of one commodity, the quantity demanded of another commodity automatically decreases and if price of one commodity decreases, the demand for other commodity rises. The price of complimentary goods and quantity demanded has inverse relationship.

6.4 IMPORTANCE OF DEMAND ANALYSIS

Demand analysis plays an important role in economics. Thus, it is very important to know that what is the demand for commodity and what are determinates of demand. In demand analysis, the study of determinants of demand, types of demand and demand forecasting is included. The importance of demand analysis is given, briefly as below:

1. It forecasts about sales so that organisation produces according to demand only. This helps in co-ordination between sales and production. Therefore, the problem of over or under production may be controlled.
2. It brings efficient change in demand. Management can give appropriate direction to demand by controlled effect on determinants of demand. The importance of advertisement regarding demand of any commodity can be predicted by demand analysis.
3. Demand analysis is helpful in price determination. Through demand schedule the quantity demanded at different prices can be known. As a result, appropriate price can be chosen on which profit amount will be maximum
4. Demand analysis is helpful in planning and decision making. Management decides the future policies according to the nature of demand.
5. Demand analysis is also helpful for government, finance minister and international economists. The price policy of public sector industries and taxation policies are based on demand analysis.

6.5 SUMMARY

Demand is affected by various economic, social and political elements but their individual effects are different. The most important factor affecting demand is price. The quantity of any commodity demanded by any consumer at a particular price is called Price Demand. The demand of commodities also depends on income of individuals. The relationship between income and demand is called Income Demand. The demand of any commodity is also affected by price of other related commodities. The change in demand of any commodity due to change in price of related goods is called 'Cross Demand. Goods which help in the production of other goods, the demand for these commodities is called Producers' Goods Demand. The goods which are used for consumption of end user consumer, its demand is called Consumers' Goods Demand. Durable goods are those which can be used for consumption at various times up to a particular time period like furniture, TV, car, refrigerator, machinery etc. Perishable goods are used only once. When the commodity is demanded so that other goods can be manufactured with its

help, such demand is called derived demand. Demand analysis plays an important role in forecasts about sales, change in demand, price determination, planning and decision making, public sector industries and taxation policies.

6.6 KEY WORDS

Perishable Goods : Goods lessened in value and become worse by being kept.
Industry Demand : Need of Industrial Company for product or services.
Demand Determinants : Different factors that affect the demand.

6.7 TERMINAL QUESTIONS

6.7.1 Essay Type Questions

1. What is Demand Determinants? Discuss the factors affecting of Demand.
6. What is the importance of demand analysis in Managerial Economics? Discuss the important factors determining the demand.
7. Write a detailed note on 'Cardinal Utility Analysis of Demand'.
8. State the kinds of demands. Explain any three kinds of demands.
9. How does producers' goods differ from consumers' goods?

6.7.2 Objective Questions

1. Engel curve is also called as.....
   - **(a)** Income demand curve
   - **(b)** Price demand curve
   - **(c)** Derived demand curve
   - **(d)** Autonomous demand curve
2. Giffen goods are also called as.....
   - **(a)** Superior goods
   - **(b)** Complimentary goods
   - **(c)** Inferior goods
   - **(d)** All above

Ans. 1. (a), 2. (c)

UNIT-7

DEMAND FORECASTING

Structure

7.0 OBJECTIVES

After studying this unit you should be able to:

- Write the meaning and characteristics of demand forecasting.
- Enlist the purposes of demand forecasting, both short-term and long- term.
- How the survey of buyers' intentions and economic indicators methods are used to forecast the demand?
- How can you forecast the demand for a newly established business concern?

➢ Briefly explain the limitations of demand forecasting.

7.1 INTRODUCTION

Demand forecasting means to make prediction about possible demand for any commodity for a particular time period. Demand forecasting is having two words demand and forecasting. Demand means effective desire for a particular price and time whereas forecasting or fore + casting means prediction for future. Demand forecasting for a particular time period is scientific estimation of sales quantity and value of an organisation. Demand forecasting seeks to investigate and measure the forces that determine sales for existing and new products. Generally companies plan their business – production or sales in anticipation of future demand. Hence forecasting future demand becomes important. The art of successful business lies in avoiding or minimizing the risks involved as far as possible and face the uncertainties in a most befitting manner. Proper demand forecasting is essential for any organisation for the purpose of planning and managing future events.

7.2 CONCEPT OF DEMAND FORECASTING

Some important definitions of demand forecasting are as follows:

1. In the words of **Philip Kotler,** "The company sales forecast is the expected level of company sales based on a chosen marketing plan and assumed marketing environment."
2. As per **American Marketing Association,** "Demand forecasting is an estimate of sales in dollars or physical units for a specified future period under a proposed marketing plan."
3. In views of **Reymonds Wills,** "Demand forecasting means to predict the company's share in perspective market."
4. According to **Cundiff and Still,** "Sales forecasting is an estimate of sales during a specified future period, in which estimate is tied to a proposed marketing plan and which assumes a particular set of uncontrollable and competitive forces."

It is clear from above definitions that demand forecasting means predicting total sales quantity and amount of commodity or service for a particular future period under a proposed marketing programme.

7.3 CHARACTERISTICS OF DEMAND FORECASTING

Following characteristics are clear from above discussion of the concept of demand forecasting:

1. It is the prediction for future sales.

2. This forcasting is based on past and present sales experiences and possible future events.
3. It is done for a specific time and price.
4. Forecasting can be done in form of quantity or value of the commodity
5. Scientific prediction or forecasting is done with reason and intelligence. It does not have any place for mere assumptions and imaginations.
6. Statistical and mathematical techniques can also be used in demand forecasting.
7. Future marketing plans are also considered in future sales forecasting.
8. Demand forecasting can be made for any particular product or for whole product class. For example, Hindustan Unilever Limited can conduct demand forecasting for only 'Rin or Lifebuoy' soap or for all soap brands produced by it.

7.4 OBJECTIVE OF DEMAND FORECASTING

On the basis of time, demand forecasting is of two types: short-term and long-term forecasting. Objectives for both short-term and long-term demand forecasting are different, which are discussed below:

7.4.1 Objectives of Short-Term Demand Forecasting

Short-term demand forecasting means to make prediction for future demand with the period of one year or less than one year. It can be weekly, monthly, half-yearly or yearly Following are its main objectives:

1. **Formulation of Production Policy:** First objective of demand forecasting is to formulate the production policy of firm on its basis. It coordinates with future demand and supply circumstances through estimation of future demand and enables production on its basis, so that firm may overcome with the problem of over-production or under-production.
2. **Regular Availability of Raw Material :** Second objective of demand forecasting is to regulate availability of raw material for required production, so that there is regular flow of raw material in production process and the cost of stock is minimum. The level of stock of raw material can be maintained between minimum and maximum levels on the basis of demand forecasting. It enables

proper flow of inventory in production process without any shortage or wastage.

3. **Adequate Arrangement of Labour:** Another aim of forecasting is also to arrange skilled and unskilled labour as per requirement. Thus, it ensures coordination in production process with minimising the events of shortage or excess of labour.

4. **Optimum Use of Machines:** It is the aim of forecasting to ensure optimum use of firm's machinery and equipments. Total machine capacity of the firm can be utilised with the help of demand forecasting so ultimately, the objective of profit maximisation or loss minimisation may be achieved.

5. **Determination of Price Policy:** Producers make estimation about strengths or weaknesses of future market through demand forecasting. If there is a possibility of weak state of market, then, businessmen will not increase the prices. On the contrary, if future market is assumed to be strong then, businessmen may take decision about high prices. Hence, demand forecasting is also done with an objective of determining price policy.

6. **Setting Sales Target:** Different categories of market are analyzed and each of them are forecasted. These categories of forecasting becomes sales target for sellers and agents of different regions and their performance is measured on the basis of these targets.

7. **Estimation of Short-term Capital Requirement :** We can predict short-term capital requirement of firm on the basis of short-term demand forecasting. Requirement of cash balance depends on level of sales and size of production activities so short-term money can be arranged by making demand forecasting.

7.4.2 Objectives of Long-Term Demand Forecasting

Long-term demand forecasting refers to study about future sales for period more the one year. Objective of long-term demand forecasting are as below:

1. **Plant Capacity Planning:** Main long-term aim of demand forecasting is to ensure plant capacity according to forecasted demand. If the capacity of plant is not sufficient, new plans for extension of required plants can he made.

2. **Arrangement of Efficient Man Power :** Unskilled labour can be employed in short-term also, but for the purpose of availing skilled and appropriate labour it is a long-term process. Sufficient time and money is required for their recruitment and training. Through

long-term demand forecasting this process of getting required efficient man power can be done.

3. **Forecasting of Long-term Financial Requirement:** Long-term financial requirement of organisations can only be predicted through demand forecasting. Along with identifying requirements about future, proper steps for obtaining them can also be taken through demand forecasting.

7.5 METHODS OF DEMAND FORECASTING

Demand forecasting for old or existing products is a general and frequent process. Some of important methods or techniques, used for forecasting the sales of existing products are as below:

1. **Survey of Buyers' Intentions :** In this method, consumer surveys are conducted to gather information about their future plans for purchase. Consumers of existing products are asked about their intention of quantity to purchase..This method is most popular and based on the assumption that buyers are the mirror of social demand. It is mainly done is two forms (i) Census Method, and (ii) Sample Method.

In **census method** all the potential customers are contacted and asked abouttheir future plans for purchasing the products. All the information are gathered and added and possible demand of a product is forecasted.

In **sample method** only a few selected representative consumers are chosen and demand for product is forecasted on the basis of opinion of such representatives. This method is widely used as it is easy where number of consumer is very large.

Merits:

(1) This method is very easy and simple.

(2) As these information are based on direct opinion of customers, these are comparatively near to the reality.

(3) It is best for short-term forecasting.

Demerits:

(1) This method is not suitable for long-term forecasting as taste, interest, fashion and preferences of customers change according to the length of the time.

(2) Census method involves time, money and efforts in large quantity and on the other hand, in sample method there is fear of error in selecting the samples.

(3) Mostly customers do not give proper information about their intentions.

2. **Sales Force Composite** : Salesmen are directly connected with the customers, hence, have greater access about demand of the product. In this method of forecasting, salesmen are asked about demand and probable sales of the product. Responses of all salesmen are gathered together which is summarised for demand forecasting. These predictions are

rechecked also, as some salesmen may be of pessimistic or optimistic nature. In other words, in this method preference is given to responses of the sellers, sales representatives, sales managers, and dealers because they have immediate and direct approach to the customers.

Merits :

(1) This method is easy and less expensive because it does not involve use of statistical techniques and survey.

(2) Predictions in this method are near to the reality as these are based on salesmen's responses.

(3) Quota for every salesmen is decided in proper way through this method.

(4) Salesperson's experiences and opinions are obtained which is helpful in policy making for future.

Demerits :

(1) This method may be biased due to the opinions of salesperson.

(2) Possibility of overestimation or underestimation by salesperson exist so the final result may be affected.

(3) If quota of salesperson is decided on the basis of these estimates, they may intentionally underestimate.

(4) It is useful for short-term forecasting only and does not apply on long-term forecasting.

3. **Experts' Opinion Or Delphi Method:** In this method, opinion of outside experts are taken in place of buyers and salespersons. Different experts opinions are taken and general consensus is developed through which future demand is estimated. Group discussion is done in group of experts and every expert gives his opinion about product demand. Delphi method was propounded in late 1940 at Rand Corporation of USA by Olaf Helmer, Dalcey and Gordan in the area of technological forecasting. Delphi technique can be used for cross checking information of forecasts.

Merits :

(1) This method is based on expert experiences and professional knowledge.

(2) Firms don't have to arrange the data collection.

(3) Results about demand forecasting are obtained easily and fastly.

(4) This method is also suitable for new products because past information and data are not available.

Demerits :

(1) Being costly, small firms can not take advantage of it.

(2) Experts being theoretical and professionists may give result which is lacking practicality.

(3) Confidientiality of result through this method can not be secured and information may not be exclusive to the speicficy firm.

4. Group Excutive Judgement : In this method, forecasting is done on the basis of experiences and knowledge of organizational officers group. For this, a seminar is arranged where all the officers jointly forecast demand after group discussion and interactive session.

Merits: (1) This method is fast and easy

(2) Advantage of firms experienced officers is taken in this method.

(3) This method can be used where past data and information are not available.

Demerits : (1) Responsibility of impurity or wrong forecasting can not be decided for any specific officer.

(2) Forecasting may be biased as these are based on personal opinion and thinking of officers and less on facts.

5. Economic Indicators Method : In this method, some, specific economic indicators are used for demand forecasting. For this, economic factors affecting demand of goods are considered. These economic indicators are different for different commodities, like;

1. For building materials (like cement, bricks etc.) - accepted plans of houses by Development Authority.
2. For consumer products (like flour, sugar, oil) - individual income of people.
3. For agricultural equipments (like tractor, thrasher, pumping set) - income of agriculturists & farmers.
4. For demand of petrol and parts of cars - registration of car by RTO.
5. For demand of television - number of families in country.

These economic indicators' data can be obtained form different institutions such as Central Statistical Organisation, Development Authorities, Population Department, RTO etc.

Here we can understand it with an example; no. of cars registered can be known by RTO and if 20%rise has been in any city is one year, it can be forecasted that demand of petrol will rise by 20%.

Merits : (1) This method is easy and less expensive.

(2) Forecasting results are more authentic as they are based on facts and logic.

Demerits: (1) It is difficult to identify the economic factors relating to different commodities and extent of relationship.

(2) This method is not appropriate for forecasting of new product because there is no past data.

6. Market Test Method : In this method, actual sales of commodity is made for a period of time in any selected sample of the market and on the basis of results obtained, forecasting for whole year and total market is made.

Merits : (1) This method is also authentic as it is based on actual results.

(2) It is suitable method for new product.

Demerits : (1) This method involves more time and labour.

(2) To state behaviour of whole market on basis of a small part of market may be false.

7. Statistical Method :Various statistical tools are used for obtaining accurate demand forecasting. This method belives that history repeats itself. In this method, quantitative relationships are gained by using statistical techniques on basis of past actual sales data. Some of main tools used in demand forecasting are: average, diagram method, correlation, regression, extrapolation, interpolation and time series analysis. In this method, future trend of demand are projected through statistical application of past years data relating to sales and present circumstances.

Merits : (1) This method is based on statistical tools and not mere on assumptions hence are more authentic.

(2) Outcomes in this method are not affected by personal bias.

(3) This method is scientific and cheaper.

(4) Predictions can be made fastly.

Demerits : (1) This method is highly complicated due to having mathematical approach.

(2) Can not be used in new products forecasting because past data are not available for new products.

(3) Finding proper past data is a difficult task.

(4) This method assumes that future trends would be like past but it is not necessary in real life.

7.6 DEMAND FORECASTING FOR NEW PRODUCTS

Forecasting task for a new product is relatively difficult than old products because experiences, information and data of previous year are not available in relation to new item. New product is unfamiliar to both firm and customers and competitive advantages are not known. Following methods are used in the process of demhnd forecasting of new products:

1. **Evolutionary Method :** Any new product is next developmental step of an existing product. For example, the Coloured television is next developmental stage of Black & White television. If demand of Coloured television is to be forecasted, it has to be done on the basis of demand trends of existing Black & White television. In same way, demand for mobile phones can be forecasted on basis of land-line telephone connections. This method is useful where new product is an advanced form of existing product.

2. **Substitute Method :** Under this method, demand for substitute of goods is forecasted for predicting demand trend of any new product. New products demand can be forecasted by comparing its quality and price with substitute goods. For example, we can make forecasting of demand of ball point pen on basis of demand of fountain pen or coffee demand can be forecasted on the basis of demand of tea.

3. **Opinion Polling Method :** In this method, prospective customers are contacted and their responses is taken by giving them demonstration about product regarding its features and advantages, eventually prediction about future demand of new product is made. This method is also called 'Survey of Buyers' Intentions' because buyers direct views are surveyed. Demand forecasting of new engineering equipments and machineries are done through this method. But, making samples of product, getting customers response about product and identifying buyers intentions about purchase is a difficult task.

4. **Market Test Method:** In this method, new product is actually sold in a small part of market for some time and forecasting of demand for whole year for whole market is projected throught outcomes derived. While using this method selection of sample market should be carefully done.

5. **Experts' Opinion Method :** In this method, the opinion of external experts and specialists is gathered for demand forecasting. Specialists are provided necessary information about product and opinion is taken regarding possible demand of such product. Some organisations take help of specific agencies also which may charge the fee for such

services. Though it is a simple method but quality of demand forecasting depends on ability and experiences of the specialists.

Above methods of demand forecasting are not competitors to each other but most of the institutions use them together.

7.7 IMPORTANCE OF DEMAND FORECASTING

Success or failure of every business enterprise depends on demand forecasting to a large extant. In present complex product system, demand forecasting is very important tool for management. In brief, we can explain importance of demand forecasting as below:

1. **Basis for establishment of firm :** Demand forecasting is the basis oil which entrepreneurs take courage for establishment of new firm. Entrepreneurs take decision, to establish that firm to produce goods and services whose demand is expected to rise in the future period.

2. **Decision regarding size of plant :** Size of plant for production of goods is also related to demand forecasting. If there is a possibility of rise in future demand, plans for expansion of plant size is taken to meet the future requirements.

3. **Production Planning:** Decisions regarding production such as when, how much, where, how are also dependent on demand forecasting. Maximum profit for business is only possible when production is done according to demand and situation like over-production or under-production are avoided.

4. **Availability of production resources :** Raw material, labour, machinery capital etc. are necessary for production. Demand forecasting is helpful in arranging the required resources and shortage or wastage of resources are also checked by it.

5. **Helpful in appropriate price policy formulation**: Demand forecasting is very helpful in deciding an appropriate price policy. Since forward projections about market condition can be made through demand forecasting thus, coordination of demand and supply call be maintained to combat the situations of sudden rise or fall in prices. This way reputation of company can also be established by adopting constant price policy.

6. **Proper sales policy :** Marketing managers become more cautious and careful by demand forecasting and can make prior arrangements to combat the market risks. This demand forcasting is helpful in appointment of advertisers and sellers also.

7. **Helpful in sales control :** Demand forecasting enables managemant to identify the market areas where more control is needed. Managers can modify their execution through effective marketing

planning in areas. The premises of marketing, sales planning and control are based on sales forecasting.

7.8 LIMITATIONS OF DEMAND FORECASTING

Demand forecasting has following main limitations:

1. **Change in Fashion:** Change in fashion is natural scenario of development of civilization. In today's modern world, rule of demand forecasting is applicable for a very short period. **Morane** has rightly said in England that economic forecasting is true only for next six hours like weather forecasting, beyond it they are void.

2. **Uneconomical :** Forecasting involves collection of various types of data and information and their analysis. This process is very expensive and small businessman can not afford it. They consider it as luxurious expenses.

3. **Consumers' Psychology:** Demand forecasting largely depends on psychological state of consumers. To make prediction and collect information about consumers' thinning is a difficult task. Consumers may think and express differently, even it is also possible that they are not sure about their own opinions so psychological elements prove to be a complex problem in demand forecasting.

4. **Lack of Efficient Experts:** Demand forecasting should be done by experts but, in general, there is lack of eligible and experienced experts. There is a possibility of errorfull prediction if demand forecasting is done by inefficient persons.

5. **Lack of Past sales data:** Past sales data are very important for demand forecasting but to collect these data according to requirement is a difficult task. In fact, in case of new products past sales data are not available.

7.9 SUMMARY

Demand forecasting is to make prediction about possible demand for any commodity for a particular time period. . Demand forecasting seeks to investigate and measure the forces that determine sales for existing and new products. forcasting is based on past and present sales experiences and possible future events. Demand forecasting can be made for any particular product or for whole product class. Demand forecasting is of two types: short-term and long-term forecasting. Short-term demand

forecasting means to make prediction for future demand with the period of one year or less than one year. Long-term demand forecasting refers to study about future sales for period more the one year. In Survey of Buyers' Intentions method consumer surveys are conducted to gather information about their future plans for purchase. In Sales Force Composite method of forecasting, salesmen are asked about demand and probable sales of the product. Responses of all salesmen are gathered together which is summarised for demand forecasting. In Experts' Opinion Or Delphi method, opinion of outside experts are taken in place of buyers and salespersons. In Group Excutive Judgement method, forecasting is done on the basis of experiences and knowledge of organizational officers group. In Economic Indicators Method method, some, specific economic indicators are used for demand forecasting. In Statistical Method various statistical tools are used for obtaining accurate demand forecasting.

7.10 KEY WORDS

Forecasting : Process of making statements about events where actual outcomes have not yet been observed.

Survey : Methods of collecting quantitative information's.

Prediction : Statement about the way things will happen in the future.

7.11 TERMINAL QUESTIONS

7.11.1 Essay Type Questions

1. Briefly describe the concept and different methods of demand forecasting.
2. Discuss the objectives of short-term and log-term demana forecasting. What are the criteria of good forecasting system?
3. Examine the importance of demand forecasting. What are the methods of demand forecasting of new product?
4. Explain, in brief, the various steps of demand forecasting. Also mention the importance and limitations of demand forecasting.
5. As an expert of Managerial Economics, what methods would you adopt for demand forecasting? Briefly discuss the criteria and steps of a good forecasting system.
6. What is the meaning of demand forecasting ? What are the factors involved in it? Explain the short-term and long-term objectives of demand forecasting.

7.11.2 Objective Questions

1. Which of the following is clearly the objective fo long-ter demand forecasting?
   (a) Regular availability of raw material
   (b) Determination of price policy
   (c) Arrangement of efficient men power
   (d) Formulation of production Policy
2. Statistical methods of demand forecasting can not be applied for...
   (a) New Products
   (b) Old Products
   (c) New and Old Products
   (d) Neither New Products nor Old Products

Ans. 1. (c), 2. (a)

UNIT-8

ELASTICITY OF DEMAND

Structure

8.0 OBJECTIVES

After studying this unit you should be able to:

- What is the fundamental difference between Law of Demand and Elasticity of Demand?

- What is the concept of perfectly inelastic and elastic demand?
- How has Prof. Boulding measured the price elasticity of demand?
- "Cross elasticity of demand is concerned with substitutes and complimentary."
- State the meaning and characteristics of advertising elasticity of demand.
- State any five determinants of elasticity of demand.

8.1 INTRODUCTION

The law of demand states that the quantity demanded of a commodity is dependent or influenced by the price of the commodity. It states that as price of a commodity changes, the quantity demanded also changes in opposite direction. This way, the law of demand tells us only the direction of the change but does not state the rate of change. The extent to which different demand for various commodities changes as per respective change in price may not be same. In other words, the law of demand does not tell us by what amount the quantity demanded of a commodity will change in response to change in its price. To overcome this problem economists have presented the technical concept of elasticity of demand.

CONCEPT OF ELASTICITY OF DEMAND

The elasticity of demand means the measurement of rate of change in the quantity demanded due to change in price of commodity, income of consumers, price of related commodities and change in advertisement expenditure. This depicts the quantitative relationship between quantity demanded and (i) price of commodity, or (ii) income of consumers, or (iii) price of related commodities, or (iv) advertisement expenditure. That is why, elasticity of demand has been divided into four categories *i.e.*(i) Price elasticity of demand, (ii) Income elasticity of demand,(iii) Cross/substitution elasticity of demand (for related commodities), and(iv) Advertisement elasticity of demand.

Out of these types of elasticity, price elasticity of demand is the most important. All of them are discussed later in this chapter.

8.2 CONCEPT OF PRICE ELASTICITY OF DEMAND

The most important factor affecting quantity demanded is price of commodity. Due to which most of the economists called price elasticity of demand as synonym of elasticity of demand. Price elasticity of demand has been defined by various economists in different ways. Some of them are as below:

According to **Benham,** "The concept of elasticity of demand relates to the effect of a small change in price upon the amount demanded."

As per **Marshall,** "The elasticity of demand in a market is great or small according to the amount demanded increases much or little for a given fall in price or diminishes much or little for a given rise in price."

According to **Boulding,** "The elasticity of demand maybe defined as the percentage change in quantity demanded which would result from one per cent change in price."

According to **Mrs. Joan Robinson,** "The elasticity of demand at any price or any output is the proportional change of amount purchased in response to a small change in price divided by the proportional change of price."

Thus price elasticity of demand may be defined as the degree or the rate of' change of responsiveness of quantity demanded of a commodity in response to change in its price.

In brief, it can be explained with following way:

Price elasticity of demand =

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

This formula can be clarified by an example. Suppose, the quantity demanded of any commodity is 80 units when its price is Rs.10. If its price is reduced to Rs.8, its quantity demanded increases to 100 units. In this case, price elasticity of demand will be computed as follows:

Condition	Price	Demand
I	Rs.10 per unit	80 Units
II	Rs.8 per unit	100 units

(a) Proportionate change in demand $= \frac{\text{Change in demand}}{\text{Previous demand}}$

$$= \frac{20}{80} \quad \frac{1}{4}$$

(b) Proportionate change in price $= = \frac{\text{Change in price}}{\text{Previous price}}$

$$\frac{2}{10} \quad \frac{1}{5}$$

(c) Price elasticity of demand $= = \frac{\text{Proportionate change in demand}}{\text{Proportionate change in price}}$

$$\frac{1}{4} \div \frac{1}{5}$$

$$= \frac{1}{4} \times \frac{1}{5} = 1.25$$

In simple words, price elasticity of demand is the measurement of change in the quantity demand of any commodity due to change in its price. It symbolises the degree of correlation between demand and price. The price elasticity is negative due to inverse relationship between demand and price but this negative sign is generally ignored and not written.

8.3 DEGREES OF PRICE ELASTICITY OF DEMAND

The price elasticity of demand is different for different commodities. The effect of change in price is not same on all the commodities. Some are more affected in comparison to others. That is why, the value of price elasticity of demand may be from zero to infinity. The price elasticity of demand is classified in following five categories:

1. **Perfectly Elastic Demand** ($e = \infty$): When there is a very small change or no change in price of any commodity, but it gives rise to infinite increase or decrease in its demand, it is called perfectly elastic demand. In other words, a slight increase in price of commodity results to decrease in its quantity demanded and a nominal reduction in price of commodity results to rise in quantity demanded to infinity. This kind of situation is called perfectly elastic demand. In mathematical expression, it is termed as infinite ($e=\infty$). It is show in diagram 1:

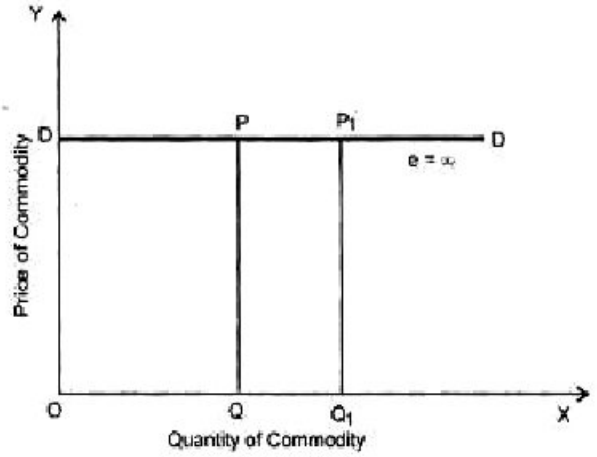


Diagram-1

In diagram, units of quantity demanded are shown on x-axis and price of commodity on y-axis. In case of perfectly elastic demand, curve is parallel to x-axis. In diagram, at price of OD or PQ, demand of commodity is OQ, But in second condition, when price OD or PQ are unaffected, demand increases to OQ_1. This way, there is a change in quantity demanded at unaffected price also. Generally, the perfectly elastic demand is not found in practical life and it is an imaginary concept.

2. **Highly Elastic Demand/Relatively Elastic Demand ($e > 1$):** When change in price of any commodity is more in comparison of change

in its quantity demanded, it is called highly elastic demand. For example, if there is an increase of 20% in the quantity demanded of any commodity due to 10% reduction in the price of that commodity, this condition is of highly elastic demand. Mathematically it is expressed as e> 1. In diagram 2, DD is demand curve which states that when price is OP the quantity demanded is OQ but when price reduced to OP_1, its demand increases to OQ_1.

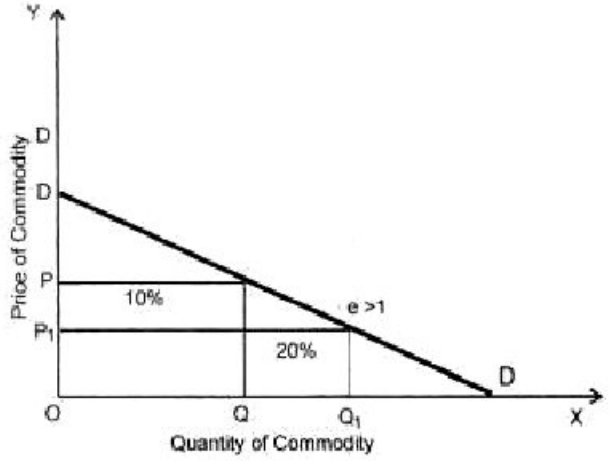


Diagram-2

The increase in demand QQ_1, is more in comparison of reduction in price PP_1. Generally, in case of luxurious items this kind of flat demand curve is found.

3. Unit Elastic Demand (e = 1): When the change in price of commodity is equal to the resulted change in quantity demanded of that commodity, it is called unit elastic demand. For example, when there is a reduction of 10% in price of any commodity and due to this there is increment of 10% in the quantity demanded of that commodity, the demand for such commodity is called unit elastic demand. It is expressed as e = 1 in mathematical way.

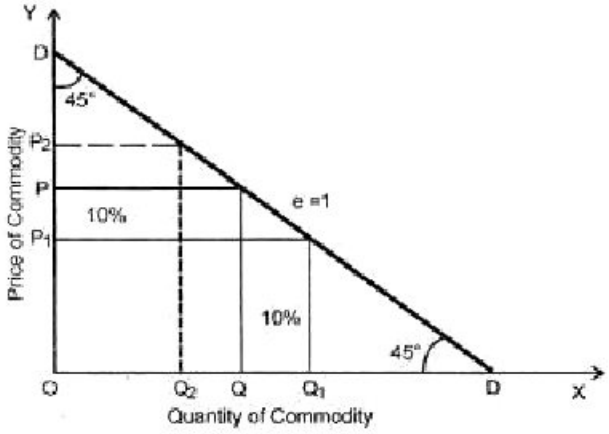


Diagram-3

In diagram 3, DD is elastic demand curve. At price OP quantity of OQ is purchased. If there is a decrease of PP_1 in price, its quantity demanded increases by QQ_1 and difference of PP_1 and QQ_1 is same. This

way, at increase by PP_2 in price and resultant decrease by QQ_2 in quantity demanded, the difference in the change is same. Thus, it is called unit elastic demand.

4. Highly Inelastic Demand/Relatively Inelastic Demand (e < 1): Highly inelastic demand or relatively inelastic demand is also called as inelastic demand when proportionate change in quantity of any commodity is less than the proportionate change in price of commodity, then the demand for commodity is called highly inelastic demand. In mathematical way, it is expressed as $e < 1$. For example. If the change in quantity demanded is 8% due to change in commodity's price of 10%, such demand is called highly inelastic demand. Such demand is found in case of necessary items (as grain and cloth). In diagram 4, the quantity demanded is OQ at OP price. On decrease in price of PP_1, there is comparatively less increase in the quantity which is QQ_1. QQ_1 is comparatively less than PP_1. This way the elasticity of demand is less than a unit.

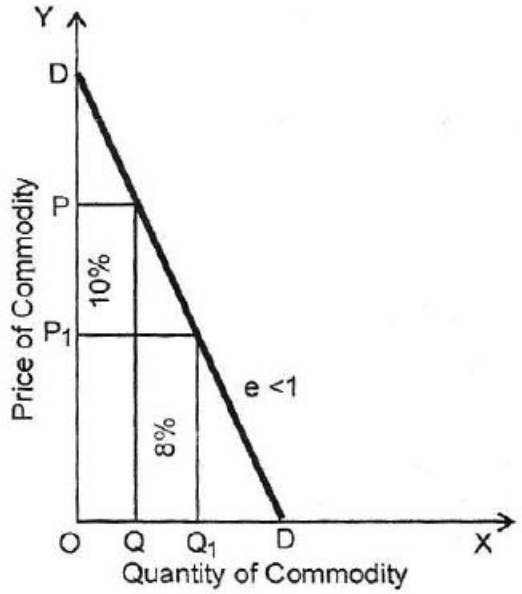


Diagram-4

5. Perfectly Inelastic Demand (e = 0): When there is no change in demand of any commodity even at sufficient change in its price, the demand for such case is called perfectly inelastic demand. Mathematically, it is expressed as zero i.e. $e = 0$. It is an imaginarily situation. There is no example of such situation in real life. In diagram 5, demand curve is perpendicular to X axis. It is clear that at price OP demand is OQ and where price reduces to OP_1 demand remains unaffected as OQ.

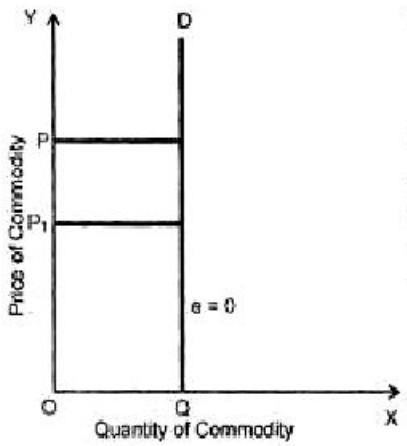


Diagram-5

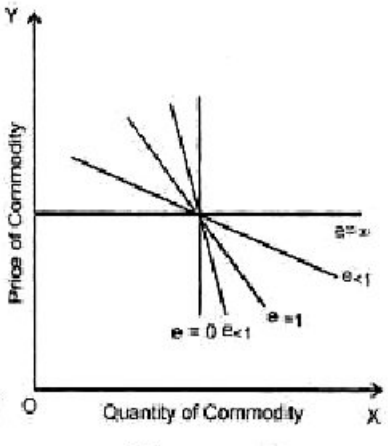


Diagram-6

The different categories of price elasticity of demand can be shown as diagram 6.

8.4 METHODS OF MEASURING PRICE ELASTICITY OF DEMAND

The categories of price elasticity of demand tell us that elasticity of demand is less or more. So, for specific knowledge of increase or decrease, measurement of elasticity of demand is made. Economists have suggested following methods of elasticity of demand measurement *i.e.* (i) Total Outlay Method, (ii) Proportionate or Percentage Method, and (iii) Point Method.

8.4.1 Total Outlay Method

In this method which was propounded by **Prof. Marshall**, the relative comparison is done between total expenditure of price prior to change and price after change. Elasticity of demand can be measured by considering the change in total outlay as a result of change in the price of the commodity. Due to change in price, there is a change in total quantity of commodity purchased that is why there is a change in total expenditure also. This way it is found out that total quantity of expenditure is more or less or equal to quantity prior. As per total outlay method three categories are there for elasticity of demand. [e = 1, e> 1, e < 1]

(a) More than unit (e > 1): Where the effects of changes in price of commodity is such, that due to increase in price there is decrease in total expenditure and in its opposite, at decrease in price, there is an increase in total expenditure, the elasticity of demand is called greater than unit.

It can be illustrated as below:

Price (in Rs. per Unit)	Quantity demanded (units)	Total Expenditure (inRs.)	Elasticity of demand
6 (Basic Price)	100	600	e >1
8 (Increase in Price)	60	480	
4 (Decrease in Price)	175	700	

It is clear from above table that at increase in price of commodity total expenditure reduces whereas at decrease in price there is increase in total expenditure. Thus, elasticity of demand is more than unit.

(b) Equal to unit (e= 1): When there is no change in total expenditure due to change in price, the elasticity of demand is equal to unit. In this case, the proportionate change in price of commodity is equal to the proportionate change in quantity demanded in inverse direction.

Illustration regarding this fact is as below:

Price (in Rs. per Unit)	Demand (in units)	Total Expenditure (inRs.)	Elasticity of demand
6	100	600	
8	75	600	e = 1
4	150	600	

It is clear from above table that at all three prices of commodity, total quantity of expenditure is same.

(c) Less than unit (e < 1): When the effect of changes in the price of commodity is such that total expenditure reduces due to decrease in price and total expenditure increases with price increase, such elasticity of demand is less than unit.

For example:

Price (in Rs. per Unit)	Demand (in units)	Total Expenditure (inRs.)	Elasticity of demand
6	100	600	
8	90	720	e < 1
4	125	500	

It is clear from above that at increase in price of commodity total expenditure on it increases and at reduction in price total expenditure decreases. The three categories of total outlay method for measuring price elasticity of demand can also be shown through diagram. In given diagram 7, in first part, when price OP_1 reduces then total expenditure increases, thus elasticity of demand is greater than unit i.e. e> 1.

In second part when price reduced to OP_2 from OP, then total e is unaffected, thus elasticity of demand is equal to unit (e =1)

In third part, when price is reduced to OP_2 then the quantity of total expenditure is reduced, thus elasticity of demand is less than unit i.e. (e < 1).

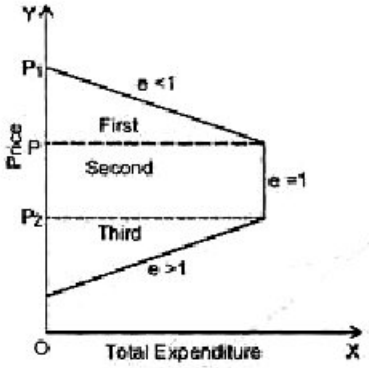


Diagram-7

8.4.2. Proportionate or Percentage Method

This method was propounded by **Prof. Flux** so it is also called **Flux method.** In this method elasticity of demand is measured by dividing proportionate change in demand by proportionate change in price. In the form of formula it is:

Elasticity of demand =

$$\frac{\text{Proportionate or Percentage Change in Demand}}{\text{Proportionate or Percentage Change in price}}$$

OR

Elasticity of demand

$$\frac{\text{Increase/Decrease in Demand}}{\text{Initial Demand}} \div \frac{\text{Increase/Decrease in price}}{\text{Initial Price}}$$

The elasticity of demand can be analysed on the basis of this method that if it is equal to or less than or greater than unit. For example, the demand for a commodity was 400 units when its price is as Rs.5. If the price increases to Rs.6 its demand reduced to 380 units then;

$$\text{Elasticity of demand} = \frac{20}{400} \div \frac{1}{5} = \frac{20}{400} \times \frac{5}{1} = 0.25$$

In this example, the demand elasticity is less then unit.

It should be noted that relationship between demand and price is generally negative and so the sign of(-) is not placed in the formula. Whenever sign of negative is not clearly stated it means it is hidden. In this method, the initial or new demand and price are used for calculating elasticity of demand. Some economists calculate elasticity of demand by average of initial and new both.

8.4.3. Point or Geometrical Method

This method was firstly used by **Prof. Boulding.** As per this method, elasticity of demand is calculated by dividing lower sector of tangent of any demand curve at a particular point by the upper sector. It has following formula for calculation:

$$\text{Elasticity of demand} = \frac{\text{Lower sector of Tangent}}{\text{Upper sector of Tangent}}$$

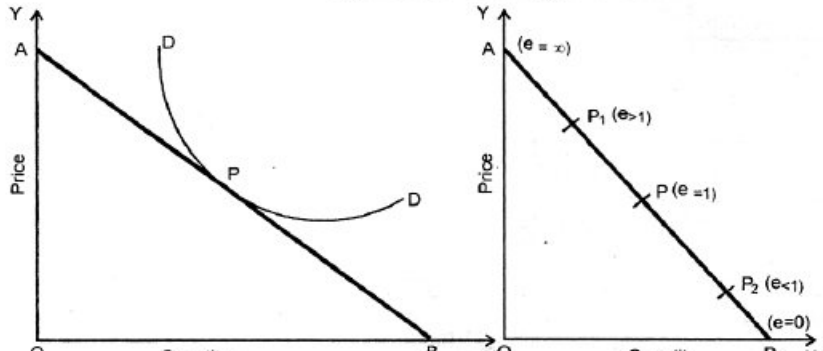


Diagram-8

Diagram-9

In diagram 8, DD is demand curve and at point P elasticityof demand is to be calculated. At this point tangent AB is drawn which meets to X and Y axis.

$$\text{The elasticity of demand at point P} = \frac{PB}{PA}$$

If the quotient is 1 then elasticity of demand is equal to unit. If the quotient is more than 1, the elasticity of demand will be greater than unit and when quotient is less than 1, elasticity of demand will be less than unit. It can be zero and infinite also. The geometrical method of measuring elasticity of demand is very practical as it clarifies that elasticity of demand at different points of demand curve is uneven.

In diagram 9, possible five conditions are shown by point method. AB is a straight tangent line. At the middle point P of AB,

Elasticity of demand = $\frac{PB}{PA} = 1$

At point P_1, elasticity of demand = $\frac{P_1B}{P_1A}$ = More than unit

At point P_2, elasticity of demand = $\frac{P_2B}{P_2A}$ = Less than unit

At Point A, elasticity of demand = $\frac{AB}{O}$ Infinity

Whereas, at point B, elasticity of demand = $\frac{O}{AB}$ = Zero

This way:

If Lower sector > upper sector then e > 1

If Lower sector < upper sector then e < 1

If Lower sector = upper sector then e = 1

If Lower sector is complete then e = ¥

If Upper sector is complete then e=0

8.5 INCOME ELASTICITY OF DEMAND

The consumer's income is another important element affecting the demand. So, the magnitude of change in demand due to change in income is studied in income elasticity of demand. It states the quantitative relationship between income of individual and demand of commodity. The demand for goods and services increases with increase in consumer's income and vice versa. As per **Prof. Boulding,** "Income elasticity of demand is that change in quantity demanded which is originated due to one percentage change of monetary income, other quantities and prices remaining constant."

Income elasticity of demand is calculated by dividing proportionate change in demand by proportionate change in income or it is explained as:

$$\text{Income Elasticity of Demand} = \frac{\text{Proportionate change in Demand}}{\text{Proportionate change in income}}$$

For example, if there is an increase of 30% in the demand of a commodity due to 20% increase in income, in this case:

$$\text{Income Elasticity of Demand} = \frac{30\%}{20\%} = 1.5$$

Following alternative formula can also be used to measure income elasticity of demand, which is more authentic and practical:

$$e = \frac{Q - Q_1}{Q} \div \frac{I - I_1}{I}$$

e = Income elasticity of demand, Q= Initial quantity of demand

Q_1= New quantity of Demand, I = Initial Income

I_1= New Income

For example, if at consumers income of Rs.2,000 quantity demanded is 100 units and when income increases to Rs.3,000, quantity demanded in- creases to 125 units, then elasticity of demand

$$= \frac{100-125}{100}, \frac{2,000-3,000}{2,000}$$

$$= \frac{-25}{100} \div \frac{-1,000}{2,000}$$

$$= \frac{-25}{100} \times \frac{2,000}{-1,000} = \frac{1}{2}$$

Types of income elasticity of demand: Income elasticity of demand is of 3 types as shown is Diagram 10.

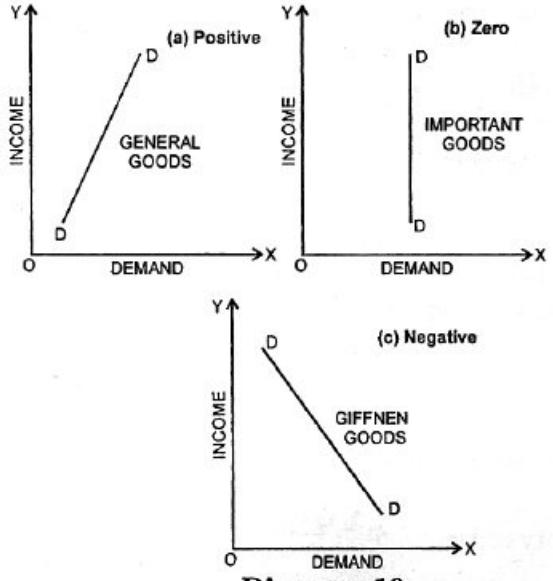


Diagram-10

1. **Positive:** In general types of commodities, the relationship of income and demand found to be positive. In these cases the demand for particular item increases with increase in income and decreases with decrease in income. Positive income elasticity of demand can be of 3 kinds; equal to unit, more than unit and less then unit.
2. **Zero:** In case of items of necessities (like, salt, kerosene oil, postcard), there is no effect of increase or decrease of income on its demand, and thus income elasticity of demand is zero. In this case, demand curve is straight and vertical as shown in diagram 10 (b).
3. **Negative:** Inferior goods (like maize etc.) have negative income elasticity of demand or demand for these items reduces with increase in income.

For practical importance, income elasticity of demand is divided into positive (equal to unit, more than unit and less then unit), negative and zero. Managerial economists may fore cost whether there is possibility of growth or contraction of business. In case of positive income elasticity of demand, with rise in income of costumers the demand for commodity will rise and in its opposite, when income elasticity of demand is negative, in case of rise in income demand will fall.

Income elasticity of demand plays a crucial role is planning and management. Managers may take its help in production planning and demand forecasting.

8.6 CROSS ELASTICITY OF DEMAND

The concept of cross elasticity of demand was firstly given by **Moore** in his book **'Synthetic Economics'** and this concept was developed by **RobertTiffen.** The quantity demanded of any commodity is influenced by change in prices of other related items also. Related commodities can be of two types:

(a) Substitutes: Like tea and coffee, pen and ball pen etc. They can be used in place of each other. Demand for tea may increase not because, its own price has fallen but because the price of coffee has gone up.

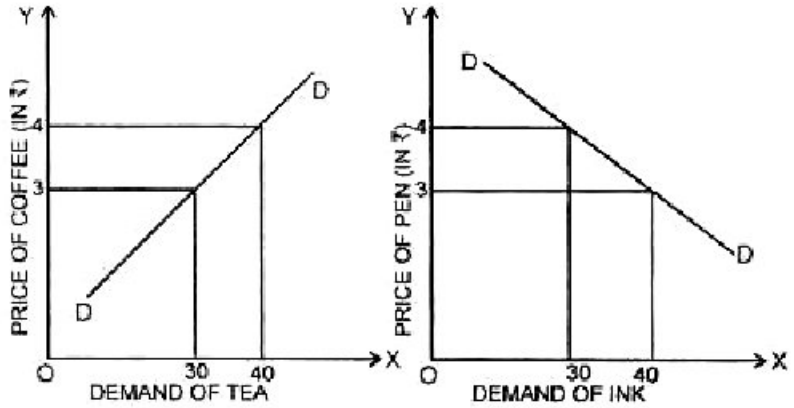


Diagram-11

(b) Complementary: Like pen and ink, car and petrol etc. They are used together to satisfy a particular want. In case of such goods, when the price of one commodity increases, the demand for other will decline and vice versa. That is why, when price of pen increases demand for ink decrease and when price for pen reduces demand for ink increases.

Cross elasticity of demand can be defined as, "The degree of change of quantity demanded of one commodity to change in the price of another related commodity is called cross elasticity of demand."

Thus;

Cross elasticity of demand =

$$\frac{\text{Proportionate change in the quantity demanded of x commodity}}{\text{Propotionate change in price of y commodity}}$$

In diagram 11, the cross elasticity of demand for substitute goods is positive. The relation between price and quantity demanded for substitute goods is direct because increase in price of one commodity leads to increase in demand for another commodity. Like at rise in price of coffee people will start consuming more of tea in place of coffee and thus demand for tea will rise.

In case of complementary goods relationship between price and quantity demand is inverse and demand curve slop is negative. If price of pen increases then demand for it will reduce and there will also be decrease in demand for ink. This way when cross elasticity of demand is positive then goods are substitute to each other and if it is negative, goods are complementary.

8.7 ADVERTISING ELASTICITY OF DEMAND

8.7.1 CONCEPT OF ADVERTISING ELASTICITY OF DEMAND

In present competitive business world, advertisement is very significant to increase the demand for commodities. Advertisement expenditure's effect on demand for commodities is known as advertisement elasticity of demand. If clarifies the relationship between advertisement expenditure and quantity demanded of any commodity. It may also be clarified as:

Advertisement elasticity of demand

$$= \frac{\text{Proportionate change in demanded}}{\text{Propotionate change in advertisement expenditure}}$$

or $e = \frac{Q-Q_1}{Q} \div \frac{A-A_1}{A}$

Where;

Q = Initial demand,

Q_1 = Changed demand after advertisement expenses,

A = Initial advertisement expenses,

A_1 = Advertisement expenses afterwards.

8.7.2 CHARACTERISTICSOF ADVERTISING ELASTICITY OF DEMAND

Following are the important facts about advertisement and demand of commodity:

1. When price, quantity, distribution channel etc. are constant, advertisement leads to rise in demand.
2. A particular quantity of commodity can be demanded without advertisement also. In diagram 12, OD quantity demanded is given at zero advertisement expenditure.
3. In starting, with increase in advertisement, quantity demanded increases then it rises with slow rate and after a point there is no increase in quantity demanded with increase in advertisement expenses.
4. If advertisement is done by unfair means it leads to decrease in quantity demanded is place of increase.

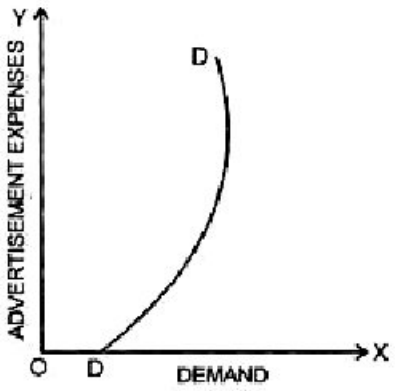


Diagram-12

8.7.3 FACTORS AFFECTING ADVERTISING ELASTICITY OF DEMAND

Advertisement elasticity of demand is affected by following factors:

1. **Product Stage:** Advertisement for new products give fast growth in demand and advertisement elasticity of demand is more, whereas in case of old products advertisement elasticity of demand is less or inelastic.
2. **Competitors Reaction:** If the advertisement by producer attracts the rivals for more advertisement on their part then, the effect of advertisement will be less or else it will be high.

3. **Quality of Advertisement:** If the present advertisement is better in quality in comparison to the past advertisements, then the elasticity of demand will be more and more quantity will be demanded by customers.

4. **Effects of Non-Advertising Factors:** Demand for commodity is also affected by non-advertising factors like price, income, growing intensity, fashion etc. Thus, for accurate measurement of advertisement elasticity of demand, these effects should also be studied.

5. **Time Interval:** Mostly the effect of advertisement expenditure on demand is seen after a certain time interval. Even the past advertisements also affect the present demand. In addition to this, present advertisement affects future sales, which is difficult to calculate.

Importance: The study of advertisement elasticity of demand is important for economists and marketing managers. Through its analysis, it can be easily decided whether to increase advertisement expense or not. At one side it is helpful in controlling growth of advertisement expenses and on another hand proper utilization of advertisement expenses is possible. Advertisement elasticity of demand analysis helps every business firm for achieving its primary objective of profit earning.

8.8 FACTORS AFFECTING ELASTICITY OF DEMAND

Different commodities have different elasticity of demand, more or less elastic etc., depending on various economic and non-economic determinants. The main factors affecting elasticity of demand are following:

1. **Nature of commodity:** Elasticity of demand of any commodity depends on its nature. The elasticity of necessity items like flour, salt etc. is inelastic. Due to their importance, these items are demanded by customer at whatever given price. There is no substantial effect of price change on these demand. Elasticity of demand for comfort items are of average category. For example, demand for milk, ghee is mostly neither very elastic nor inelastic but is elastic. Demand for luxurious goods is more elastic. Demand for television, car and beauty product is greatly affected by price.

2. **Presence of substitutes:** Demand for commodities which have various substitutes available are more elastic. Its reason is that, at increase in price of commodity people will start using other alternative substitutes. For example, when coffee becomes expensive people will start using tea. In its opposite, if there is no substitutes available its demand will be inelastic.

3. **Alternative use of commodities:** There are different items which are used in various alternative ways. Demand for such commodities is more elastic. It the price of commodity rises, consumers will purchase that commodity for most important use only and hence, demand will be very small. Like electricity can be used for lighting, cooking, heating etc. If price of electricity increases it would be used only for urgent uses such as lighting.

4. **Postponement of the use of commodity:** Demand for a commodity is elastic, if its consumption can be postponed, for example, television, refrigerator etc. In its opposite, if consumption cannot be postponed for future its demand would be inelastic like food grain, medicine etc.

5. **Joint Demand:** Some items are used with other commodities jointly, like bread and butter, pen and ink, petrol and car etc. Elasticity of demand of such commodities are related to main article's elasticity of demand.

6. **Income Group:** Commodities used by richer class have inelastic demand. In its opposite, commodities used by poorer section have elastic demand. Price effect is more on demand on poor persons and less on rich people.

7. **Habits of the Customer:** If customer is habitual of any commodity, the demand for such goods will be inelastic as in case of liquor and cigarettes etc. On the other hand, commodities used very occasionally have elastic demand.

8. **Ratio of Income and Expenditure of the Customer:** Commodities on which consumer spends a very small proportion of his income have highly inelastic demand. On other side, commodities on which, consumers spend a large fraction of his income, have elastic demand. For example, consumer spends smaller proportion of income on needle, thread, match box etc.

Thus, these items have inelastic demand. Whereas consumer spends larger proportion on cloth, cycle and radio etc., hence these items have elastic demand.

9. **Government Policy:** When consumption of commodities is made limited by Government through distribution control system and rationing system there is no effect of price change on demand. Demand for such items are inelastic, on the other side, commodities in free market have elastic demand.

10. **Discipline:** Sometimes, political parties, educational and social institutions make compulsory provisions for using particular uniform and articles by their members, students and social workers, at that time demand for such items becomes inelastic.

8.9 IMPORTANCE OF ELASTICITY OF DEMAND

The concept of elasticity of demand is not only important in theoretical life but also in practical life of modern economic world. Elasticity of demand assists the economists, in taking decisions. According to **Keynes**, "Marshall's most important contribution is principle of elasticity of demand and description for theory of price and distribution is impossible without its study." Generally, businessman is interested in knowing results prior to price change, it can be predicted with help of elasticity of demand. Actually importance of elasticity of demand is more practical than theoretical. Some of the importance of elasticity of demand is as follows:

1. **Helpful in Price Determination:** Elasticity of demand is base for price determination for a producer. Main aim of any manufacturer or producer is to earn profit. How far demand will increase with lowering price of commodity or how much demand will decline with increasing its price, can only be known by observing elasticity of demand. Sales for commodities which have elastic demand, can be increased by lowering their price, on the other hand for commodities, which have inelastic demand it is better to price them at high price to earn profit.

2. **For Monopolist:** Monopolist has total control on supply of commodity. Thus, for maximising profit, he prices them according to its elasticity of demand. If demand for commodity is inelastic then he would earn more profit by charging high price. On other side, he would charge lower price from the customers for the commodities having elastic demand.

3. **Price Discrimination:** Price discrimination means charging different prices from different customer or classes. It happens due to inequality in elasticity of demand. Seller will charge high price from customer where demand is inelastic and charge low price where elasticity of demand is more.

4. **Dumping:** In dumping, businessman has to analyse the elasticity of demand of commodity in foreign market. In order to compete with foreign competitors or sellers at market of elastic demand businessman will price the commodity at lower level in foreign market as compared to local market. This way he will able to enter in foreign market.

5. **Joint Supply:** When two or more commodities are produced together, it is difficult to measure different cost individually, like wheat and sugar. In this case, price of the commodity whose demand is more elastic is kept low and price of the commodity whose demand is inelastic is kept high.

6. **Determination of the reward of production factors:** Remuneration or reward of various factors of productions is determined by elasticity of demand. Factors of inelastic demand are paid more reward and factors of

elastic demand are paid less reward. For example, when demand for labour is inelastic, more wages is given by owner.

7. For Government : Government and finance minister have to take care about elasticity of demand of commodities while imposing the taxes, granting subsidies to industries, determining prices of public utilities etc. Government imposes less tax on commodities which have elastic demand or else demand for such commodities will decline due to price rise and government will receive less tax revenue. Elasticity of demand helps Government to have greater effectiveness of incidence of taxation, economic and financial policy formulation. It also helps government in controlling inflation rate and trade cycle effects.

8. Significance in International Trade: Terms of trade between two countries depend on elasticity of demand. If commodities which are to export, are of inelastic nature, we would be able to sell it at higher prices to foreign market. On the contrary, if demand for import is inelastic for us we would buy it at higher price also. Thus, elasticity of demand is helpful in determining terms of trade and balance of payment. It is also helpful in deciding about devaluation of currencies. For example, the policy of devaluation will be effective if demand for country's exports is elastic.

9. Helpful in Determination of Transport Rate: Freight rate for transports whose demand is inelastic would be higher in comparison to case where demand are elastic. If goods cannot be sent by road transport apart from rail- ways then rate of railways will be high as its demand is inelastic.

8.10 DIFFERENCE BETWEEN LAW OF DEMAND AND ELASTICITY OF DEMAND

Both law of demand and elasticity of demand give explanation about price and demand relationship but they have following differences:

1. Law of demand is a qualitative statement whereas elasticity of demand is a quantitative statement. Law of demand tells only about the direction of change in demand or it states that price will change inversely as quantity demanded change. But, it does not tells what amount the quantity demanded will change due to the change in its price. Elasticity of demand gives information about the extent of change in price due to change in quantity demanded.

2. Law of demand clarifies relationship between price and demand whereas elasticity of demand includes study of effect of income, advertisement, price of related goods along with price on quantity demanded.

3. Law of demand states that there is an inverse relationship between quantity demand and price whereas elasticity of demand can be both positive and negative.

8.11 SUMMARY

The elasticity of demand means the measurement of rate of change in the quantity demanded due to change in price of commodity, income of consumers, price of related commodities and change in advertisement expenditure. Thus price elasticity of demand is the degree or the rate of change of responsiveness of quantity demanded of a commodity in response to change in its price. The price elasticity of demand is classified in five categories: Perfectly Elastic Demand, Highly Elastic Demand/Relatively Elastic Demand, Unit Elastic Demand, Highly Inelastic Demand/Relatively Inelastic Demand, Perfectly Inelastic Demand. In Total Outlay Method Elasticity of demand can be measured by considering the change in total outlay as a result of change in the price of the commodity. In Proportionate or Percentage Method elasticity of demand is measured by dividing proportionate change in demand by proportionate change in price. In Point or Geometrical Method elasticity of demand is calculated by dividing lower sector of tangent of any demand curve at a particular point by the upper sector. Magnitude of change in demand due to change in income is known as income elasticity of demand. The degree of change of quantity demanded of one commodity to change in the price of another related commodity is called cross elasticity of demand. Advertisement expenditure's effect on demand for commodities is known as advertisement elasticity of demand. Elasticity of demand is important is important for both theoretical life and practical life of modern economic world. It helps in taking decisions regarding price determination, price discrimination, dumping, joint supply, determination of the reward of production factors and in determination of transport rate.

8.12 Key Words

Total Outlay: According to this method the degree of elasticity of demand is measured by comparing firm's revenue from consumer's total outlay on the goods before the change in the price.

Price: Amount of money paid to acquire one unit of a good.

Market: A medium that allows buyers and sellers of a specific good or service to interact in order to facilitate an exchange.

Inelastic Demand: Situation in which the supply and demand for a good are unaffected when the price of that good or service changes.

8.13 TERMINAL QUESTIONS

8.13.1 Essay Type Questions

1. Define Price Elasticity of Demand and explain its various degrees. How can it measure?
2. Explain the degrees of price elasticity or demand. Discuss the main methods of measuring it.
3. Explain the factors on which elasticity of demand depends. State the practical importance of elasticity of demand.
4. Explain the role of elasticity of demand in business decisions and what factors govern the elasticity of demand?
5. What are meant by cross and advertising elasticity of demand? How is price elasticity of demand measured? Give suitable diagrams to illustrate your answer.
6. Explain briefly any two of the following with the help of diagrams:
   (a) Income elasticity of Demand,
   (b) Advertising elasticity of Demand
   (c) Cross elasticity of Demand.
7. Define price elasticity of demand and explain the Flux method of measuring it. What are its various degrees?
8. Explain the concepts of Cross Elasticity and Advertising Elasticity of Demand with suitable examples.
9. State the meaning and characteristics of Advertising Elasticity of Demand. Describe briefly the factors affecting it.

8.13.2 Objective Questions

1. The demand for a commodity is said to be elastic if the total amount spent for the commodity is:
   (a) Less when the price is low and more when price is high.
   (b) The same whether the price is high or low.
   (c) More when the price is low and less when the price is high.
   (d) All above
2. What should be price elasticity of demand by proportionate method if:

   Q_1=20,2000; Q_2=25,000; P_1=Rs.10; P_2 = Rs.8 ?

3. State whether the following statements are true or false:

(i) Elasticity of demand is a qualitative statement.

(ii) Total outlay method of measuring price elasticity of demand was propounded by Boulding.

(iii) The income elasticity of demand for inferior goods use to be negative.

(iv) The cross elasticity of demand for substitutes use to be positive.

(v) The proportionate method of elasticity of demand measurement was propounded by Marshall.

4. Which of the following should be normally most inelastic demand?

(a) Soap (b) Salt

(c) Cigarettes (d) Television

Ans. 1. (c), 2. (c), 3. (i) False, (ii) False, (iii) True, (iv) True, (v) False 4. (b)

Uttar Pradesh Rajarshi Tandon
Open University

M.COM-203
Managerial Economics

Block

3

CONSUMER BEHAVIOUR

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ENG BLOCK III

1.5 MANAGERIAL ECONOMICS

This block comprises Four Units. The First Unit of this block is related with indifference curve analysis. The next unit explains the concept of consumer's surplus. The Third Unit deals with Cost Analysis and the units of this block is related with cost output relation.

Theory of Consumer's Behaviour

The traditional theory of demand starts with the examination of the behavior of the consumer. Since market demand is assumed to be summation of demands of individual consumer.

There are two basic approach to the problem of comparison of utilities the cardinal approach of the ordinal approach. The ordinalist school postulated that utility is not measurable but it is an ordinal magnitude. The consumer need not know in specific units the utility of various commodities to make his choice. He must be able to determine his order of preference among the different bundh of goods. The main ordinal theories are the indifference curve approach and the revealed preference theory.

UNIT-9

INDIFFERENCE CURVE ANALYSIS

OBJECTIVES

After giving through this unit you should be able to know about—

- Concept of Indifference Curve
- Characteristics of Indifference Curve
- Consumer's Equilibrium through indifference curve theory.

STRUCTURE

9.1 INTRODUCTION

The Technique of Indifference Curve was originated by Edgeworth and its refinement was effected by Pareto an Italian Economist in 1906. This Technique however, received perfection & systematic application in the demand analysis at the hands of Prof. J. R. Hicks & R. G. D. Allen in 1934. Hicks, infact, expounded & Popularised the innovation of indifference 3 curve approach to the theory of demand in his Value & Capital published in 1939. Indifference curves have been devised to represent the orinal measurement of utility.

Oridnal utility : Scale of preference- In oridinal sense utility is viewed as the level of statisfaction rather than amount of satisfaction. The level of satisfaction is relatively comparable but not quantifiable. Prof. J. R. Hicks mentions that it is possible to observe from experience and experiment the preferences which consumers display when choosing between different goods. He however, asserts that people are not interested in any one Commodity at a time as assumed by the marginal utility approach, Generally, consumer's are at a time, interested in a number of commodities, & the satisfaction resulting from their combinations. Besides, they can always compare the level of satisfaction yielded by one particular combination of goods with that of another combination. In fact, the level of satisfaction is a function of increasing the stock of goods a larger stock of goods, apparently, yields a higher level of satisfaction than what a smaller stock of goods would yield. As such different levels of satisfaction yielded by different stocks of goods can be visualised and compared but their differences cannot be measured in precise quantity. A rational consumer, obviously, prefers that stock or combination of goods which yield higher level of satisfaction than one which yields a lower level. This consumer can conceptually arrange goods and their combinations in order of their significance or level of satisfaction. This conceptual arrangement of combination of goods and service set in order of the level of significance is called scale of preference.

The scale of preference indicates consumers'ordinal utility preference. It is independent of the consumer's income and also the prices of goods. It is just based on the mental assessment of the consumer regarding the capacity of given goods and services to satisfy his wants. In other words, the scale of preferences is based on individuals likes and dislikes, habits & Chorices.

Indifference Schedule

When a consumer lays down his scale of preference about different combination of certain goods under consideration he will rank them as per higher and lower level of satisfaction visualized in them. A combination which is estimated to give the higher level of satisfaction will be assigned the first order of preference. The combination yielding comparatively lower level of satisfaction will be assigned second order of preference of one yielding a still lower degree of satisfaction is assigned the third order of preference and so on. However the consumer might come across some combination which yield a same level of satisfaction to him, so that he prefers them equally from given order of preference. In such a case he is said to infifferent in different to such combination of goods. The indifference curve analysis uses this concept of equal satisfaction as its

base. This implies that person has no specific preference between two or more sets of combination of goods as he finds them equally significant. Hence, he will be indifferent to these alternatives. Hicks opines that by experimenting it is possible to discover such equal satisfaction yielding combinations of goods.

9.2 CONCEPT OF INDIFFERENCE CURVE

The indifference curve is a geometrical device representing all such combinations of two goods yielding equal satisfaction of a particular level. While plotting an infifference curve, however, it is assumed that consumer is able to given sufficient information & the goods are perfectly divisible, so that we have infinite number of combinations of given goods yielding a same level of satisfaction, thus by graphically plotting all such combinations & joining their locus of p points we derive an indifference curve as illustrated in given figure.

In above figure, apples & Banana's are measured along the x-axis & the y-axis respectively. It is the difference curve derived on the basis of indifference schedule. Thus an infifference curve is the curve representing the various combination of two goods yielding equal satisfaction to the consumer. Obviously, different point such as a, b, c, d & e on the infifference curve indicate different combinations of the goods but all these combinations are equal significance for the consumer so he is different to them as he will be neither better out nor worse in choosing any these points. Thus the consumer is indifferent to any point of given indifference curve. Again an infifference curve represents a particular level of satisfaction. Thus, if we were downwards or upwards from one point to another on the given infifference curve the level of satisfaction of change. Alternatively, therefore, an indifference curve may be described as equal satisfaction curve or iso-utility curve.

Indifference curves: An indifference curve is the locus of points-particular combinations or bundles of goods-which yield the same utility (level of satisfaction) to the consumer, so that he is indifferent as to the particular combination he consumes.

An indifference map shows all the indifference curves which rank, the preferences of the consumer. Combinations of goods situated on an indifference curve yield the same utility. Combination of goods lying on a higher indifference curve yield higher level of satisfaction and are preferred. Combination of goods on a lower indifference curve yield a lower utility.

An indifference curve is shown in figure 9.1 and a partial indifference map is depicted in figure 9.2 It is assumed that the commodities y and x can

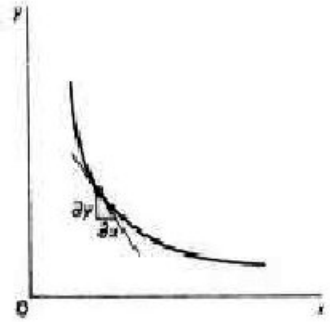


Figure 9.1

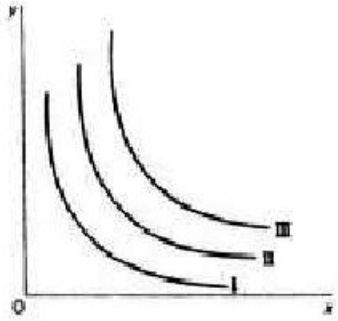


Figure 9.2

Substitute one another to a certain extent but are not perfect substitutes. The negative of the slope of an indifference curve at any one point is called the marginal rate of substitution of the two commodities, x and y, and is given by the slope of the tangent at that point:

$$\begin{bmatrix} \text{slope of} \\ \text{indifference} \\ \text{curve} \end{bmatrix} = -\frac{dy}{dx} = MRS_{x,y}$$

The marginal rate of Substitution of x for y is defined as the number of units of commodity y that must be given up in exchange for an extra unit of commodity x so that the consumer maintains the same level of satisfaction. With this definition the proponents of the infifference-curves approach thought that they could avoid the non-operational concept of marginal utility. In fact, what they avoid is the assumption of diminishing individual marginal utilities and the need for their measurement. The concept of marginal utility is implicit in the definition of the MRS, since it can be proved that the marginal rate of substitution (the slope of the infifference curve) is equal to the ratio of the marginal utilities of the commodities involved in the utility function:

$$MRS_{x,y} = -\frac{MU_x}{MU_y} \quad \text{or} \quad MRS_{y,x} = -\frac{MU_y}{MU_x}$$

Furthermore, the indifference-curve theorists substitute the assumption of diminishing marginal utility with another which may also

be questioned namely the assumption that the indifference curves are convex to the origin, which implies diminishing MRS of the commodities.

9.3 ASSUMPTIONS

Indifference curve theory is based on the following assumptions.

1. **Rationality :** Consumer is assumed is be rational he aims at the maximinature if his utility given his income and market prices. It is assumed he has full knowledge of all relevant informations.
2. **Utility is ordinal :** It is taken as amiomatically then that consumers can rank his preference according to the rates faction of each basket. The mid not know preciasly the amount of satisfacture. It is not necessarily assume that utility is cardinal measurement only ordinal measurement is required.
3. **Diminishing marginal rate of substitution :** Preferences are ranked in terms of indifference curves which are assumed to be convex to the origin. This implies that slopes if indifference curves increases. Slope of Indifference curve is called the MRs of the commodities. Indifference curve theory is based on DMRS.
4. **Total utility :** Total utility of the consumer depends years the quantities of commodity consumed.
5. **Consistency & Transitivity of choice :** It is assumed that consumer is consistent in his choice. The consistency assumption may be written symbolically as:

   If A > B, then B > C

   Similarily, it is assumed that consumer's choice are characterized by transitivity

   If A > B, & B > C, then A > C

9.4 PROPERTIES OF INDIFFERENCE CURVES

In order to use indifference curves as a true of analysis it is essential to know their basic characteristics. Some basic properties of indifference curves are inlisted & discussed below:

1. An indifference curve has a negative slope.
2. They are convex to origin.
3. Indifference curves do not intersect to each other.
4. Higher indifference curves gives higher utility and lower gives lower utility.
5. Indifference curve does not touch its axis. (Either x axis or y axis)

1. **Downward slope or Negative Slope :** Every indifference curve must slope downwards from left to right which means an

indifference curve has a negative slope indicating that as a quantity of 'X' increases in set of combination of X and Y the amount of Y decreases. This is very essential to substitute the diffinition of an indifference curve that it represent an equal satisfaction phenomenan at all points.

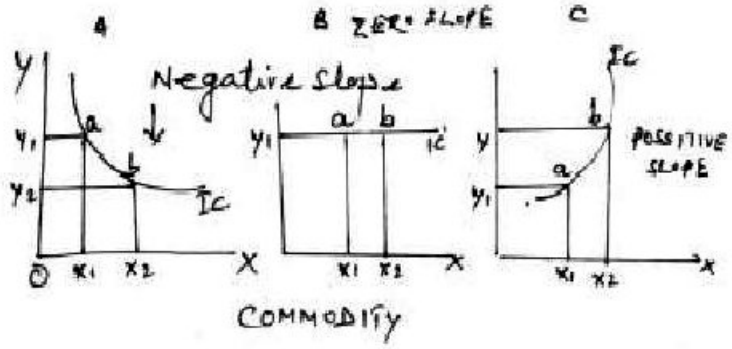


Figure-9.3

It may be recalled that in order to maintain du=0, when dx represents an increase dy must imply a decrease. This is possible only when the curve has a negative slope. As shown in figure (A).

If however an indifference curve has no negative slope, it will have either zero slope or a positive slope. If it has no slope then the indifference curve is a horizontal straight line as shown in figure (B).

This implies that a consumer would be actually satisfied with more of commodity X combined with a given quantity of Y. This is absured. Actually a combination which includes an increased quantity of one good with no decrease in the amount of another good will yield a higher level of satisfaction as compared to a combination containing less of one good and the unchanged amount of another good. Hence the consumer can not be indifferent to these combinations. In figure B, thus combination 'b' is preferred to 'a' thus the level of satisfaction does not remain constant as be move from a to b while by definition the indifference curve implies that the level of satisfaction constant through out the curve. Thus the indifference cannot be horizontal or parallel to x-axis. Similarily, it can be proved that an indifference curve to y-axis can not run parallel, i.e. it cannot be vertical straight line.

2. **The indifference curves are convex to origin :** The indifference curves are convex to the origin. This implies that the slope of an indifference curve decreases (in absolute terms) as we move along the curve from the left downwards to the right : the marginal rate of substitution of the commodities is diminishing. This axiom is derived from introspect6ion, like the 'law of diminishing marginal utility'of the cardinalist school. The axiom of decreasing marginal rate of substitution expresses the observed behavioural rule that the number of units of x the consumer is willing to sacrifice in order to obtain an additional unit of y increases as the quantity of y

decreases. It becomes increasingly difficult to substitute x for y as we move along the indifference curve. In figure the fifth unit of y can be substituted for x by the consumer giving up $x_1 x_2$ of x; but to substitute the second unit of y and stiff retain the same satisfaction the consumer must give up a much greater quantity of x, namely x_3, x_4.

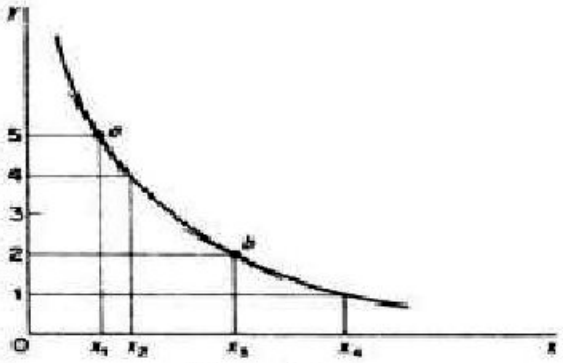


Figure 9.4

The assumption implies that the commodities can substitute one another, but are not perfect substitutes. If the commodities are perfect substitutes the indifference curve becomes a straight line with negative slope (figure 9.4). If the commodities are complements the indifference curve takes the shape of a right angle (figure 9.5).

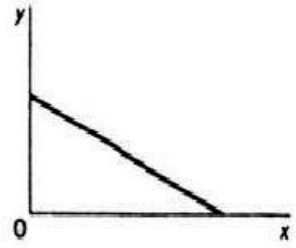


Figure 9.5

Perfect substitutes

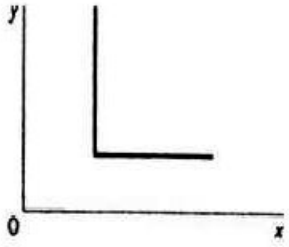


Figure 9.6

Complementary goods

3. Indifference curve do not intersects to each other : Indifference curves do not intersects to each other, if they did the point of their intersection would imply two different levels of satisfaction, which is impossible.

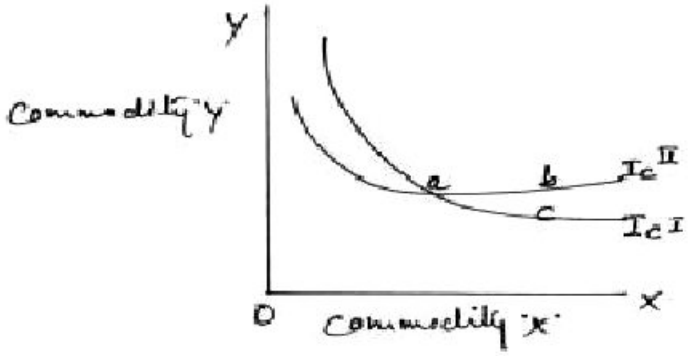


Figure 9.7

4. Parallel : When a set of indifference curve is drawn, curves appear is be parallel, but they need not be parallel. The economic significance of an indifference may does not vary whether curves are parallel or not, actually, there is no definite projection between the range of different levels of satisfaction represented by different indifference curves. So they are not paralle.

5. The further away from the origin an indifference curve lies the higher level of utility it denotes : bundle of goods on a higher indifference curve are preferred by rational consumer.

9.5 THE BUDGET CONSTRAINT OF THE CONSUMER

The budget contraint of the consumer : The consumer has a given income which sets limits to his maximising behaviour. Income acts as a constraint in the attempt for maximising utility. The income constraint, in the case of two commodities, may be written

$$Y = p_x q_x + p_y q_y \qquad (2.1)$$

We may present the income constraint graphically by the budget line, whose equation is derived from expression 2.1, by solving for q_y:

$$q_y = \frac{1}{P_y} Y - \frac{P_x}{P_y} q_x$$

Assigning successive values to qx (given the income, Y and the commodity prices, Px, Py), we may find the corresponding values of qy. Thus, if qx = 0 (that is, if the consumer spends all his income on y) the consumer can buy Py units of y. Similarly, if qy = 0 (that is, if the consumer spends all his income on x) the consumer can buy Y units of x. In figure these results are shown by points A and B. If we join these points with a line we obtain the budget line, whose slope is the ratio of the prices of the two commodities. Geometrically the slope of the budget line is Mathematically the slope of the budget line is the derivative

$$\frac{\Delta q_y}{\Delta q_x} = \frac{P_x}{P_y}$$

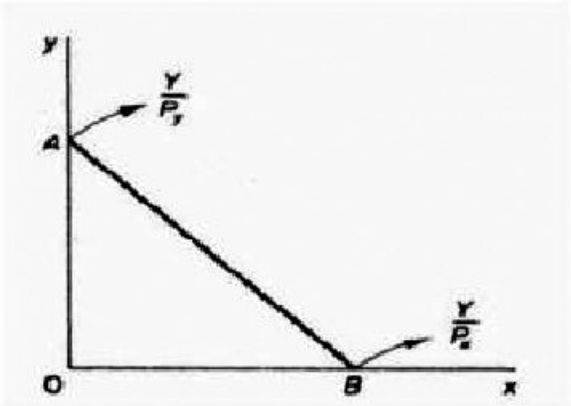


Figure 9.8

Derivation of the equilibrium of the consumer : The consumer is in equilibrium when he maximises his utility, given his income and the market prices. Two conditions must be fulfilled for the consumer to be in equilibrium.

The first condition is that the marginal rate of substitution be equal to the ratio of commodity prices

$$MRS_{x,y} = \frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

This is a necessary but not sufficient condition for equilibrium. The second condition is that the indifference curves be convex to the origin. This condition is fulfilled by the axion of diminishing MRSx,y, which states that the slope of the indifference curve decreases (in absolute terms) as we move along the curve from the left downwards to the right.

Graphical presentation of the equilibrium of the consumer : Given the indifference map of the consumer and his budget line, the equilibrium is defined by the point of tangency of the budget line with the highest possible indifference curve (point e in figure)

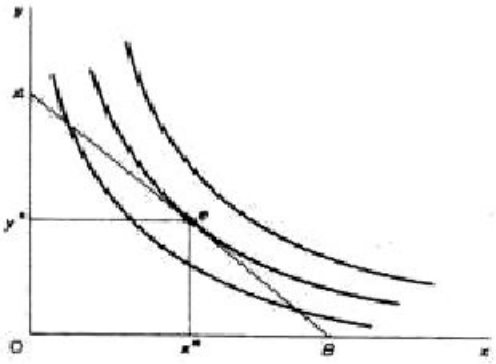


Figure 9.8

At the point of tangency of slopes of the budget line $\left(\frac{P_x}{P_y}\right)$ and of the $\left(MRS_{x,y} = MU_x . MU_y\right)$ indifference curve are equal:

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

Thus the first-order condition is denoted graphically by the point of tangency of the two relevant curves. The second-order condition is implied by the convex shape of the indifference curves. The consumer maximises his utility by buying x* and y* of the two commodities.

Thus, although in the indifference-curves approach cardinality of utility is not required, the MRS requires knowledge of the ratio of the marginal utilities, given that the first-order condition for any two commodities may be written as :

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y} = MRS_{x,y}$$

Hence the concept of marginal utility is implicit in the definition of the slope of the indifference curves, although its measurement is not required by this approach. What is needed is a diminishing marginal rate of substitution, which of course does not require diminishing marginal utilities of the commodities involved in the utility function.

9.7 Derivation of the demand curve using the indifference-curves approach

Graphical derivation of the demand curve. As the price of a commodity, for example of x, falls, the budget line of the consumer shifts to the right, from its initial position (AB) to a new position (AB), due to the increase in the

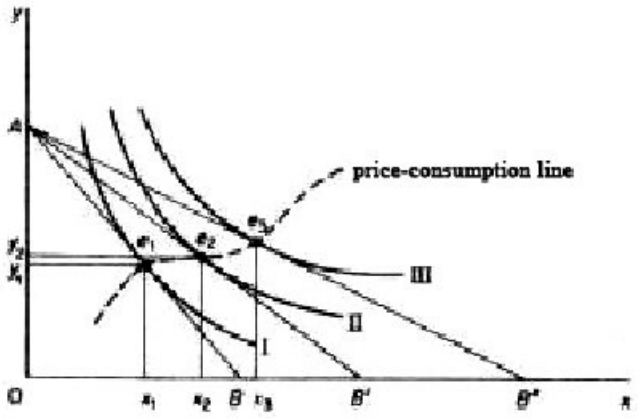


Figure 9.9

purchasing power of the given money income of the consumer. With more purchasing power in his possession the consumer can buy more of x (and more of y). The new budget line is tangent to a higher indifference curve (e.g. curve II). The new equilibrium occurs to the right of the original equilibrium (for normal goods) showing that as price falls more of the commodity will be bought. If we allow the price of x to fall continuously and we join the points of tangency of successive budget lines and higher indifference curves we form the so-called price-consumption line (figure 9.9), from which we derive the demand curve for commodity x. At point e1 the consumer buys quantity x1 at price y1. At point e2 the price, y2, is lower than y1, and the quantity demanded has increased to x2, and so on. We may plot the price quantity pairs defined by the points of

equilibrium (on the price-consumption line) to obtain a demand curve, as shown in figure 9.10.

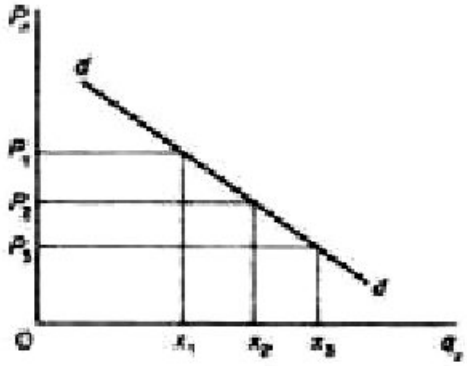


Figure 9.10

The demand curve for normal commodities1 will always have a negative slope, denoting the 'law of demand', (the quantity bought increases as the price falls).

In the indifference-curves approach the 'law of demand' is derived from that is known as Slutsky's theorem, which states that the substitution effect of a price change is always negative (relative to the price : if the price increases, the quantity demanded decreases and vice versa). The formal proof of Slutsky's theorem involves sophisticated mathematics. However, we may show graphically the implications of this theorem.

We saw that a fall in the price of x from P1 to P2 resulted in an increase in the quantity demanded from x1 to x2. This is the total price effect which may be split into two separate effects, a substitution effect and an income effect. The substitution effect is the increase in the quantity bought as the price of the commodity falls, after 'adjusting' income so as to keep the real purchasing power of the consumer the same as before. This adjustment in income is called compensating variation and is shown graphically by a parallel shift of the new budget line until it becomes tangent to the initial indifference curve (figure 9.11). The purpose of the compensating variation is to allow the consumer to remain on the same level of satisfaction as before the price change. The 'compensated-budget line' will be tangent to the original indifference curve (I) at a point (e'1) to the right of the original tangency (e1) because this line is parallel to the new budget line which is less steep than the original one when the price of x falls. The movement from point e1 to e'1 shows the substitution effect of the price change : the consumer buys more of x now that it is cheaper, substituting y for x. However, the compensating variation is a device which enables the isolation of the substitution effect, but does not show the new equilibrium of the consumer. This is defined by point e2 on the higher indifference curve II. The consumer has in fact a higher purchasing power, and, if the commodity is normal, he will spend some of his increased real income on x, thus moving from x'1 to x2. This is the income effect of the price

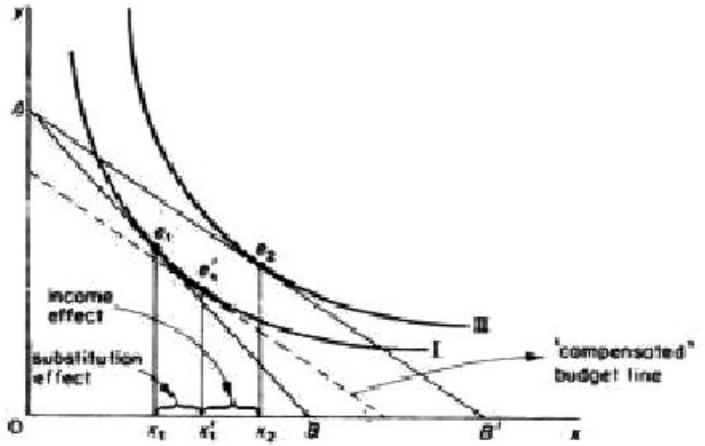


Figure 9.11

change. The income effect of a price change is negative1 for normal goods and it reinforces the negative substitution effect (figure 9.11). If, however, the commodity is inferior, the income effect of the price change will be positive : as the purchasing power increases, less of x will be bought. Still for most of the inferior goods the negative substitution effect will more than offset the positive income effect, so that the total price effect will be negative. Thus the negative substitution effect is in most cases adequate for establishing the law of demand.

(It is when the income effect is positive and very strong that the 'law of demand' does not hold. This is the case of the Giffen goods, which are inferior and their demand curve has a positive slope. Giffen goods are very rare in practice.)1

9.8 SUPERIORITY OF INDIFFERENCE CURVE APPROACH

The indifference curve approach is considered superior to the Marshallian utility analysis of consumer demand in the following respects:

1. Marshall assumes cardinal measurement of utility, which is unrealistic. The indifference curve technique, on the other hand, realistically makes an ordinal comparison of utility—the level of satisfaction.
2. The concept of utility is replaced by the concept of scale of preference in the indifference curve technique. The scale of preference is laid down on the basis of consumer's tastes and likings, independent of his income.

   Again, unlike Marshall, Hicksian scale of preference needs no information as to how much satisfaction is gained but it aims only at knowing whether a consumer's satisfaction level is greater than, less than or equal, between various combinations of two goods.

3. The Marshallian analysis assumes that to the consumer the marginal utility of money remains constant. In the indifference curve analysis, such assumption is not needed.
4. Marshallian demand theory deals with a single commodity tkane exclusively. Hick's ordinal approach, however, consider at least two goods in combination. Thus complementarity and substitutability aspects of goods are being explicitly considered in the Hicksian analysis.
5. The utility approach is based on the law of diminishing marginal utility. On the other hand, the indifference curve approach rests on the principle of diminishing marginal rate of substitution. The concept of marginal rate of substitution is superior to that of marginal utility because it considers two goods together and also because it is a ratio expressed in physical units of the two goods and as such practically measurable.
6. In Marshall's analysis, the consumer equilibrium condition is :

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

The utility cannot be measured numerically, this condition is impracticable.

In Hicksian analysis, the equilibrium condition is expressed as :

$$MRS_{xy} = \frac{P_x}{P_y}$$

This is a measurable phenomenon. Again, it is more comprehensive as it recognises the fact that equilibrium in purchasing one commodity depends on the price of other goods and their stocks as well.

7. The Marshallian demand curve has no means to dichotomise the price effect into income and substitution effects. In the indifference curve analysis, the price-consumption curve enables us to have the bifurcation of price effect into income and substitutioni effect.

8. Marshall views the Giffen paradox as an exception to the law of demand. Whereas the case of Giffen good is incorporated in the price-consumption curve to examine the consumer's typical behaviour caused by negative income effect. Thus, the unsolved riddle about Giffen good in the utility analysis is solved in the indifference curve analysis. It represents the law of demand in abroader and more precise way.

9.9 CRITICISMS OF INDIFFERENCE CURVE ANALYSIS

Following are the major criticisms leveled against the indifference curve analysis :

1. D.H. Robertson opines that the indifference curve analysis conveys nothing new about the theory of demand. It is just 'old wine in new bottle'. It merely substitutes new concepts and equations in the old logic. For instance in place of the concept of 'utility', it has introduced the term 'preference'. Again, in place of cardinal number system it gives just ordinal number system to denote the scale of preference. Moreover, the concept of marginal utility is replaced by the marginal rate of substitution. All these ultimately amount to the same thing as what Marshall wanted to convey in his exposition of the law of demand. Above all, the concept of scale of preference introduced by Hicks is as subjective and unrealistic as the concept of utility itself. Thus the indifference curve analysis has remaind only as exercise of abstract thinking.

2. Again, the Hicksian principle of diminsihing marginal rate of substitution is, in essence, based on the law of diminsihing utility. That means the law of diminishing marginal rate of substitution is as much determinate or indeterminate as the much criticised law of diminishing marginal utility. Thus, strangely enough Hicks has himself utilised Marshall's assumption even after severely criticising them.

3. The indifference curve analysis assumes that the consumer has perfect knowledge and capability of forming his scale of preference which is translated in terms of indifference map. In actual practice, this is hardly possible. In fact, the consumer would make choices in particular situations, but he would not contemplate making choices and lay down scale of preference in an indefinitely large number of situations and determine indifferent positions.

4. Professor Armstrong points out that in drawing the indifference curve, Hicks assumes transitivity and continuity. Actually, indifference curves are non-transitive. An indifference curve is transitive if we see that the utility difference at difference point of indifference curve is not preceptible to the consumer. This may be true with very close points on an indifference curve. Thus, in Fig. 1.12A, $a = b$, $b = c$, ... $a = c$ is visualised on the transitivity assumption. But, when the difference of utility is perceptible a may not be equal to c. Thus, if we remove the assumption of transitivity, indifference curves will be discontinuous as shown in Fig. 9.12B. With discontinuous indifference curves, it is very difficult to carry out the whole demand analysis as has been seen in the previous sections.
5. The indifference curve analysis has basic limitation of geometrical dimensions. Thus, it cannot be easily extended to more than two goods.
6. The indifference curve analysis being introspective, has no empirical test. Again the functions involved are incapable of statistical verification.

7. Indifference curve analysis may look absurd in case of bulky goods which are not divisible, yet we think of 1/3 of T. V. set combined with 1 1/2 of Refrigerator and so on. Similarly, absurdity is also involved in considering cases like combination of sarees and blouses. It is ridiculous to say that a women consumer is indifferent between 1 saree and 10 blouses and 4 sarees plus 2 blouses, as the derives the same satisfaction from both the combination. Moreover, is it not absurd to say that 2 1/2 sarees are combined with 7 ¾ blouses to get the same indifference curve?

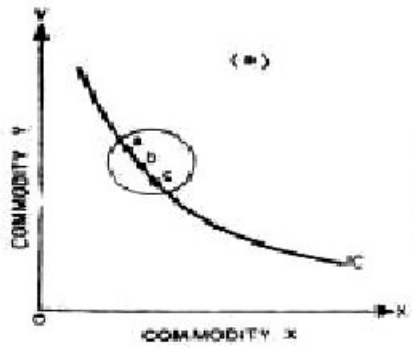


Figure 9.12-A

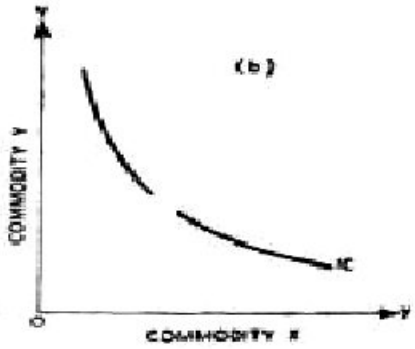


Figure 9.12-B

9.11 SUMMARY

Despite these shortcomings of the indifference curve analysis, however, the fact remains that technique of indifference curves has wide applications in economic analysis. It is widely used in modern welfare economics.

9.12 FURTHER READINGS

1. Ahuza H.L. : Advanced EconomicAnalysis
2. A. Koutsoyiamns : Modern Micro Economics.
3. Mithani, D.M. : Modern Economic Analysis
4. Sinha, V.C. : Advanced Economics
5. Sapiro : Advanced Economics

UNIT 10

CONSUMER'S SURPLUS

OBJECTIVES

After giving through this unit you should be able to—

- Concept of Consumer's Surplus
- Definition of Consumer's Surplus
- What is actually consumer's Surplus
- Consumer's Surplus by using Indifference Curve.

STRUCTURE

Dupit originated the concept of consumer's surplus but we owe to Marshall the introduction of the concept of consumer's surplus systematically. His idea was to give a definite expression to something with which we, as consumers, are all familiar.

Even in our ordinary purchases there is some consumer's surplus since we may be prepared to pay more than we actually pay for a commodity. But consumer's surplus is to be found especially in the purchase of commodities which are highly useful, but which are very cheap, e.g., post card, newspaper, match box, soap, salt, etc. For such commodities, we are prepared to pay much more than we actually pay if the alternative is to go without them. The extra satisfaction that we derive is called consumer's surplus.

In the words of Marshall, "The excess of the price which he (i.e., consumer) would be willing to pay rather than go without the thing over that which he actually does pay is the economic measure of this surplus satisfaction.... It may be called consumer's Surplus".1 To use Hicks's words : "It (consumer's surplus) is the difference between the marginal valuation of a unit and the price which is actually paid for it".2

In short, consumer's surplus is what we are prepared to pay minus what we actually pay. As will be clear from the following section, the consumer's surplus is measured by the difference between total utility and the amount spent.

Consumer's Surplus and the Law of Diminishing Marginal Utility

The concpet of consumer's surplus may be derived from the law of diminishing utility.

The idea will be clear from the table on the next page.

(N.B. : The figures in the following table are merely illustrative representations of the amount of utility. Any other figures may be taken, provided variations in the amount of utility are similar to those in the table given below, i.e., the additional utility at every step should be diminishing.)

(1) Units (Toasts)	(2) Total Utility (Units of Satisfaction)	(3) Marginal Utility (Units of Satisfaction)
1	20	20
2	38	18
3	53	15
4	64	11
5	70	6
6	70	0
7	62	–8
8	46	–16

Suppose the price in the market is 6 Paise per toast. The consumer will purchase as many toasts as make his marginal utility equal to the price. Thus, he will purchase 5 toats and pay for each six Paise (one unit of utility is supposed to be one Paisa worth). In this way, he will spend in all 30 Paise. But the total utility of 5 toasts is measured by 70 Paise. He thus gains a consumer's surplus measured by 40 (70–30) Paise. This is so becuase he would have paid 70 Paise rather than go without the toasts, but he actually pays only 30 Paise. If the price rises to 11 Paise, he will purchase 4 toasts only and pay 44 Paise, whereas the total utility is worth 64 Paise. This will give him a consumer's surplus measured by 20 (64-44) Paise, and so on.

Diagrammatic Representation : Along OX are measured the units of the commodity to be purchased, and along OY is measured the

utility in terms of money, which means the price that the consumer is willing to pay rather than go without a particular unit of the commodity.

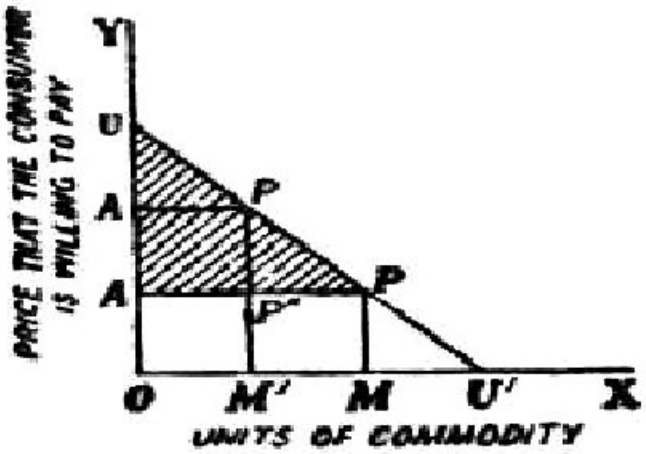


Fig. 10.1 Consumer's Surplus

Fig. 10.1 Consumer's Surplus If the market price is PM, the consumer will extend his purchase up to the Mth unit, i.e., he will purchase OM quantity. This is so because for this amount his marginal utility is equal to the price. But his marginal utility for the earlier units is more than PM. For M'th unit, for instance, his marginal utility is P'M' but he only pays the market price PM (= P'M') for this unit as for othres. He thus obtains an excess of utility for the M'th unit equal to PP'. This is consumer's surplus from this unit. Similar surplus arises from the purchase of other units. The total consumer's surplus thus derived by him, when OM units are purchased at PM price, is shown by the shaded area UAP. If the market price rises to P'M', he will purchase only OM' quantity, and the consumer's surplus will fall to the smaller triangle UAP'.

The consumer's surplus arises from the fact that some purchasers are marginal while others are not. The instra-marginal pruchasers enjoy a surplus. Similarly, a consumer enjoys a surplus on intra-marginal purchases, i.e., purchases which are not marginal.

Consumer's Surplus and Form of Market : In the calculation of consumer's surplus, we assume a perfect market, i.e., the same price for all units. In case, however, the consumers were subjected to price discrimination, i.e., higher price for earlier units and lower for the successive ones, then they would be forced to pay more for the same quantity of the commodity as compared with the perfect market. Thus, purchases in the perfect market yield surplus over purchases in the discriminating market.

Hicksian Refinements : As already mentioned. Hicks has defined consumer's surplus as the difference between marginal valuation of a unit and the price which is actually paid for it. The difficulty in the concept of consumer's surplus centres round the calculation of this marginal valuation.

The assumption of constant marginal utility of money enabled Marshall to ignore the differences between various marginal valuations. This makes Marshall's definition inadequate.

Hicks has distinguished between various species of consumer's surplus.1 One type of consumer's surplus is the Increment of Consumer's Surplus. It results when consumption of the commodity is increased consequent on a fall in price, income remaining unchanged. This increment is divided into two parts : (a) increment of surplus on units consumed previously and (b) new surplus from increase in consumption. The first is equal to the cost difference. Here there is a change in what the consumer does pay but no change in what he is prepared to pay. The second part arises from the difference between the marginal valuation of the extra units and the price which is paid for them.

Difficulties of Measurement

We have explained above that the consumer's surplus is simply the difference between what we are prepared to pay rather than go without and what we actually pay. Or it can be ascertained by the following formula :

Consumer's surplus = Total Utility – Price □ Number of units purchased (i.e., the total amount spent).

How simple it looks!

The measurement of consumer's surplus, however, is not so simple as that. There are numerous difficulties which stand in the way of the precise measurement of consumer's surplus :

A complete list of demand prices is not available : We are aware of a part only of the demand schedule. As we do not know what prices we are prepared to pay for every one of the units, the whole of the consumer's surplus cannot be ascertained. In actual life, however, we are concerned with that part of the demand schedule with which we are fairly familiar. Reactions to small changes in prices are fairly well known. In real life, we are not concerned with hypothetical scarcity prices, or unimaginably low prices.

Necessaries : Consumer's surplus, in the case of necessaries of life and conventional necessaries is indefinite and immeasurable. In case of necessaries of life as well as conventional necessaries, however, it is said that there is no positive satisfaction. In their case, there is only removal of pain rather than giving of pleasure. Patten calls it "pain economy". Only when the necessaries of life have been satisfied can there be any idea of consumer's surplus. It is to this stage which Patten calls "pleasure economy", that consumer's surplus belongs.

Consumer's Circumstances : Some consumers are rich while others are poor. A rich man is prepared to pay much more for a thing than go without it. This difference in the consumer's circumstances makes the measurement of consumer's surplus difficult and inexact. This difficulty is met by the idea of average. When there is a large number of purchasers, rich and poor, the variations in individual circumstances may be ignored.

Consumer's Sensibilities : Every consumer has his own tastes and sensibilities. Some desire a commodity more ardently than others, and are, therefore, prepared to offer more. This difficulty is also met, as in the above case, by the idea of average. When we deal with consumers in the bulk, the individual tastes and sensibilities may be supposed to cancel themselves out.

Change in Marginal Utility of Money : As we go on buying a commodity, less and less amount of money is left with us. Hence, the marginal utility of each unit of money increases. But, when we measure consumer's surplus, we do not make any allowance for this change in the marginal utility of money.

In reply to this objection, we may point out that, in actual practice, only small amounts of money are spent on the purchase of individual commodities. The changes in the marginal utility of money are, therefore, negligible. Change in Earlier Units : There is the further difficulty, viz., that, with every increase in the purchase of a commodity, the urgency of the need for the earlier purchase is diminished and their utility decreases. This decrease in the utility of earlier units is not taken into account when calculating the consumer's surplus. To measure consumer's surplus precisely, it is suggested that the earlier parts of the list of demand prices should be continually redrawn. This objection would have been valid if the utility written against each unit were the average, and not additional utility. Only the average changes at every step and not additional utility. If, for instance, the consumer buys two toasts, the average is 19, in case of there it is 53/3, and in case of four it is 16, and so on. (See the above table). Thus, the average no doubt changes but the marginal or additional utility will not have to be altered whatever the number of units purchased.

Substitutes : Then, there is the difficulty arising out of the presence of substitutes. To meet this difficulty, the two substitutes, say, tea and coffee, can be regarded as one commodity, as suggested by Marshall.

Commodities Used for Distinction : In such cases, e.g., diamonds, the fall in price will not lead to increase in demand. When such commodities become cheap, they no longer confer distinction on the user. The demand for them, therefore, may fall off. Hence, a fall in price in such cases will not increase consumer's surplus.

Conclusion : We may, therefore, conclude by saying that the exact measurement of consumer's surplus is impossible. Even so, the concept of consumer's surplus is not a useless one. In practical life, whether in business or in public finance, it is always possible to have a rough and workable idea about the measure of consumer's surplus, and that is what matters.

Criticism of Consumer's Surplus

The concept of consumer's surplus has been subjected to scathing criticism by economists like Cannan, Nicholson, Robinson and Davenport. Its scientific character has been attacked on the ground that it is based on assumptions which are unwarranted. As pointed out above, there are several

difficulties in its exact measurement so that it has little practical utility. Its measurement assumes that utilities are capable of exact measurement and can be translated in terms of money. It further assumes, that different units of the commodity have different utilities. Moreover, the utility of each commodity is regarded as something independent which it is not. It is also assumed that the marginal utility of money remains constant. While we go on spending money, the utility of each unit of the money left with us increases, while the marginal utility of the commodity falls. This makes the calculation of consumer's surplus still more difficult.

The validity of the concept has been questioned on the ground that the assumptions on which it is based do not hold good in practice. Marshall has, however, defended it by pointing out that a consumer spends only a fraction of money he has on a particular commodity. Hence, for practical purposes, the marginal utility of money may be assumed to be constant.

Hicks has, however, given a representation of consumer's surplus with the help of indifference curves which makes the concept independent of this assumption, i.e., constant marginal utility of money.[1]

In the case of necessaries and conventional necessaries, it seems to have no application, for in such cases the consumer will be willing to pay any amount rather than go without. The utility is infinite.

It is, therefore, said that the whole idea of consumer's surplus is hypothetial, imaginary and illusory. A man cannot always say what he will be willing to pay rather than go without a thing. This inquiry seldom presents itself to him in the market. The price in the market is a fact which he must accept; what he is called upon to decide is how much he will buy. It is further pointed out that if there is a surplus, the consumer will be induced to buy more and more of that commodity till the surplus disappears. It simply cannot exist.

The criticism is indeed damaging. From the strictly scientific point of view, the validity of none of these objections can be quetioned. The main point of criticism is that it is incapable of precise numerical measurement. This may at once be conceded. But it cannot be denied that something like this does exist in real life. Rather than go without a thing, we are prepared to pay more than what we actually pay. In this way, we do enjoy a surplus of satisfaction, though we cannot say exactly how much. It certainly tells us that a system of uniform market price does yield a surplus of satisfaction to some consumers who would have been able and willing to pay more if the alternative was to go without. In real life, the transactions are of a type which yield a surplus satisfaction to the consumers.

Thus, the concept of consumer's surplus has great practical utility and serves as a tool of modern economic welfare analysis.

Measurement of consumer's surplus with indifference curves

As has been noticed above, Marshallian measure of consumer's surplus has been severely criticised. The most important objection against

the Marshallian measure of consumer's surplus with the help of demand curve (or marginal utility curve) is that it is based on the twin assumptions that utility is measurable and marginal utility of money remains constant as a person spends more of it on a particular good.

Economists like Hicks and Allen have contended that utility is a subjective phenomenon and hence, cannot be measured in concrete terms. Further, they confend that the assumption of the constancy of marginal utility of money is not valid. Marshall's assumption of constant marginal utility of money ignores the "income effect" of the price change, which is often important. Marshall defended his assumption by pointing out that since the consumer spends only a small fraction of his income on a particular good, the marginal utility of money does not change to any significant extent. But this need not necessarily be the case.

Prof. J. R. Hicks has rehabilitated the concept of consumer's surplus by approaching it is terms of ordinal utility function or indifference curve technique. He has given a measure of consumer's surplus without assuming utility to be measurable and the marginal utility of money to be constant.

Take the following diagram (Fig. 10.2). Money is measured on the axis of Y and commodity A is measured on the axis of X. Suppose our consumer has OY1 of money with him to spend on goods. Indifference curve I0 shows that he is indifferent between OY1 of money and any combination money and commodity A on it. For 'example, he is indifferent between OY1 of money on the one hand and OH of commodity A plus OS (= HR) of money. In other words, he is prepared to pay or forego FR (= Y1S) amount of money for OH of commodity A. His obtaining OH amount of commodity A as against FR amount of money depends upon his preference and is independent of any price in the market.

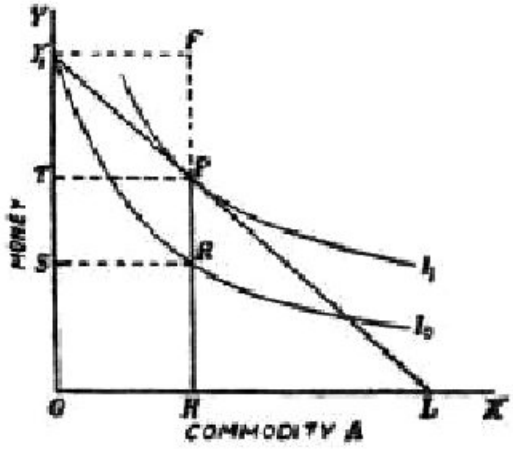


Figure 10.2 Measurement of Consumer's Surplus

Suppose now that the price in the market is as represented by the price line Y1L, money with the consumer remaining the same. With this price in the market he will be in equilibrium at point P on a higher indifference curve I1 and in this equilibrium position he will actually forego FP (= Y1T) amount of money for OH of commodity A. But independent of the price in the market he was prepared to pay FR amount of money for OH of commodity A. Thus, he has to pay PR amount of money less than what he is prepared to pay. Hence, PR is surplus which accrues to our consumer because of the fact of this particular market price.

Professor Hicks has further developed the concept of consumer surplus and has propunded four kinds of consumer's surpluses which are :

(i) Price Compensating Variation;

(ii) Price Equivalent Variation;

(iii) Quantity Compensating Variation;

(iv) Quantity Equivalent Variation.

The discussion of all these four consumer's surplus is beyond the scope of this book. Marshallian consumer's surplus which we have explained above with the help of indifference curve technique is called 'Quantity Compensating Variation', in the new Hicksian terminology.

Practical Utility of Consumer's Surplus

Although incapable of precise measurement the concept of consumer's surplus has a great practical utility and theoretical importance.

Conjunctural Importance : It enables us to compare the advantages of environment and oportunities, or conjunctural benefits. A person getting Rs. 500 in Delhi can enjoy better amenities of life than a person getting Rs. 1,000 in a place more remote from the centre of civilisation. It also enables us to compare the economic condition of the people at different times. The larger the consumer's surplus the better off are the people.

Public Finance : The Finance Minister considers while proposing fresh taxation, how much the people are willing to pay for a thing and how they will be affected by a rise in price resulting from the imposition of a tax. Where the consumers are enjoying a surplus, there is scope for taxation, for the people are willing to pay more. The rise in the price will not affect the demand much.

Imposition of a tax or granting of a bounty is bound to affect consumer's surplus.1 But the effect will differ according as the industry is subject to the law of constant return, diminishing return or increasing return.

In the case of constant return, the consumer's surplus will be diminished by more than the gross receipts of the State. "On that part of the consumption which is maintained, the consumer loses what the State receives; and on the part which is destroyed by the rise in prices, the consumer's surplus

is destroyed and there is no payment to the State". Conversely, the gain of consumer's surplus in the case of a bounty is less than the bounty itself.

Where the law of diminishing returns operates, the gross receipts from the tax may be greater than the resulting loss of consumer's surplus. A bounty will increase consumer's surplus.

In the case of increasing returns, the tax is more injurious and the bounty more beneficial. A tax will diminish consumer's surplus more than what it brings to the State and a bounty will increase the consumer's surplus more than the amount paid by the State.

Monopoly Value : Similarly, a businessman, especially a monopolist, will find that he can easily raise prices if the commodity is yielding surplus of satisfaction to the consumers. The consumers are willing to pay more, if need be. As a matter of expediency, however, the businessman will not raise the price so much as to absorb the whole of the surplus. He will not drive a hard bargain. He will like to cultiate and retain the goodwill of his customers and follow, therefore, a policy of compromise.

Value-in-use and Value-in-Exchange : We know that the market value of a commodity is different from its utility or value-in-use. Commodities like salt and match box have greate value-in-use but a very small value-in-exchange. The consumer's surplus from such commodities is very large for weare prepared to pay much more for such commodities than we actually pay. Consumer's surplus depends on the total utility, i.e., value-in-use, whereas the price or value-in-exchange coincides with marginal utility. The doctrine of consumer's surplus, therefore, clearly brings out the distinction between value-in-use and value-in-exchange. It is large where the value-in-use is large even though the vlaue-in-exchange may be small.

Benefits from International Trade : By entering into trade with an other country, we import certain articles which happen to be cheaper. Before we imported them, we were paying more for similar commodities. They yield a surplus of satisfaction which is measured by the excess of what we would have paid for them over what we have actually paid. The larger this surplus, the more beneficial is international trade.

Conclusion : It is thus clear that the concept of consumer's surplus is not merely of theoretical interest. It is of great practical value.

Importance of the concept consumer's surplus

1. The concept of consumer's surplus does emphasis the amenities that we enjoy in a modern society. Much of the consumer's surplus we enjoy depends on our srrounding & the opportunities of consumption available to us, e.g., a mention of life in America as compared to central Africa. It thus clearifies conjunctural importance, the concept enables us to compare the advantages of environment the opportunities or conjunctural benefits. The larger the consumer's surplus, the better off are the people. The concept thus serves as an index of economic betterment.

2. It is useful in price policy of monopoly firm. The monopolist can put a higher price on the goods if consumer's surplus is high without causing any reduction in scale.

3. It is of significance to the exchequer in determining indirect taxation. The finance minister can easily levy more taxes where consumer's surplus is high.

4. By estimating the differences in consumer's surplus resulting from a change in price, we can know and compare the effects of a given change in the price of any commodity on the different classes of people. It is therefore, widly adopted in welfare economies.

5. Gains from international trade can be measured in terms of consumer's surplus obtained in imported goods.

Criticism

These are the following criticism of Marshallian Consumer's Surplus :

1. Assumptions are unrealistic :

   (a) utility cannot be measured cardinally, therefore consumer's surplus cannot measured and expressed numerically.

   (b) Marginal utility of money does not remain constant.

   (c) If commodities have substitutes, with rising prices, he will purchase other goods rather than pay higher prices for the same. The concept has no theoretical validity.

2. It is meaning less is apply the doctrine of consumer's surplus to necessaries the utility derived from necessaries is infinite.

3. The concept is imaginary and illusory. It does not exit in reality. We create a surplus.

4. It is of no practical significance. Prof. Little Say's "the Doctrine of consumer's surplus is a useless theoretical toy".

Conclusion

The concept of consumers surplus does emphasise the amenities that we enjoy in modern society. Much of the consumer's surplus we enjoy depends on our surrounding & the opportunities consumption available to us for example amenities of life of America as compared to Central Asia. It thus clarifies conjunctural Importance.

Further Study

1. Atuza H. L.—Advanced Economic Analysis

2. A. Koutsoyiannis—Modern Micro Economies.

3. Mithan, D. M.—Modern Economic Analysis

4. Sinha, V. C.—Advanced Economies.

UNIT 11

COST ANALYSIS

OBJECTIVES

After reading this unit you should be able to know about :

- Nature & concept of cost.
- What is real cost, opportunity cost, Money Cost.
- Types of costs.
- Characteristics of Costs.

STRUCTURE

11.1 INTRODUCTION

Cost is normally considered from producers or firms point of view. In producing a commodity a firm has to employ an aggrigate of various factors of production such as level, labour, capital & enterpreneurship. There factors are to be compensated by the firm for their efforts or contribution mode in producing the commodity. this compensation is the cost. Thus, cost of production of commodity is the aggrigate of the price paid for the factors of production used in producing that commodity. Cost of production therefore, denotes the value of the factors of production employed. In short, thus the value of inputs required in the production of good determines its cost of output. The term cost has various concepts. These are :

- Real Cost,
- Opportunity Cost,
- Money Cost

11.2 REAL COST

The term "real cost of production" refers to the physical quantities of various factors used in producing a commodity. For example, real cost of a table is composed of three hours of carpenters labour two cubic feet of wood, a dozen of nail, half a bottle of varnish paint, depriciation of carpenters tablt etc. Which go in to making of table. Real cost, thus signifies the aggrigate of real productive resources absorbed in the production of commodity.

Prof. Marshall, however, describes 'real cost' as follows, The Production of a commodity generally requires many different kinds of labour and the use of capital in many forms. The exertions of all the different kinds of labour that are directly or indirectly in valued in making it, together with the abstinevers of rather the waiting required for having the capital used in making it. All these efforts and sacrifices together will called "the real cost of production of a commodity". According to Prof. A. Marshall, thus, the real cost of production connotes the toil trouble & sacrifice of a factors in producing a good. Thus, the Marshallian concept of real cost has only a philosophical significance. In practice, however, it is difficult to measure it.

11.3 OPPORTUNITY COST OR ALTERNATIVE COST

Since the real cost cannot be measured in absolute term, the concept of opportunity cost was thought of to measure it in an objective sense. The concept of opportunity cost is based on the scarcity & versatility characteristics of production resources.

It is know a economic fact that our wants are multiple but resources are scarce & versatile i.e. capable of alternative uses. Thus, problem of choice is involved. We have to make a choice of the use of given resource for a particular purpose out of its various alternative applicability's. Hence, when we select the resources in one use to have one commodity for satisfying our particular wants it is obvious that its other use of some other commodity that can be produced by it cannot be available simultaneously. That means the second alternative use of the resources is to be sacrificed to have the resources being used in one particular way, i.e. to get a particular commodity, because the same resource can not be used in both ways at same time. Hence, the use of factors in producing a commodity always involves loss of opportunity of production of some other commodity. Thus, sacrifice or loss of

opportunity of alternative use of a given resource is termed as **"opportunity cost"**.

In other words, the real cost of production of something using a given resources in an objective sense is the benefit forgone of some other things by not using that resources in its best alternative use. Some economist, therefore describe it as alternative cost.

It is also known as social cost of production. Prof. Ferguson and could for instance put that, the alternative or opportunity cost of producing one unit of commodity X is the amount of commodity Y that must be sacrificed in order to use resources to produce X rather than Y. This is social cost of producing 'X'. It should be noted that opportunity cost of anything is just the next best alternative forgone in the use of productive resources and not all alternative possibilities of uses.

The concept of opportunity cost has great economic significance. The opportunity cost determines the relative prices of goods. For example, if the same collection of factors can produce either one car or three scooters then the price of one car will tend to be least thrice that of one scooter. In fact, the opportunity cost sets value of a productive factor from its best alternative use. It implies that if a productive factor is to be retained in next best alternative use, it must be compensated or paid at least what it can earn from its next best alternative use. It means a resource a resource will always tend to more in the occupation where it has opportunity to earn. As such the concept of opportunity cost serves as a useful economic tool in analyzing the optimum resource allocation and relative price determination of products.

11.4 MONEY COST

'Money Cost' is the monetary expenditure or inputs of various kinds raw material labour etc. required for output i.e. the money spout on purchasing of different units of factors of production needed for purchasing a commodity. Money cost is therefore, the payment mode for the factors in terms of money.

Money cost, thus is total money outlay for the firm which includes

- Cost of raw material
- Wages & salaries
- Power charges
- Rent of houses or factory premises
- Intrest payments of capital invested
- Insurance premiums
- Taxes like property tax, excise duty licence fee etc.
- Miscellanious business expenses like market & advertising expense, transport cost etc.

The above list of items, included in money cost in an explicit payment made by the firm. These are recorded expenditure during the process of production. It is, thus, known as accounting cost or explicit money cost, as these are actual monetary expenditure incurred by the firm. Explicit money costs are direct & contractual payments of the firm.

To, an economist however, this is not enough for consideration. In the economic sense, there are certain costs which are implicit in nature. Such as where there is an imputed value of good & services used by the firm but not direct payment is made for such use. Thus, from an economists paint of view, apart from explicit costs there are implicit money cost. Implicit money costs are imputed payment which are not directly or actually paid out by the firm as no contractual disbursement is fixed for them. Such implicit money cost arise when the firm or enterpreneure supplies certain factors owned by himself for instance, the enterpreneur may have his own land in production for which no rent is to be paid in the actual sense. But this however, is to be reckoned as a cost assuming that if the enterprenure hand rented this land to somebody, he would have definitely earned some rent, hence, such rent is to be imputed and regarded as implicit money cost. Thus implicit money costs are as follows :

- Wages of labour rendered by the enterpreneur himself.
- Intrest on capital supplied by him.
- Rent of land and premises belonging to the enterpreneur himself and used in his production.
- Normal Returnes of enterpreneur a compensated needed for his management and organisational activity.
- Depriciation allowances on wear & tear of capital goods.

There items are to be valued at curent market rates for estimating the implicit cost. These are implicit money costs because these go to the enterpreneur himself. These are self recipient payment and they are in prac tice unrecorded expenditure of production but in an economic sense, we have to consider total money costs as composed both of explicit & implicit expenses.

The distinction between the explicit & implicit money costs is important in analysing the concept of profit. In the accounting sense profit is calculated as the residual of total sales receipts minus total cost. In the economic sense however, normal profit is included in total cost of production which consists of explicit & implicit expenses all taken together under implicit costs, normal profit a return to the enterpreneur's management function is included.

Economic cost = Accounting costs + implicit cost

Money cost is also regarded as the supply price of the factors needed for producing a commodity. To some economists thus, the money cost of production of a commodity is the money fund required to induce the factors of production to be allocated to this production rather than to seek employment in alternative uses.

In Economic analysis of costs thus, economists concentrate more on the cost function expressed in money terms because it is the money cost which serves as the basis for price determination and output policy. The term cost function obviously, refers to the functional relationship between costs & output. In the following sections, we shall discuss the cost out behaviour in the short term and long run as the adjustability of costs of output typically depends upon the length of period involved.

Significance of Opportunity Costs : There are competiting demands (depending upon the marginal utility of the consumers) for the same resources. Since these resources are scarce, certain demands are satisfied only at the sacrifice of other demands. The resources tend to move from those uses in which their demand price (marginal utility to the consumers in the aggregate) is lower to those in which it is higher until they tend to be distributed in various uses (for the production of various commodities and services) in such a way as to equalize their marginal utilities in the various uses.

It is thus the demand price or marginal utility which determines how much of a particular factor of production will be utilized for the production of a particular commodity. The supply of a commodity, therefore, ultimately depends upon the attraction offered by the demand price (or marginal utility) to the relevant factors of production. If this demand price is not high enough, these factors will be used for the production of commodities the demand price for which is high enough to attract them.

Thus, the cost of production of a commodity is fundamentally the sum-total of retention prices that have to be paid to the productive services for retaining them in a particular industry, and this must at least be equal to what they can command elsewhere.

Application of Opportunity Cost Doctrine : The opportunity cost doctrine has a wide application in the field of economic theory. It applies to the determination of values both internally and internationally. It also applies to income distribution.

Limitations : There are, however, some limitations in its application :

(i) **Specific :** It does not apply to productive services which are specific. A specific facotr has no alternative use. Its transfer cost oropportunity cost is, therefore, zero. Hence, the payment made to this factor is of the nature of rent (preferably called non-cost outlays).

(ii) **Inertia :** Further, the doctrine of opportunity cost does not take into consideration the element of inertia. The factors may be reluctant to leave an occupation. In a case like this, where a factor's preference may have to be overcome, a payment exceeding the purely transfer cost will have to be made to induce it to take to an alternative occupation.

(iii) **Non-pecuniary considerations :** In view of these non-pecuniary considerations, the notion of objective costs must be given up. The theory of opportunity costs can be restated thus : "The cost of productive service X in making A is equal to the amount of B that X could produce plus (or minus) the non-pecuniary returns (or cost) attached to producing B." It has been suggested that non-pecuniary returns should be converted into pecuniary returns to restore objectivity to the theory. But it is not always possible to find a common monetary denominator for the purpose.

(iv) **Not Homogeneous :** Besides, it should be remembered that units of productive service are rarely homogeneous. This obstructs their transfer.

(v) **Wrong Assumption :** Moreover, the theory is basedon perfect competition which seldom exists.

(vi) **Individual and Social Costs :** Another discrepancy may arise on account of the difference in individual and social costs. A product may cost the factory owner Rs. 10 but to the society it will cost something in the form of ill-health due to the smoke that his factory sends out.

Conclusion : In spite of all these limitations and complications, the theory of cost, viz., theory of opportunity or alternative costs, is the most acceptable one at present. Certain features of this theory are worth noting :

(i) Cost of production of a commodity depends on demand prices of other commodities to the production of which the same productive service can contribute.

(ii) This cost analysis is not vitiated by the fact that a commodity is produced by the combination of several factors because marginal product of each factor can be ascertained.

Enterprenuer's Cost : In what follows we shall use the term "Cost of production in the sense of money cost or expenses of production, this is enterprenuer's cost.

- Wages of labour
- Intrest on capital
- Rent or Royalities paid to the owers of land
- Depriciation of capital goods

- Profits of the manufacture sufficient to include him carry on the production of the commodity.

The enterprenuer's cost may classified as : production costs including material costs. Wage costs, interest costs etc. both direct & indirect cost; selling cost including cost of advertising; and other costs including insurance charges, rates taxes etc.

11.5 ANALYSIS OF THE BEHAVIOUR OF COSTS IN SHORT RUN

It may be recalled that the short-run period refers to the time interval during which some factor units cannot be adjusted. The factors of production which cannot be adjusted during the short period are together referred to as plant and include capital equipment, top managerial personnel and minimum of subordinate staff such as watch and ward, maintenance technicians etc. In other words, short period is the period during which the plant of a firm cannot be changed.

The short-run cost-function relates to the short-run production function. A short-run production function Q = f , stated in general, implies two sets of input components : (i) fixed inputs and (ii) variable inputs. Thus, factors of production employed, in short run, are classified as fixed factors and variable factors.

Fixed factors are unalterable : These factors are, for instance, machineries, factory building, managerial staff etc., which remain unchanged over a period of time. Variable factors are like labour, raw-materials, power etc., the inputs of which are varied to vary the output in the short run.

Since, cost refer to the prices paid to the factors of production, we find prices paid to fixed factors, and the prices paid to the variable factors which are termed as the fixed costs and the variable costs respectively.

Fixed Costs : Fixed costs are the amount spent by the firm on fixed inputs in the short run. Fixed costs are, thus, those costs which remain constant, irrespective of the level of output. These costs remain unchanged even if the output of the firm is nil. Fixed costs, therefore, are known as "supplementary costs" or "overhead costs".

Fixed costs, in the short run, remain fixed because the firm does not change its size and the amount of fixed facotrs employed. Fixed or supplementary costs usually include :

(i) Payments of rent for the building.

(ii) Interest paid on capital.

(iii) Insurance premiums.

(iv) Depreciation and maintenance allowances.

(v) Administrative expenses—salaries of managerial and office staff, etc.

(vi) Property and business taxes, licence fees, etc.

These costs are overhead costs in the sense that they are to be incurred even if the firm is shut down temporarily and the current production is nil. Further, they do not change as the output increases. Thus, fixed costs are also referred to as "unavoidable contractual costs" which occur even if there is no output. In brief, the costs incurred on the business plant are called fixed costs.

Fixed costs may be classified into two categories : (i) Recurrent and (ii) Allocable. Recurrent fixed costs are those which give rise to cash outlays, as certain explicit payments like rent, interest on capital, general insurance premiums, salaries of premanent irreducible staff etc. are to be made at a regular time-interval by the firm. "Allocable fixed costs" refer to implicit money costs like depreciation charges which involve no direct cash outlays but are to be reckoned on the basis of time rather than usage.

Variable Costs : Variable costs are those costs incurred on variable factors. These costs vary directly with the level of output. In other words, variable costs are those costs which rise when output expands and fall when output contracts. When output is nil, they are reduced to zero.

The short-run variable costs include :

(I) prices of raw materials

(ii) wages of labour,

(iii) fuel and power charges,

(Iv) excise duties, sales tax,

(iv) transport expenditure, etc.

Besides, user costs are included in variable costs for analytical consideration. User cost is the depreciation caused by the actual use of capital assets like machinery. It is linked with the rate of output.

Variable costs may be classified into : (i) fully variable costs and (ii) semi variable costs. The former vary more or less at the same rate of output, e.g. cost of raw materials, power etc. Semi-variable costs are, however, those costs which do not change with output, but they will be completely eliminated when output is nil.

The distinction between prime costs (variable costs) and supplementary costs (fixed costs) is, however, not very significant. In fact, the difference between fixed and variable costs is meaningful and relevant only in the short period. In the long run, all costs are variable because all factors of production become adjustable in the long run. In the short period, only those costs are variable which are incurred on the factors which are adjustable in the short period. In the short run, however, the distinctions between prime and supplementary cost is very significant

because it influences the average cost behavior of the product of the firm. Thus, it has significant bearing on the theory of firm. In specific terms, the significance of making this distinction between fixed and variable costs is that in the short period a firm must cover at least its variable or prime costs if it is to continue in production. Even if a firm is closed down, it will have to incur fixed or supplementary costs. The firm will suffer no great loss in continuing production if it can cover at least its variable costs under the prevailing price.

11.6 TYPES OF COSTS AND THEIR MEASUREMENT

In economic analysis, the following types of costs are considered in studying cost data of a firm : (1) Total Cost (TC), (2) Total Fixed Cost (TFC), (3) Total Variable Cost (TVC), (4) Average Fixed Cost (AFC), (5) Average Variable Cost (AVC), (6) Average Total Cost (ATC), (7) Marginal Cost (MC).

Total Cost (TC) : Total cost is the aggregate of expenditures incurred by the firm in producing a given level of output. The total cost is measured in relation to the production function by multiplying the factor prices with their quantities. In symbolic terms :

If, the production function is :

then total cost is :

$TC = f(Q)$

which means that the total cost varies with output. Thus,

$TC = p_1x_1 + p_2x_2 + p_3x_3 + \ldots + p_n x_n$

Alternatively,

$TC = \sum p x,$

where '$\sum$' refers to the sum of, p stands for factor prices and x for factor quantities.

Conceptually, total cost includes all kinds of money costs : explicit plus implicit. Thus, normal profit is also incuded in the total cost. Normal profit is an implicit cost. It is a normal reqard made to the entrepreneur for his oreganisation services. It is just a minimum payment essential to retain the entrepreneur in a given line of production. If this normal return is not realized by the entrepreneur in the long run, he will stop his present business and will shift his resources to some other industry.

Now, the entrepreneur himself being the paymaster, he can't pay himself, so he treats normal profit as implicit cost and adds it to the total cost.

In the short run, total cost may be bifurcated into total fixed cost and total variable cost. Thus, total cost may be viewed as the sum of total fixed cost and total variable cost at each level of output. Sympolically,

$$TC = TFC + TVC$$

Total Fixed Cost (TFC) : Total fixed cost corresponds to fixed inputs in the short-run production function. It is obtained by summing up the product of quantities of the fixed factors multiplied by their respective unit prices. Thus :

where refers to invariable inputs and their quantities in fixed amount, p

stands for their prices, k denotes a constant amount. This implies that TFC remains the same at all levels of output in the short run.

Suppose a small furniture-shop proprietor starts his business by hiring a shop at a monthly rent of Rs. 40, borrowing a loan of Rs. 1,100 from the bank at the interest rate of 12 per cent and buys capital equipment worth Rs. 150. Then, his monthly total fixed cost is estimated to be :

Rs. 40 (rent) + Rs. 150 (Equipment Cost)

+ Rs. 10 (monthly interest on the loan) = Rs. 200.

Total Vriable (TVC) : Corresponding to variable inputs, in the short-run production function, are total variable cost. It is obtained by summing up the production of quantities of variable inputs multiplied by their prices.

Thus :

where xv refers to quantities of variable inputs, and p refers to their prices. Again,

$$TVC = f(Q)$$

which means that total variable cost is an increasing function of output.

Suppose, in our illustation of the furniture-shop proprietor, if to start with the production of sofas, he employs a carpenter on the piece wage of Rs. 30 per sofa. He buys wood worth Rs. 200, rexine cloth worth Rs. 300, spends Rs. 110 for other requirements to produce 3 sofas. Then, his total variable cost is measured as :

Rs. 200 (wood price) + Rs. 300 (rexine cost) + Rs. 110 (alliedcosts) + Rs. 90 (labour charges) = Rs. 700.

Average Fixed Cost (AFC) : Average fixed cost is total fixed cost divided by total units of output.

Thus :

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

where Q stands for the number of units of the product. Thus, the average fixed cost is the fixed cost per unit of output.

In the above example, thus, when TFC = Rs. 200 and Q = 3, AFC = 200/3 = Rs. 66.67.

Average Variable Cost (AVC) : Average variable cost is the total variable cost divided by total units of output.

Thus :

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

where AVC means Average Variable Cost.

Thus, the average variable cost is variable cost per unit of output.

In the above example, TVC = Rs. 700, Q = 3.

∴ AVC = 700/3 = Rs. 233.33.

Average Total Cost (ATC) : The average total cost or average cost is total cost divided by total units of output.

Thus :

In the short run, since

TC=TFC+TVA

Since,

ATC=AFC+AVC

Hence, the average total cost can be computed simply by adding average fixed cost to the average variable cost at each level of output.

To take the above examples, thus,

ATC=Rs. 66.67+Rs. 233.33=Rs. 300 per sofa.

Marginal Cost (MC): Marginal cost may be defined as the addition to total cost incurred in producing an additional unit of output. Thus, marginal cost is the difference between the total cost of producing n units and the total cost of producing n-1 units, where n denotes the number of units of a good produced.

Symbolically,

Suppose, the total cost for producing 4 sofas (i.e. n=4) is Rs. 1,150 while that for sofas (i.e.n-1) is Rs. 900. Marginal cost of producing the 4^{th} sofa, therefore, works out as under:

Alternatively, marginal costs may be defined as change in total cost associated with a one unit change in output. It is also called as extra-unit cost'' or incremental cost, as it measure the amount by which total cost increases when output is expanded by one unit. It can also be

calculated by dividing the change in total cost by the one unit change in output. Symbolically, thus:

$$MC = \frac{\Delta TC}{\Delta_1 Q}$$

Where, Δ denotes change in, but output is assumed to change by 1 unit only. Therefore, output change denoted by

It must be remembered that marginal cost is the cost of producing additional unit of output and not of average product. It indicates change in total cost for producing an additional unit.

Further, marginal cost is independent of the size a fixed cost in the short run. Since fixed cost are independent of output and remain constant throughout, it is obvious that increase in total costs are entirely due to the variable costs. Hence marginal cost consists of variable cost only. The change in the total variable costs for producing an additional unit of output determines the marginal cost.

Below, we may summarise these four important per unit costs in which a firm is always interested in the short period :

1. Average Total Cost = Average Fixed Cost + Average Variable Cost (ATC = AFC + AVC)
2. Average Fixed Cost = Total fixed cost output
3. Average Variable Cost = Total variable cost output
4. Marginal Cost=Change in Total Cost One unit change in Output

It must be noted that abbreviations, TVC, TFC, TC, AFC, AVC, ATC and MC are frequently used by economists to represent respectively total variable cost, total fixed cost, total cost, average fixed cost, average variable cost, average total cost and marginal cost.

Cost Schedules : A cost schedule is a statement of variations in costs, resulting from variations in the level of output. It shows the response of cost to changes in output. Hypothetical cost schedules of a

furniture manufacturing firm has been presented in Table 9.1 to illustrate and elucidate the measurement, characteristics of behaviour and relationships of the various cost concepts described above.

Table 9.1

Hypothetical Cost Schedules of a Firm in the Short Run

No. Of Sofas (Q)	Total fixed cost (TEC)	Total variable cost (TVC)	Total cost (TC)	Average fixed cost (AFC= TFC/Q)	Average variable cost (AVC= TVC/Q)	Average cost (TC= TC/Q)	Marginal cost (MC= TCn-TCn-1)
0	200	0	200	___	___	___	___
1	200	300	500	200	300	500	300
2	200	550	750	100	275	375	250
3	200	700	900	66.67	233.33	300	150
4	200	950	1150	50	237.50	287.50	250
5	200	1300	1500	40	260	300	350
6	200	1800	2000	33.33	300	333.33	500
7	200	2700	2900	28.57	385.71	414.28	900
8	200	4100	4300	25	520	545	1400

Behaviour of Total Cost : Examining the total cost schedules in Table 9.1, we may observe the following interesting points about the behaviour of the various total costs :

1. TFC remain constant at all levels of output. It is the same when output is nil. Fixed costs are thus independent of output.
2. TVC varies with output. It is nil when there is no output. Variable costs are, thus, direct costs of output.
3. TVC does not change in the same proportion. Initially it is increasing at a decreasing rate, but after a point, it increases at an increasing rate. This is due to the operation of the law of variable proportions or non-proportional output, which states that initially to obtain a given amount of output relatively, variation in factors are needed in less proportion, but after a point when the diminishing phase operates, variable factors are to be employed in a greater proportion to increase the same level of output.

Total Fixed, Total Variable and Total Cost Curves : Total cost curves are derived by plotting the total cost schedules graphically. The cost curves depict cost output behaviour of the firm in an explicit manner. In Fig. 11.1 we, however, present a generalised form of total fixed, total variable and total cost curves to explain the cost-behaviour in the short run.

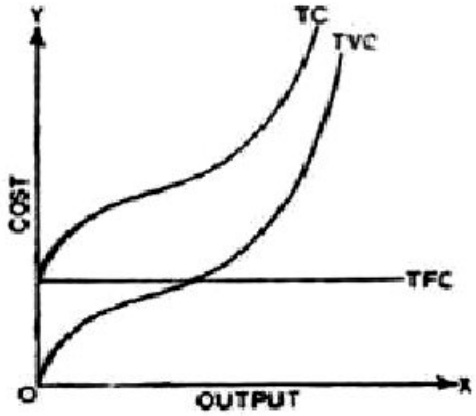


Figure 11.1

A careful observation of figure 11.1, reveals the following important characteristics of cost-behaviour :

1. The curve TFC is the curve for total fixed costs. As the total fixed costs remain unchanged, irrespective of the level of output, the total fixed cost curve (TFC) is a straight horizontal line, parallel to the x-axis, denoting its constant characteristic.

2. The total fixed cost curve (TFC) orginates in the y-axis (the cost-axis) which implies that even if the firm is producing no output, it has to incur the cost.

3. The curve TVC represents total variable cost. If reflects the typical behaviour of total variable costs, as initially it rises, gradually but eventually, it becomes steeper, denoting a sharp rise in the total variable costs. The upward rising total variable costs are related to the size of the size of the output. The total variable cost curve originates at the point of origin which implies that variable costs are reduced to zero when no output is produced.

4. The curve TC represents total costs. It is derived by adding up vertically the TVC and TFC curves. It is easy to see that te shape of TC is largely influenced by the shape of TVC. When the TVC curve becomes steeper. TC also becomes steeper. Further, the vertical distance between TVC curve and TC curve is equal to TFC and is constant throughout, because TFC is constant. Evidently, the vertical distance between TVC and TC curves represents the amount of total fixed costs.

11.7 BEHAVIOUR & RELATIONSHIP OF VARIOUS UNIT COST IN SHORT RUN

From the cost schedules given in Table 9.2, it is apparent that costs per unit are derived from the total costs. It is obvious that the firm in the short period will have four categories of unit costs :

(i) Average Fixed Cost (AFC),

(ii) Average Variable Cost (AVC),

(iii) Average Total Cost (ATC), and

(iv) Marginal Cost (MC).

From the given cost data, we may, thus, observe the following points in the regard :

1. AFC decrease as output is increased. Since total fixed costs remain the same, average fixed costs decline continuously. It is the outcome of 'spreading the overhead over more units'. Since AFC = TFC/Q, it is a pure arithmetical result that the numerator remain ing unchanged, the increasing denominator causes diminishing product. TFC thus spreads over on each unit of output with the increase in output (Q). Hence AFC diminishes continuously.

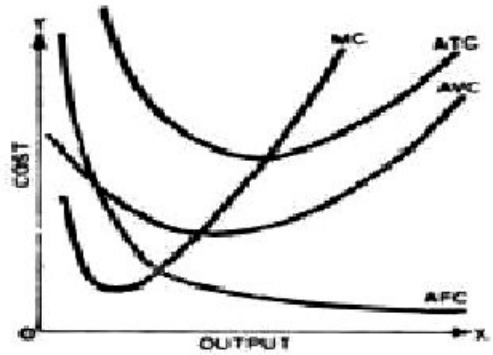


Fig. 11.2

2. AVC first decreases and then increases as output is increased.

3. ATC also decreases initially, at a point it remains constant for a while and then increaess as output is increased.

4. Marginal cost (MC) also decreases initially and then increases as output is increased.

5. The MC is determined by the rate of increase in the total variable cost (TVC). In the beginning, for the very first unit, thus average variable cost and marginal cost are the same (becaue AVC = TVC for the first unit)

6. When the average cost is minimum, MC = AC.

Short-run Unit Cost Curves : The behaviour patterns and relations of unit costs in the short run become more explicit when we plot the cost data on a graph and draw the respecive cost curves.

We have thus the following four cost curves of a firm in the short period :

(1) AFC curve;

(2) AVC curve;

(3) ATC curve; and

(4) MC curve.

There have been illustreated in Fig. 3.2

Average Fixed Cost Curve (AFC Curve) : AFC tends to decrease progessively with an increase in output. Thus, the AFC curve is a rectangular hyperbola, it approaches both the axes asymptotically, i.e. it gets very close to but never touches either axis.

Average Variable Cost Curve (AVC Curve) : The average variable cost tends to fall in the initial stages as the firm expands its output upto the optimum level. Once the normal capacity is exhausted, the average variable cost tends to rise. Thus, usually the average variable cost curve declines initially, reaches the minimum and then goes on rising. The AVC curve is, thus, some what U-shaped, indicating that as the output increases initially, the average variable cost decrease, then it may remain contant for a while and then start increasing. There are, thus, three phases of the AVC curve :

(i) decreasing phase;

(ii) constant phase and

(iii) increasing phase.

These stages in the ATC curve correspond to the stages of increasing constant and decreasing averge product (returns to the variable factors) underlying the law of variable proportions.

Average Total Cost Curve (ATC) Curve : Since the average total cost is the sum of average fixed average variable costs, the ATC curve is also the vertical summation of the AFC and AVC curves. Hence, the curve ATC is derived by the super-imposition of the AVC curve over the AFC curve. As

such, the ATC curve is U-shaped, indicating that if the output of the firm is increased, initially the average total cost increases upto a point, then it remains constant for a while and thereafter, it starts rising.

Explanation of the U-Shape of ATC Curve : The reasons why the ATC curve is U-shaped are not far to seek. Since, ATC = AFC + ATC, it follows that the behaviour of the ATC curve is determined by the AVC curve and AFC curve. The AFC curve is a rectangular hyperbola, which

implies that the average fixed cost diminishes continuously as output expands. In the initial stage, the AVC curve also slopes downward. As such in the beginning, the ATC curve tends to fall when output expands. At a certain point, however, the AVC starts rising, so the AVC curve has a positive slope, yet the ATC curve continues to fall. This is due to the predominant influence of the falling AFC curve. Since the falling effect of AFC curve is stronger than the rising effect of AFC curve at this stage, the net effect causes ATC to fall. But, as the ouput expands further to a higher level, the AVC curve tends to rise sharply due to the operation of the law of diminishing returns. Now, the rising effect of AVC being predominant, it more than discounts the falling effect of AFC curve, so the net effect is that the ATC starts rising. Indeed, at the point where that rise of AVC exactly nullifies the fall of AFC, the balancing effect causes ATC to remain constant first and then when the rising effect of AVC becomes more pronounced, the ATC starts rising. As such the overall ATC curve assumes U-shape. The falling path of ATC is largely due to the falling AFC curve, while its rising path is largely influenced by the rising AVC curve. It may be noted that the distance between ATC and AVC curves becomes narrow as the curves move upward. This is a clear indication of the increasing influence of AVC on ATC in the later stage. In this way, the slopes of the ATC curve, initially negative and thereafter positive, reflect the combined influence of fixed and variable cost curves. The economic reason underlying the U-shape of the average cost curve is that there is greater importance of fixed costs in any firm till the normal capacity is exhausted and the normal point or the point of least cost combination of various factors (fixed and variable) is reached. The average cost, therefore, declines in the beginning. But once the normal output of the plant is reached, more and more variable factors are to be employed due to the diminishing returns, so that the variable cost rises sharply to increase the output further which outweighs the effect of falling average fixed cost so that the ATC starts moving with AVC. This is how the ATC curve assumes U-shape in the short-run period.

Again as we have already seen, the ATC curve is the reciprocal of the AP curve. The AP curve is formed by the operation of the law of diminishing returns in the short run. The occurrence of non-proportional output is basically due to the indivisibility of fixed factors and imperfect substitutability between fixed and variable factors.

Marginal Cost Curve (MC Curve) : The marginal cost curve also assumes U-shape indicating that in beginning, the marginal cost declines as output expands, thereafter it remains constant for a while and then starts rising upward.

Marginal cost is the rate of change in total costs when output is increased by one unit. In a geometrical sense, marginal cost at any output is the slope of the total cost curve at the corresponding point.

Apparently, the slope of the MC curve also reflects the law of diminishing returns.

In the short run, the marginal cost is independent of fixed cost and is

directly related to the variable cost. Hence, the MC curve can also be derived from the TVC curve. In fact, the TC and TVC curves have identical slope at each level of output, because TC curve is derived just by shifting TVC curve at TFC level. Thus, MC can be derived from the TVC curve and AVC curve is also derived from the TVC curve. However, MC will not be the same as AVC. As a matter of fact, AVC curve and MC curve are the reflection and the consequence of the law of non-proportional output operating in the short run.

Relationship of Marginal Cost to Average Cost : From a given cost schedule, as the Table 9.1, we may find a unique relationship of marginal cost to average total cost (or simply average cost) an under :

1. In the beginning, when average cost is falling, marginal cost also declines to some extent. But, at a certain stage, MC tends to rise though AC continues to fall. However, the MC would be less than the AC.
2. When AC is minimum, MC = AC.
3. After the point of equality, when AC is rising, MC also rises, but now MC tend to be higher than AC.

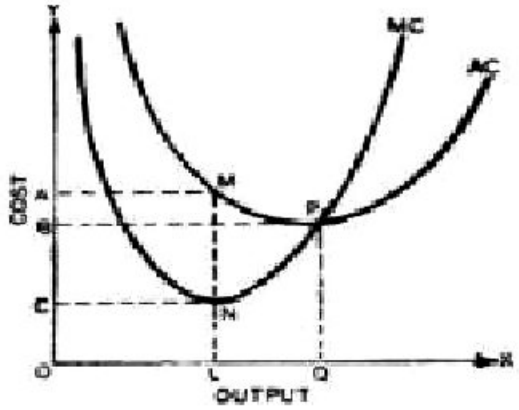


Fig. 11.3

The above-stated relationship is easy to see through geometry of C and MC curves, as shown in Fig. 11.3.

It can be see that :

1. Initially, both MC and AC curves are sloping downward. When AC curve is falling, MC curve lies below it.
2. When AC curve is rising, after the point of intersection, MC curve lies above it.
3. It follows thus that when MC is less than AC, it exerts a downward pull on the AC curve. When MC is more than AC, it exerts an upward pull on the AC curve. Consequently, MC must equal AC,

while AC is at a minimum. Hence MC curve intersects at the lowest point of AC curve. It may be recalled that MC curve also intersects at the lowest point of AVC curve. Thus, it is a significant mathematical property of MC curve that it always cuts both the AVC and ATC curves at their minimum points.

11.8 CHARACTERISTICS OF COSTS IN THE LONG RUN

The long-run period is long enough to enable a firm to vary all its factor inputs. The firm can change in the long-run the quantities per unit of time of factory building, machinery, tools and equipments, managerial staff and all other resources which are unalterable in a short-run period. In the long run, therefore, because all factors become adjustable, there are no fixed costs. In short period, a firm has to carry on its production within the existing plant capacity. In the long run, a firm is not tied up to a particular plant capacity. It can move from one plant capacity to another whenever it is obliged to do so in the light of changes in demand for its products. The firm can expand its plant capacity in order to meet the long-term increase in demand or reduce its plant capacity if there is a drop in demand.

In the long run, thus, there are only the variable costs or direct costs as total cost. There is no dichotomy of total cost into fixed and variable costs as we see in the short-run analysis.

In the long run, when we examine the unit cost of a firm, we come across only the average marginal costs. Hence, we have only to study the shape and relationships of the long-run average cost curve and the long-run marginal cost curve.

Long-run Average Cost Curve (LAC) : As a matter of fact, the long run is a 'planning horizon'. All economic activity actually operates in the short run; long run is only a perspective view for the course of action. Thus, an economic entity—entrepreneur or consumer—can plan his course of action in the long run, but chooses actually numerous aspects of the short run in the real course of operation. That means, the long run is comprised of all possible short-run situations out of which a choice is made for the actual course of operation.

In reality, thus, the long run consists of perspective planning for the expansion of the firm; hence, it involves various short-run adjustments visualized over a period of time. Thus, methodologically, the long-run cost curve is the envelope of the short-run average cost curves.

The derivation of the LAC curve is shown in Fig. 11.4

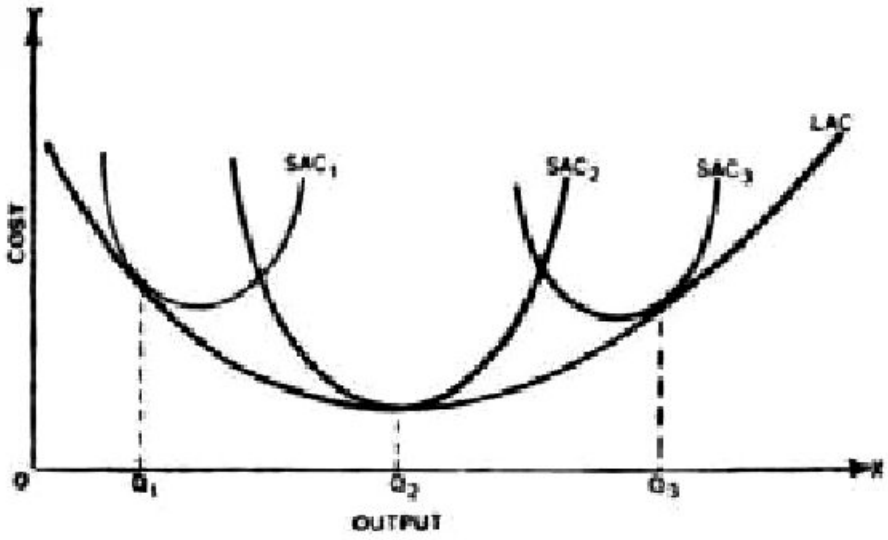


Fig. 11.4

In Fig. 3.4 the LAC curve is drawn on the basis of three possible plant sizes. This is a much simplified assumption. Normally, however, the firm may come across a choice among a large variety of plants. Thus, more realistically, the LAC curve is to be drawn with reference to a large number of possible plant sizes.

The main features os the LAC curve may be observed as under :

1. By joining the loci of various plant curves relating to different operational short-run phases, the LAC curve is drawn as a tangent curve.

2. Since LAC is derived as the tangent to various SAC curves under consideration, the cost levels represented by the LAC curve for different levels of output reflect the least-cost combination of resource inputs to be adopted by the firm at each level of output in the long run.

3. Whenever a firm is intending to produce a particular level of output in the long run, it has to locate a point on the LAC corresponding to that level of output and select the relevant plant and operate on the related short-run average cost curve representing the plant size. Thus, the LAC is the envelope of a family of short-run average cost curve appropriate to different levels of output. It is, therefore, also known as the envelope curve.

4. The LAC curve is regarded by the firm as the long-run planning device, as it denotes the least unit cost of producing each possible level of output. The entrepreneur would determine his course of expansion of output and the size of plant in view of the LAC curve.

A rational entrepreneur would select the optimum scale of plant. The optimum scale of plant is that size at which SAC is tangent to LAC, such that both the curves have the minimum point of tangency. In Fig. 9.4, at OQ2 level of output, SAC2 is tangent to LAC at the minimum points of both. Thus, OQ is regarded as the optimum scale of output, as it has the least per unit cost. It should be noted that there will be only one such point on the LAC curve to which a SAC curve is tangent and both have minimum points at the point of tangency. And this particular SAC phase will be regarded as the most efficient one. All others SAC curves are tangent to LAC but at the point of tangency neither LAC is minimum nor SAC will be the minimum. In fact, all these points, SAC curves are either rising or falling, showing a higher cost.

5. The LAC curve is a less pronounced U-shaped or rathe dishshaped. It then implies that in the long run, when the firm adopts a larger scale of output its long-run average cost in the beginning tends to decrease. At a certain point, it remains constant, and then it rises. This behaviour of long-run average costs is attributed to the operation of laws of returns to scale. Increasing returns in the beginning cause decreasing costs, constant returns, constant costs and decreasing returns cause increasing costs. It is apparent that since returns are based on the internal economies and diseconomies of scale, the long-run average cost curve traces there economies of scale. As a matter of fact, increasing returns to scale could be largely traced to the economies which become available to a firm when it expands its scale of operations. As a result of these economies, the firm enjoys a number of cost advantages and for every additional input of factors, it goes on getting a higher rate of return in terms of total output. Thus, *economies* of scale explain the falling segment of the LAC curve, that is, the declining average cost of output in the long run is due to economies of large scale enjoyed by the firm.

Long-run Marginal Cost Curve (LMC) : Like the short-run marginal cost-curve, the long-run marginal cost curve is also derived from the slope of total cost curve at the various point relating to the given output each time. The shape of LMC curve has also a flatter U-shape, indicating that initially as output expands in the long run with the increasing scale of production, LMC tends to decline. At a certain stage, however, LMC tends to increase. The behaviour of the LMC curve is shown in Fig. 11.5.

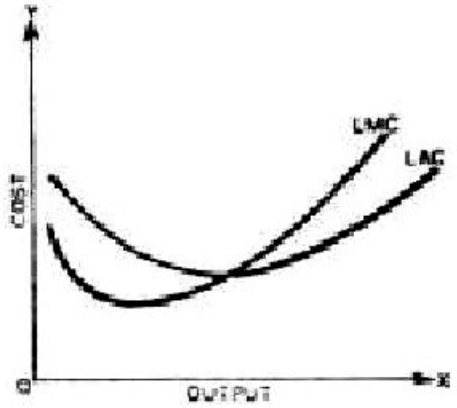


Fig. 11.5

From the above diagram, the relationship between LAC and LMC may be traced as follows :

1. When LMC curve decreases, LMC curve also decreases and LMC < LAC.
2. At a certain stage, LMC tends to rise, though LAC continues to fall. Indeed, LMC is still less than LAC.
3. When LAC is the minimum, LMC = LAC. Thus, the LMC curve intersects at the lowest point of the LAC curve.
4. Thereafter, both the LAC and LMC curves slope upwards; now LMC > LAC.

UNIT 12

COST OUTPUT RELATIONSHIP

OBJECTIVES

After giving through this unit you should be able to know about—

- Concept of short run & long run analysis of cost output relation
- Differences between fixed & variable cost
- Long Run average & Marginal Costs

STRUCTURE

12.1 INTRODUCTION

Cost functions are derived function. They are derived from the production function at any one time, economic theory distinquishis between short run cost & long run cost. Short run costs are the costs over a period during which some factors of production are fixed. Long run costs, are the costs over a period long enough to permit the change of factors of production. In the long run all factors of production become variable.

Both in the short run and long run total cost is a multivariable function that is total is determinal by mary factors. Symbolically we may write the long run cost function as

$$c = f(X, T, Pf)$$

and the short run cost function as

$$c =$$

where c = Total Cost

X = Output

T = Technology

= Price of factors

= Fixed factors

Graphically, costs are shown on two dimentional diagrams such curves simply that cost is function of output, c = f (X). Ceteris paribus. The clause ceteris paribus implies that all other factors which determines costs are constant. If these factors do change, their effect on cost is shown graphically by a shift of the cost curve. This is reason. Why determinants of cost, other than output are called shift factors. Thus any charge in these determinant will shift the production function and hence will result in shift the production function and hence will result in a shift of the cost curve.

The short run costs are costs at which firm operates in any one period. The long run costs are planning cost or ex anti costs in that they present the optional possibilities for expansion of the output & thus help the enterpreneur plan this future activities.

A distinction in necessary between internal economics of scale & External economics of scale. The internal economics are built in to the shape of long run cost curve because they are accure to the firm its action as it expends the level of its output. The external economics arise outside the firm from improvement of the environment in which the firm operates. Such economies external to the firm may be realised from action of other firm in the same or in another industry. The important characteristic of such economies is that they are independent of the actions of the firm, they are external to it. Their effect is a change in the prices of the factors employed by the firm (or in a reduction in the amount of inputs per unit of output), and thus cause a shift of the cost curves, both the short-run and the long-run.

In summary, while the internal economies of scale relate only to the longrun and are built into the shape of the long-run cost curve, the external economies affect the position of the cost curves; both the short-run and the long-run cost curve; with shift if external economies affect the prices of the factors and/or the production function.

Any point on a cost curve shows the minimum cost at which a certain level of output may be produced. This is the optimality implied by the points of a cost curve. Usually the above optimality is associated with the

long-run cost curve. However, a similar concept may be applied to the short-run, given the plant of the firm in any one period.

In the Section II of this chapter we examine the traditional theory of U-shaped costs. In Section III we examine some recent developments in the theory of costs which reject the strict U-shape of the short-run cost curves on the grounds that its assumptions are not realistic, and question the 'envelope' long-run cost curve on the grounds that diseconomies are not a necessary consequence of large-scale operations. In Section V we examine the main types and sources of economies of scale. In Section VI we summarise the available empirical evidence on the shape of long run & short run cost curves.

12.2 SHORT-RUN AND LONG-RUN COST CURVES ANALYSIS

After discussing the concept of cost as used in Economics, we are now in a position to study the nature of cost curves, both in the short-run and the long run. The shape of the cost curve shows how a change in output affects the costs. There will be a shift in the cost curve, if factors, other than a change in output, have affected the costs.

Meaning of Short-run and Long-run

Short run is a period of time within which the firm can vary its output by varying only the amount of variable factors, such as labour and raw materials. In the short run, fixed factors, such as capital equipment, top management personnel, etc., cannot be varied. In other words, in the short run, the firm cannot build a new plant or abandon an old one. If the firm wants to increase production in the short run, it can do so only by hiring more workers and buying more raw materials. It cannot increase its output in the short run by enlarging the size of its existing plant or building a new plant of a larger size. The short run is a period of time in which only variable factors can be varied, while fixed factors remain the same.

On the other hand, long run is a period of time during which the quantities of all factors, variable as wel las fixed, can be adjusted. Thus, in the long run, output can be increased by increasing capital equipment or by increasing the size of the existing plant or by building a new plant of a greater productive capacity.

12.3 SHORT-RUN FIXED AND VARIABLE COSTS

The cost of production for the entrepreneur may be analysed from another point of view. Some costs vary more or less proportionately with the output, while others are fixed and do not vary with the output in the

same way. The former are known as prime costs and the latter as supplementary costs of production or overhead costs.

The supplementary or fixed costs must be paid even though production has been stopped temporarily. They include rent of the factory building, interest on capital invested in machinery, and salaries of the permanently employed staff.

The prime costs, on the other hand, are variable costs. They vary with the output. These costs include the cost of raw materials used in the making of the commodity as well as the costs of casual or daily labour employed. They are incurred only when the factory is at work.

The distinction between variable and fixed costs applies only to a short period. Nothing can remain fixed for a long time. In the long run, the staff would change, amount of capital invested would be different, the dimensions of the factory, too, may change, and so on.

Hence in the very long run, all costs are variable.

Short Run : Total Average and Marginal Costs

Study the following table:

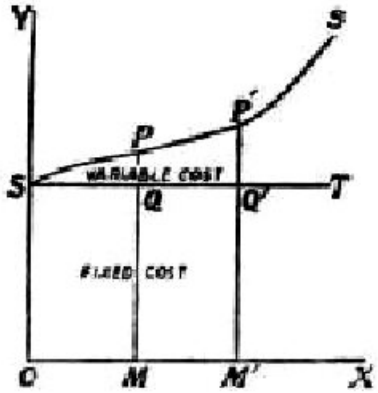
Cost of Production of a Film

Units of output (1)	Total fixed cost (2)	Total variable cost (3)	Total cost (2)+(3) (4)	Average fixed cost (2) (1) (5)	Average variable cost (3) (1) (6)	Average cost (5) (6) (7)	Marginal cost (8)
0	30	0	30	___	___	___	___
1	30	10	40	30	10	40	10
1	30	18	48	15	9	24	8
3	30	24	54	10	8	18	6
4	30	32	62	7.5	8	15.5	8
5	30	50	80	6	10	16	18
6	30	72	102	5	12	17	22

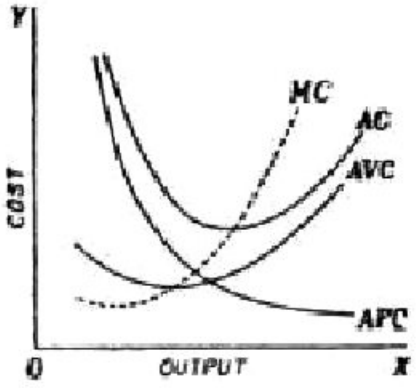
Total cost of a given output is the sum of total fixed cost and total variable cost. As far as the total fixed cost is concerned, it remains constant for all units of ouput, but we have to incur more variable costs, when output increases. total variable cost is zero, when output is zero and it increases with an increase in output, though the rate of increase is not constant. At first it increases rapidly but, then, due to economies of larger production, it does not increase as fast as before, though it jumps up

rapidly at a later stage (when output increases from 4 units to 5 units) due to diseconomies that set in.

In Fig. 12.1 (a) SS is the total cost curve and it includes the total fixed cost (the distance between the curve ST and X-axis) and the total variable cost (represented by the distances-between the curves SS and ST).



Total Cost : Fixed and Variable
Fig. 12.1 (a)



Average and Marginal Costs
Fig. 12.1 (b)

Average cost per unit is the total cost divided by the number of units produced. It is the sum of average fixed cost and the average variable cost. In Fig. 12.1 (b), we have drawn both the average fixed cost curve and the average variable cost curve. The total fixed cost being fixed for all units of output, average fixed cost in a falling curve in the shape of a rectangular hyperbola. Average variable cost curve (AVC) at first falls and then rises, as there emerge the diseconomies of large production.

By adding the two costs, average fixed and average variable, we get the average cost (AC) per unit of output. At first, the average cost is high due to large fixed cost and small output. As output increases, the fixed cost is thinly spread over the larger number of units produced, and the average cost accordingly falls. This is due to the various internal economies and the fuller use of indivisible factors. But when diminishing returns set in due to difficulties of management and limitations of plants and space, the variable costs, and therefore, the average costs, start increasing. The lower end of the curve turns up and gives it a U-shape. That is why average cost curves are U-shaped.

Marginal cost is the addition to total cost caused by a small increment in output. Marginal cost may be defined as the change in total cost resulting from the unit change in the quantity produced. Thus, it can be expressed by the formula.

Marginal cost curve (MC) in figure 19.1 (b) also falls at first due to more efficient use of variable factors as output increases and then it slopes

upward as further additions to the output interfere with the most efficient use of the variable factors.

12.4 RELATION BETWEEN MARGINAL AND AVERAGE COSTS

It can be seen that average variable cost continues to decline so long as the marginal cost is below it, but it starts rising at the point-where MC crosses AVC. The marginal cost will always rise more sharply than the average variable cost. Similar relation holds between marginal cost and average cost.

12.5 TOTAL MARGINAL COST RELATIONSHIP

It can be seen from the table on page 271 that when total cost is increasing at increasing rate, its corresponding marginal cost is rising; when total cost is increasing at a decreasing rate, its corresponding marginal cost is falling; and when total cost has reached the maximum, i.e., it is increasing at a zero rate, its corresponding marginal cost is zero.

It will be seen from the arithmetical table given on page 271 and Figure 19.1 (b) and Figure 19.4 that when marginal cost is less than average cost, average cost is falling and when marginal cost is greater than average cost, average cost is rising. This marginal-averge relationship is a matter of mathematical truism and can be illustrated by a simple example.

Suppose that a cricket player's batting average is 50. If in the next innings, he scores less than 50, may 44, his average will fall because his marginal (additional) score is less than his average score; if in the next innings he scores more than 50, say 58, his average will rise because marginal score is greater than his average score. If with the present average as 50, in the next innings, he scores just 50, then his average and marginal scores will be equal and his average score will neither rise nor fall.

In the same way, let us suppose that the average cost of a producer is Rs. 15. If by producing another unit, his average cost falls, the additional (marginal) unit must have cost him less than Rs. 15. If the production of the additional unit raises his average cost, the marginal unit must have cost him more than Rs. 15. And, finally, if his average cost remains unchanged, the marginal unit must have cost him exactly Rs. 15. In other words, in the third case, his marginal and average costs are equal. It is easier to remember this relationship between average and marginal costs with the help of Fig. 4.2 In Fig. 12.2, A represents average cost and M represents marginal cost. It is clear from this figure that when marginal cost is above (greater than) average cost, average cost rises. It is as if marginal cost were pulling average cost up towards itself. Similarly, when marginal cost is below the average cost, average cost falls as

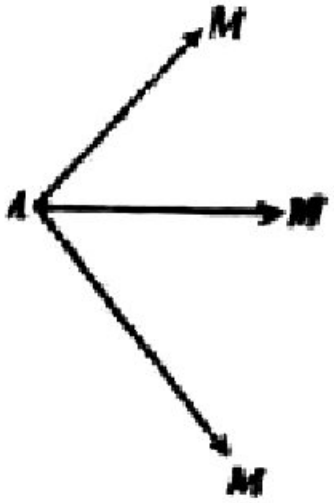


Fig. 12.2 Average and Marginal Relationship

if the marginal cost were pulling average cost downwards. when marginal cost is the same as the average cost, average cost remains constant as if marginal cost were pulling average cost along horizontally.

We can see in Fig. 19.4 that so long as marginal cost curve lies below the average cost curve, the latter is falling and where marginal cost curve lies above average cost curve, the average cost curve is rising. Therefore, at the point of inter-section, where marginal cost equals average cost, average cost curve has just ceased to fall but has not yet begun to rise yet. This, by definition, is the minimum point on the average cost curve.

It must be carefully understood that we cannot deduce about the direction in which marginal cost is moving from the way average cost is changing, that is, we cannot make any generalisation about whether marginal cost will be rising or falling when average cost is rising or falling. If average cost curve is falling, marginal cost must be below it but it (MC curve) may itself be rising or falling. If averae cost curve is rising, marginal cost curve must be above it, but it (MC curve) may itself be rising or falling. This can also be easily understood with the example of batting average.

Suppose that a player's batting average is 60, if in his next innings he scores 54, his average score will fall to 57. But his present marginal score of 54 may well be greater than his previous marginal score. He might, for instance, have had a 'duck' in his previous innings so that his marginal score has risen considerably. But as long as average score is falling marginal score whether rising or falling will be less than avergae score.

12.6 FACTORS AFFECTING COSTS

Among the factors which affect costs may be mentioned :

(i) the level of output;

(ii) changes in the prices paid for productive services (factors of production);

(iii) improvement in the techniques of production; and

(iv) changes in the size of plant and equipment. In the last case, the new ATC (average total cost) curve will at first, when the output is small, be above the old ATC curve, but, when output is sufficiently expanded the new curve will be below the old one.

It should be remembered that an increase in variable costs will increase marginal cost and average total cost. But increase in fixed cost will increase the average total cost and not the marginal cost. Fince marginal cost means an addition to the total cost caused by the production of one additional unit, it would be unfair to burden this additional unit with the increases in salaries, rent or interest, etc. (i.e., fixed costs). Increase in these times is obviously not due to the production of the additional unit.

12.7 DERIVING MARGINAL AND AVERAGE COST CURVES FROM TOTAL COST CURVE

In Fig. 12.3, SS is the total cost curve. To get the average and marginal cost for a given point P on the total cost curve, we proceed as follows :

Draw a straight line from P to the origin O. Then average cost at the point P equals the value of tangent of the angle (POX) that the st. line makes with the X-axis. In this figure, it is equal to PQ/OQ. Similarly, we can know the corresponding average costs at different points of the total cost curve. By joining all these points we get a U-shaped average cost curve (AC in Fig. 12.4)

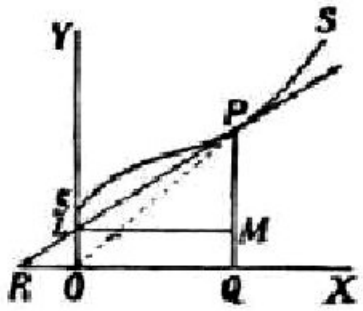


Fig. 12.3 Derivation of AC and MC Curves from Total Cost Curve

To know the marginal cost at the point P, we draw a tangent to the curve SS at the point P. Then marginal cost corresponding to the total cost at P is given by the value of the tangent of the angle that RP makes with the X-axis. In this case, it is equal to the value of the tangent of angle PRQ and this equals PQ/RQ or which is the same thing as PM/LM.

Similarly, we can know the marginal cost at different points of the total cost curve and by joining them, we get the marginal cost curve (MC in Fig. 12.4).

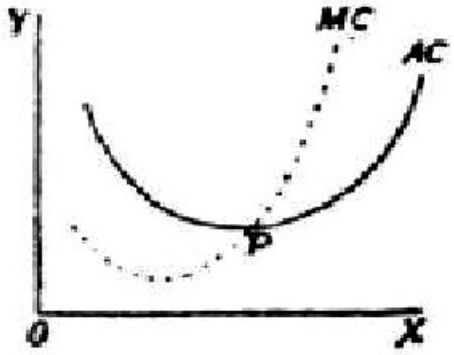


Fig. 12.4 MC and AC Curves

12.8 OPTIMUM RATE OF OUTPUT

The term 'optimum' here means the most efficient. The output at which the short-run average cost is the lowest is called the optimum rate of output for a given scale of plant. It does not necessarily follow that at this rate the profit is the maximum, because we must take into account revenue also besides cost to determine the size of profit.

12.9 LONG-RUN AVERAGE COST CURVES

The long-run average cost, curves will normally be U-shaped just as short-run cost curves are, but they will always be flatter than the short-run ones. The longer the period to which the curve relates, the less pronounced will be the U-shape of the cost curves. By the long period, we mean the period during which the size and organisation of the firm can be altered to meet changed conditions.

Why LAC Curves are Flatter : The simple explanation of why the long-run averae cost curve is flatter than the short-run cost curve may be given in terms of fixed and variable costs. It should be obvious that longer the period at the disposal of the producer, the fewer costs will be fixed and the more will be variable. Over a long period of time, there are very few costs which are just as great if output is small as they are if it is large. Over a long period, the size of the plant can be changed, unwanted buildings can be sold or let, administrative and marketing staff can be

decreased or increased in order to deal efficiently with smaller or larger outputs and sales.

Thus, total fixed cost can be varied to a considreable extent over long periods, whereas in the short run its amount is fixed absolutely. In other words, the longer the period under consideration, the fewer costs are 'fixed' and the more costs become 'variable'.

In the short run, a reduction in output will raise average costs because fixed costs will work out at a higher amount per unit of output. In the long period, however, the fixed costs can be reduced somewhat if output continues at a low level. Average fixed cost will, therefore, be lower in the long than in the short run.

Variable costs will not rise as sharply in the long run as they do in the short run. In the long run, the size of the firm can be increased to deal with an increased output more satisfactorily and the management can better tackle the various problems of larger output.

Thus, in the long run, average costs will be lower and the variable costs will not rise as sharply as, in the short period. Hence, LAC cost curves are flatter than the short-run ones.

A more adequate explanation of the flatter long-run average cost curves may be given in terms of greater divisibility of the factors of production in the long run. In the long run, the individual factors of production (like the plant, building, elaborate marketing organisation) can be used more economically because, in the long run, they are in fact, to some extent, divisible. In the short run, the shape of the cost curve of the firm depends on the action of the law of variable proportions, with capital and management as fixed (indivisible) factors. In the long run, the cost curve of the firm depends on what are called the "returns to scale". In the long run, the amount of capital can be altered and the management can be arranged differently, if necessary. They are no longer completely indivisible.

If all the factors of production can be used in varying proportions, it means that the scale of operations of the firm can be changed. Each time the scale of operations is changed, a new short-run cost curve will have to be drawn for the firm. The accompanying figure (Fig. 12.5) will bring this out. To begin with, let us suppose that the firm has the short-run cost curve AC'. In that case, the optimum output will be OM'. Now if output is desired to be increased to OM", in the short run, it can be obtained at the average cost M"L" along the short-run cost curve AC", because in the short run the 'scale' of operations is fixed. But, in the long run, a new and bigger plant can be built on which OM" is the optimum output, i.e., the firm now has the short-run average cost curve AC"', and that by increasing

the scale of its operations, the firm can produce the output OM" at a cost of M"I" instead of M"L".

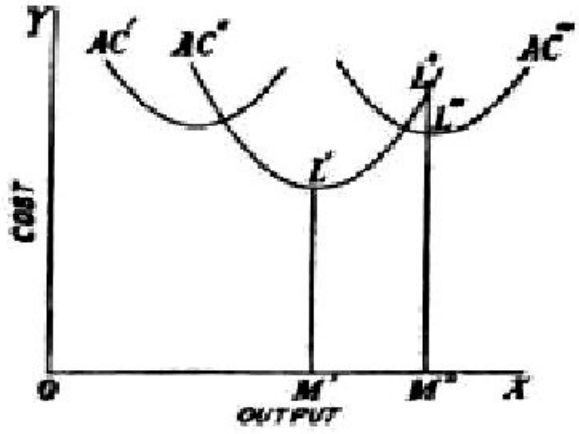


Fig. 12.5 Short-Run Cost Curve

Thus, it will have been seen that, at any given scale of operations, the firm will encounter regions of rising and falling costs, while in the long run the firm can produce on a completely different cost curve to the left or the right of the original one. For each different scale, there will be an output where average cost is at a minimum.

At this output, the firm is said to be producing at its technical 'optimum', given its scale of operations. Output is 'optimum' in the sense that average cost is at a minimum. Therefore, in the long run, the firm will be able to adjust its scale of operations so that it produces any given output at the lowest cost.

Look at the diagram (Figure 12.6). If the firm is question wishes to produce output OM' it will find it best to produce at that scale whihc has the average cost curve SAC'. If OM' quantity is desired, it will be best to produce on the curve SAC', and for output OM' on the curve SAC'. In each case, it will be producing the desired output at the lowest possible cost. It should, of course, be clearly understood that only in the long run can the scale of operations be altered; in the short run it will be fixed, and the average cost of output above or below the optimum level will necessarily rise along the shortrun curve in question, whether it be SAC or SAC' or SAC". A longrun average cost curve can, therefore, be drawn and it will show what the long-run cost of producing each output would be.

The shape of the long-run average cost curve will depend on the assumptions made. One assumption relates to the prices of factors. In the above examples, we have assumed constant factor prices. Various assumptions are, however, possible about the divisibility of factors of production. The simplest case is to assume that all factors are infinitely divisible and that there are no economies to be reaped from, for example,

the division of labour. In other words, in the long run, all factors can be adjusted so that the proportions between them are the optimum ones and production can take place at the lowest point on the relevant short-run average cost curve. As will be seen from the above figure (Fig. 12.6), on this assumption the long-run cost curve of the firm LAC, is a horizontal straight line.

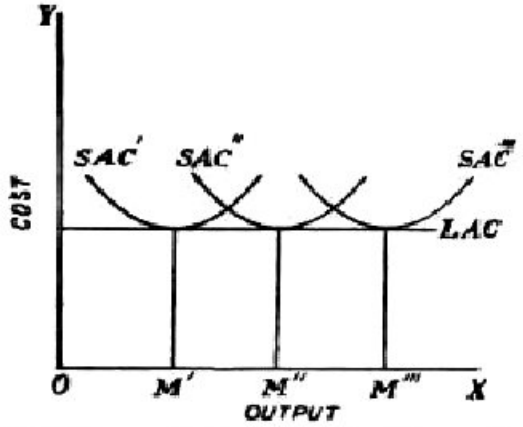


Fig. 12.6 LAC Curve with Constant Factor Prices and Divisible Factors

But this is not a realistic assumption. It is very unlikely that all factors are infinitely divisible even in the long run. And as output is increased, the firm may reasonably expect to reap some economies from the division of labour that will become more and more practicable as the scale of operations becomes larger.

It is common observation that some factors of production are indivisible. In particular, management is likely to be incompletely divisible. It is mere commonsense that an entrepreneur will be unlikely to produce twice a given output as efficiently as he produces a given output. It is, therefore, reasonable to expect that, even in the long run, firms will produce more cheaply at some scales of output than at others, if for no other reason, at least because, beyond a certain point, management becomes more difficult and less efficient. Certain combinations of factors will thus 'produce at lower costs per unit than others. This means that, in the more probable conditions, the short-run average cost curves of the firm will have different minimum points.

In the adjoining Figure 12.7, it will be seen that the short-run average cost curve SAC2 has a lower minimum point than either the curves SAC1 or SAC2. The optimum output of the firm is obtained at point M. The long-run average cost curve, which is a tangent to all the short-run curves, will be the curve LAC. It will, therefore, be U-shaped itself. But, as will be obvious from Fig. 12.7, it will be flatter than the short-run cost curves—the U-shape will be less pronounced. Economists

generally call this curve as 'envelope', since it envelops all the short-run curves. It is also called the "planning curve" of a firm.

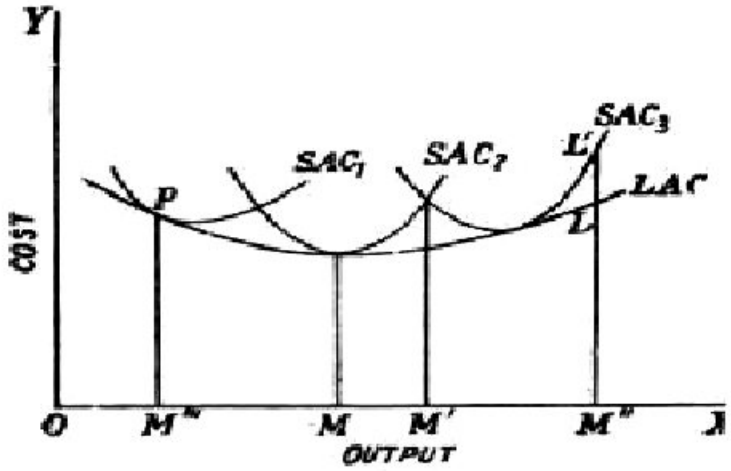


Fig. 12.7 LAC Curve : An Envelope

From the LAC curve (Fig. 12.7), it should be clear that for any given output, average cost cannot be higher in the long run than in the short run. After all, any adjustment in production which may be expected to cut costs, and which may be possible to make in the short-run, must also be feasible in the long run. On the other hand, in the short run, it is not always possible to produce a given output in the cheapest possible way. If a different output is to be produced, it is impossible to change the amounts used of all factors of production in the short run, while in the long run all possible adjustments can be made.

The conclusion, therefore, follows that at no point can the long-run average cost curve lie love a short-run average cost curve or the long-run average cost curve can never cut a short-run average cost curve, though they may be tangential to each other.

12.10 LONG-RUN MARGINAL COST CURVE

In diagram Fig. 4.8 we have drawn long-run marginal cost curve LMC from short-run average cost and marginal cost curves and long run average cost curve. Just as every point of the continuous long-run average cost corresponds to some point of a short-run average cost curve similarly every point of the continuous long-run marginal cost curve corresponds to some point on a short-run marginal cost curve.

If the output to be produced is OA, then in the long run it must be produced on point P on the short-run average cost curve SAC and the long-run average cost curve LAC, because only point P minimizes the cost for output OA. Corresponding to point P on SAC1 and LAC, there is a point R on the short-run marginal cost curve SMC1. Then AR is the relevant short-run marginal cost for output OA in the long run. Therefore,

the point R must lie on the long-run marginal cost curve corresponding to output OA.

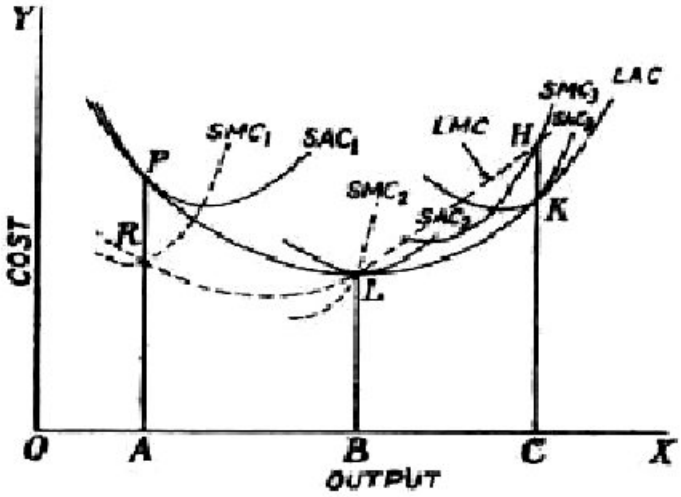


Fig. 12.8 Long-Run Marginal Cost Curve

If the output OB is to be produced, then in the long run it will be produced on point L on the short-run average cost curve SAC2 and long run average cost curve LAC. L is also the point on the short-run marginal cost curve SMC2 corresponding to output OB. Therefore, point L must also lie on the long-run marginal cost curve corresponding to output OB.

Similarly, if output OC is to be produced, then in the long run it must be produced on point K of the short-run average cost curve SAC2. Corresponding to K on SAC2, the relevant point on the SMC3 is H. Therefore, H must also lie on the long-run marginal cost curve corresponding to output OC.

By joining points such as R, L and H, we get long-run marginal cost curve LMC. The long-run marginal cost curve, like the long-run average cost curve, is U-shaped.

It is clear from Fig. 12.8 that the long-run marginal cost curve is flatter than the short-run marginal cost curves. This is what one would expect, because the U-shape of the long-run average cost curve is less pronounced than that of the short-run average cost curves. The relationship between the long-run marginal cost curve and long-run average cost curve is the same as that between marginal cost curve and short-run average cost curve. That is, when the long-run marginal cost curve lies below long-run average cost curve, the latter is falling and when the LMC curve lies above LAC curve, the latter is rising. The long-run marginal cost curve cuts the long-run average cost at the latter's lowest point. This is so because long-run marginal cost is equal to the long-run average cost when the latter is neither rising nor falling.

12.11 OPTIMUM FIRM

As output is increased with a given plant, production becomes more and more economical. This is due to the economies of scale. After a stage, however, a point of minimum cost is reached and it becomes uneconomical to expand the business any further. At this point, the average cost of production is the lowest. This is regarded as the optimum level of production for the firm concerned. It is thus the ideal size of the firm with minimum cost per unit.

The concept of the optimum firm can be explained with the help of Fig. 12.9 OX and OY are the two axes. Along OX are represented the units of output and along OY the cost of production. LAC is the long-run average cost curve and shows average cost of production at various levels of output in the long run. Obviously, the firm is of the optimum size when it produces OM output with the plant of short-run average cost SAC4. At this level, it has the minimum average cost, i.e., TM. If the size of the plant is increased, various diseconomies of scale will emerge and as a result of them, average cost of production will rise. Similarly, if the size of the plant is smaller than that represented by SAC4, the average cost of production will rise, because in this case owing to the smallness of the plant, all the economies of scale will not be available.

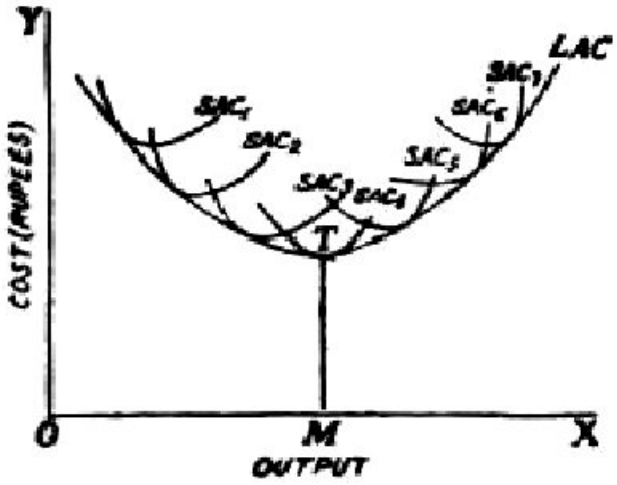


Fig. 12.9 Optimum Firm

Thus, SAC4 represents optimum plant and OM is the least-cost output of this plant. An optimum firm is that firm which is producing optimum output (i.e., least cost output) with the optimum plant. The optimum scale of plant is the most efficient scale of plant. Its short-run average cost touches the minimum of the long-run average cost curve.

Various factors discussed under internal and external economies determine the size of the optimum firm.

12.12WHY LAC CURVE FIRST FALLS AND THEN RISES

That the LAC curve slopes downward as the scale of production is enlarged is due to the various economies of scale, e.g., (1) larger scope of specialization of labour, (2) increasing use of specialised machinery, (3) other technological improvements.

The LAC curve rises after a point because of the various diseconomies of scale. e.g., rising cost of the inputs and the difficulty of management, etc.

(These economies and diseconomies have already been discussed in detail in a previous chapter).

12.13 SUMMARY

The cost of production of an individual firm operating in a market has an important influence on a market supply of commodity. It is very necessary to have a clear ???? about the concept of cost output relationship.

12.14 FURTHER STUDY

1. K. K. David—Modern Economic Theory.
2. D. M. Mithani—Modern Economic Analysis.
3. A. Koutsoyiannis—Modern Micro Economic.
4. H. L. Ahuza—Advanced Economic Analysis.
5. V. C. Sinha—Advanced Economics.

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Managerial Economics

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4

PRODUCTION AND REVENUE ANALYSIS

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UNIT-13

PRODUCTION CONCEPTS

OBJECTIVES

After going through this unit, you should be able to understand:

After going through this unit, you should be able to understand :

- The concept and rules relevant for the production decision analysis;
- The approaches towards production concepts;
- The conditions required for increasing utility and efficient production.

STRUCTURE

13.1 INTRODUCTION

In Economics the term production means process by which a commodity(or commodities) is transformed in to a different usable commodity. In other words, production means transforming inputs(labour ,machines ,raw materials etc.) into an output. This kind of production is called manufacturing. The production process however does not necessarily involve physical conversion of raw materials in to tangible goods . it also includes the conversion of intangible inputs to intangible outputs . For example , production of legal, medical ,social and consultancy services- where lawyers, doctors, social workers consultants are all engaged in producing intangible goods. An „input` is good or service that goes in to the process of production and "out put is any good or service that comes out of production process.

13.2 PRODUCTION CONCEPT

Production is a concept related to the economic process of converting inputs into outputs. Production uses resources to create a good or service that is suitable for use, gift-giving in a gift economy, or exchange in a market economy. This can include manufacturing, storing, shipping, and packaging. Some economists define production broadly as all economic activity other than consumption. They see every commercial activity other than the final purchase as some form of production.

Production is a process, and as such it occurs through time and space. Because it is a flow concept, production is measured as a "rate of output per period of time". There are three aspects to production processes:

1. the quantity of the good or service produced,
2. the form of the good or service created,
3. the temporal and spatial distribution of the good or service produced.

A production process can be defined as any activity that increases the similarity between the pattern of demand for goods and services, and the quantity, form, shape, size, length and distribution of these goods and services available to the market place. The processes and methods employed to transform tangible inputs (raw materials,semi finished goods, or subassemblies) and intangible inputs (ideas, information, knowledge) into goods or services.

An empirical production function is generally so complex to include a wide range of inputs: land, labour, capital, raw materials, time, and technology. These variables form the independent variables in a firm's actual production function. A firm's long-run production function is of the form:

$$Q = f(Ld, L, K, M, T, t)$$

where

Ld = land and building;

L = labour;

K = capital;

M = materials;

T = technology;

and, t = time.

For sake of convenience, economists have reduced the number of variables used in a production function to only two: capital (K) and labour

(L). Therefore, in the analysis of input-output relations, the production function is expressed as:

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

Above equation represents the algebraic or mathematical form of the production function. It is this form of production function which is most commonly used in production analysis.

As implied by the production function , increasing production, Q, will require K and L, and whether the firm can increase both K and L or only L will depend on the time period it takes into account for increasing production, that is, whether the firm is thinking in terms of the short run or in terms of the long run.

Economists believe that the supply of capital (K) is inelastic in the short run and elastic in the long run. Thus, in the short run firms can increase production only by increasing labour, since the supply of capital is fixed in the short run. In the long run, the firm can employ more of both capital and labour, as the supply of capital becomes elastic over time. In effect, there exists two types of production functions:

- The short-run production function
- The long-run production function

The Short- and Long-Run Production Functions

The short-run production function, often referred to as the single variable production function, can be written as:

$$Q = f(L)$$

In the long-run, both capital (K) and labour (L) is included in the production function, so that the long-run production function can be written as

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

Assumptions of Production Function

A production function is based on the following assumptions:

(i) Perfect divisibility of both inputs and output;

(ii) There are only two factors of production –capital (K) and lacour (L);

(iii) Limited substitution of one factor for the other;

(iv) Technology is given technology

(v) Inelastic supply of fixed factors in the short-run.

13.4 FACTORS OF PRODUCTION

This term refers to inputs or resources; these terms are used interchangeably in this text. They refer to anything used in the production and distribution of goods and services. When economists use the term factors of production they usually classify them into four, categories: land, labour , capital and Entrepreneurship.

a. Land

Land is really a combination of two different factors. First, there is the area of land that is needed to produce the good. This may be agricultural land, factory area, shop space, warehouse space or office space. Second, land relates to all natural resources, that is anything that comes from the surface of the land, underneath it or on top of it. Thus we include minerals, crops, wood, and even water and air, though it may seem strange to refer to these as land.

b. Labour

Labour is the easiest of the factors to understand, the input of labour being measured in number of workers, or more precisely, in number of hours worked. Of course, labour is not homogeneous and manual labour is often divided into unskilled, semi-skilled and skilled categories. Labour also includes administrative and managerial workers, though some empirical studies have omitted this important input. In practice we may wish to distinguish between these different categories of labour, especially if we want to evaluate their different contributions to output, as will be seen.

c. Capital

This term can again be confusing to students. It does not refer to money, or to capital market instruments; rather it refers to capital goods, that is plant and machinery. Like labour, this is a highly heterogeneous category, and in practice we might want to distinguish between different types of capital, again especially if we want to evaluate their different contributions to output. For example, we may want to classify personal computers, photocopying machines, printers, fax machines and coffee machines separately.

d. Entrepreneurship

Entrepreneurship refers to the ability to identify and exploit market opportunities. It therefore includes two separate functions. This input is often not considered in economic analysis; it is really more relevant in long-run situations, and it is notoriously difficult to measure. For one thing it is difficult to separate entrepreneurship from management; top management should be concerned with both the functions of entrepreneurship, if they are truly representing the interests of shareholders.

Fixed and Variable Factors of Production

Consider a firm that produces a single good. In order to produce this good, the firm must employ or purchase a number of different factors of production. The firm's production decision is to determine how much of each factor of production to employ.

In the short-run, some of the factors of production that the firm needs are available only in fixed quantities. For example, the size of the firm's factory, its machinery, and other capital equipment cannot be varied on a day-to-day basis. In the long-run, the firm can adjust the size of its factory and its use of machinery and equipment, but in the short-run, the quantities of these factors of production are considered fixed. The short-run is defined as the period during which changes in certain factors of production are not possible. The long-run is defined as the period during which all factors of production can be varied.

Technical Efficiency and Economic Efficiency

The efficiency can be technical and economic

a. Technical efficiency

This means that a firm is producing the maximum output from given quantities of inputs. Any production function assumes that a firm is operating at techni- cal efficiency. It follows from this that a given output may be produced in many ways, each one of which may be echnically efficient; in other words, that output is the maximum output that can be produced from each different combination of inputs.

b. Economic efficiency

This involves producing a given output at least cost. This usually involves a unique combination of inputs, thelevels of hese inputs depending on their substitutability and complementarities, and also on their prices.

Activity 1

1. Define Production function? Differentiate short run and long run production function.

_____

_____

_____

2. What do we mean by technically efficient firm and economically efficient firm? Discuss.

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_____

3. Discuss fixed and variable factors of production.

_____

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13.5 PRODUCTION FUNCTION WITH ONE VARIABLE INPUT

LAW OF VARIABLE PROPORTION

The law of variable proportion is one of the fundamental laws of economics. It is the generalized form of Law of Diminishing marginal return. The law of variable proportion is the study of short run production function with some factors fixed and some factors variable.

In the short run the volume of production can be changed by altering variable factors only. In the study of production function (variable proportion) the effect on output is examined by varying factor proportions. When we increase the quantity of variable factors to the combination of fixed factor, the proportion between fixed and variable factors change. The change in factor proportion and its effect on output forms the subject- matter of the law of variable proportions.

The ratio of variable factor to the fixed factor changes as the variable factors are increased in the combination. Thus the main thing to be noted is the break of proportion between fixed and variable factors of production. With disproportionate combination of factors, the returns may initially increase then remain constant for sometime and ultimately diminishes.

Therefore, the law of variable proportion is called non-proportional returns. The law can beexplained with an example. Supposing there are two factors-land and labor. Land is fixed and labor is variable factor. Further we have one acre of land and 2 laborers. The ratio of land to labor is 1:2. To increase the production 3 labors are employed with the same plot of land. The new ratio will be 1:3.

The variation in the ratio of the inputs causes a change in the size of production at various rates. The law of variable proportions or diminishing returns has been stated by Benham in the following manner.

"As the proportion of one factor in a combination of factors is increased, after a point, first the marginal and then the average production of that factor will diminishing".

Assumptions of the Law:

(i) The state of technology is assumed be given and unchanged.

(ii) The law specially operates in the short run because some factors are fixed and the proportion between factors is disturbed.

(iii) Variable factor units are homogeneous or identical in amount and quality.

(iv) The law is based on the possibility of varying the proportions in which the various factors can be combined to produce a product.

Explanation of the law:

The law can be explained with help of a table 13.1 . The behaviour of output as a result of change in the proportion of variable factors to the fixed factor can be studied through three stages. The table given below explains the short run production function of a firm with some factors variable.

Fixed Inputs (Land Capital)	Variable Resource (labor)	Total Produce (TP Quintals)	Marginal Product (MP Quintals)		Average Product (AP Quintals)
30	1	10	10	Increasing marginal return	10
30	2	25	15		12.5
30	3	37	12	Diminishing marginal returns	12.3
30	4	47	10		11.8
30	5	55	8		11.0
30	6	60	5		10.0
30	7	63	3		9.0
30	8	63	0	Negative marginal returns	7.9
30	9	62	-1		6.8

Table 13.1

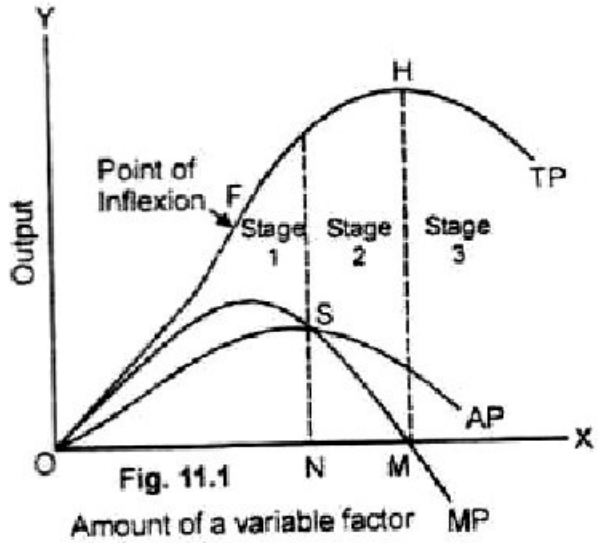

Fig. 11.1

Figure 13.1 Diagrammatic Representation

Any change of variable factor to the fixed factor changes the output. The changes due to change in Win in the factors on the total product, average. Product and the marginal product are shown in the table. As the number of laborers increases from 1 to 2, marginal as well as the average product increases. But with the further addition of labour units the average product falls and the marginal falls more speedily.

Average and marginal product continue to fall as more men are put to work. The 7th labour unit adds nothing to total production. After the 7th unit of labour, the eighth labour causes the total product to diminish. In other words the marginal productivity of 8th labour is negative.

In figure 13.1 OX axis measures quantity of variable factors. OY-axis measures output. In the diagram quantity of the variable factor is increased. Total product rises at first, remains constant at point N, and then starts falling. Average product and marginal product curves are represented by AP and MP. AP and MP curve also rise and decline. MP curve starts declining earlier than the AP curve. The behaviour of these total, average and marginal products of the variable factor as a result of the increase in its amount is generally divided into three stages.

Stage-I (Increasing Return)

Total product increases at an increasing rate to the point F. corresponding to the point F marginal product increases up to this level. From the point F total product goes on rising at a diminishing rate and marginal product starts falling -but is still higher than average product and the AP continues to rise. 1st stage ends where MP curve cuts AP curve from above.

Stage-II (Diminishing Return)

The second stage begins from the point of intersection of AP and MP curves and ends at that point where" MP is zero. At this stage both MP and AP go on falling and both of them are positive. The total product goes on rising at a diminishing rate. This stage is known as the stage of diminishing return. This is stage where a firm wishes to operate.

Stage-Ill (Negative Return)

In the third stage marginal product of variable factor is zero. MP curve cuts the OX-axis at point M. In this stage the total product starts diminishing. Total product continues to decline. As MP is negative this stage is also known as the stage of negative return.

By examining the table and its graphical presentation in Figure we can establish the following relationship between TP, MP, and AP curves.

a) If MP > 0, TP will be rising as L increases. The TP curve begins at the origin, increases at an increasing rate and then increases at a decreasing rate. The MP reaches at maximum which corresponds to an inflection point (x) on the TP curve. At the inflection point, the TP curve changes from increasing at an increasing rate to increasing at a decreasing rate.

b) If MP = 0, TP will be constant as L increases. The TP is constant.

c) If MP < 0, TP will be declining as L increases. The TP declines .

The Law of Diminishing Marginal Returns

The slope of the MP curve in Figure illustrates an important principle, the law of diminishing marginal returns . As the number of units of the variable input increases, the other inputs held constant (fixed), there exists a point beyond which the MP of the variable input declines. This law says is that MP may rise or stay constant for some time, but as we keep increasing the units of variable input, MP should start falling. It may keep falling and turn negative, or may stay positive all the time.

Three things should be noted concerning the law of diminishing marginal returns.

1. This law is an empirical generalization, not a deduction from physical or biological laws.
2. It is assumed that technology remains fixed. The law of diminishing marginal returns cannot predict the effect of an additional unit of input when technology is allowed to change.
3. It is assumed that there is at least one input whose quantity is being held constant (fixed). In other words, the law of diminishing marginal returns does not apply to cases where all inputs are variable.

Stages of Production

Based on the behaviour of MP and AP, economists have classified production into three stages:

Stage 1: MP > 0, AP rising. Thus, MP > AP.

Stage 2: MP > 0, but AP is falling. MP < AP but TP is increasing (because MP > 0).

Stage 3: MP < 0. In this case TP is falling.

These results are illustrated in Figure . No profit-maximizing producer would produce in stages I or III. In stage I, by adding one more unit of labour , the producer can increase the AP of all units. Thus, it would be unwise on the part of the producer to stop the production in this stage. As for stage III, it does not pay the producer to be in this region

because by reducing the labour input the total output can be increased and the cost of a unit of labour can be saved. Thus, the economically meaningful range is given by stage II.

Activity 2

1. Define law of variable proportion ? Explain the law in detail.

2. Which stage is best for production and why? Discuss.

3. Discuss which factors decide the variations in total product.

13.6 PRODUCTION FUNCTION WITH TWO VARIABLE INPUT

Now we consider the case of production where two inputs (say capital and labour) are variable. Although, we restrict our analysis to two variable inputs, all of the results hold for more than two also. We are restricting our analysis to two variable inputs because it simply allows us the scope for graphical analysis. When analysing production with more than one variable input, we cannot simply use sets of AP and MP curves like those discussed in last section, because these curves were derived holding the use of all other inputs fixedand letting the use of only one input vary. If we change the level of fixed input, the TP, AP and MP curves would shift. In the case of two variable inputs, changing the use of one input would cause a shift in the MP and AP curves of the other input. For example, an increase in capital would probably result in an increase in the MP of labour over a wide range of labour use.

Production Isoquants

An isoquant is a curve that shows various input combinations that yield the same total quantity of output. It is assumed that the output involved is the maximum that can be produced from those combinations of inputs. Thus the position or equation of an isoquant can be derived from the production func- tion. It corresponds to the concept of an

indifference curve in consumer theory, and has analogous properties. For example we can talk of an isoquant map, where each curve represents a greater quantity of output as one moves further away from the origin.

Properties

The three main properties of isoquants are:

1. **Negative slope :** This is because the inputs are usually assumed to be substitu- table for each other; if a firm uses more of one input it needs less of another.
2. **Convexity :** This means that their slope is decreasing from left to right; the reason for this relates to the properties of the marginal rate of technical substitution, explained shortly.
3. **Non-intersection :** It is technically possible for isoquants to intersect, as will be seen in the next section, but this will not occur in the economically feasible range of output. If curves intersect it means that a certain output is being produced using more of both inputs, and this is obviously not efficient in economic terms.

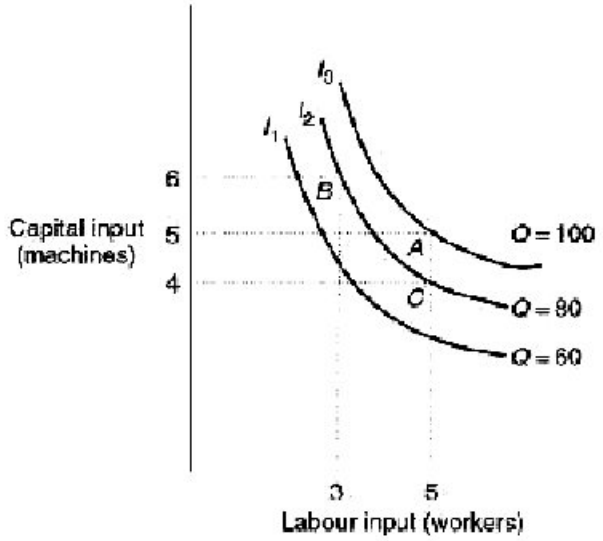

Figure 13.2 Isoquants in Isoquant Map

Figure 13.2 shows an isoquant map, Points A, B and C correspond to the values indicated in the table. Thus it can be seen that the output of 80 units can be achieved by using either six machines and three workers (point B) or four machines and five workers (point C). On the other hand, in order to produce 100 units of output it is necessary to use five machines and five workers (point A), though other combinations involving fractions of inputs) can also produce the same output. It should be noted that the isoquant for the output of 100 units starts to curve upwards as more than seven workers are used; this is because it is not possible to produce 100 units with less than five machines. The maximum output from using only four machines is 90 units, no matter how much labour is used.

The marginal rate of technical substitution

The marginal rate of technical substitution (MRTS) is a measure of the degree of substitutability between two inputs. More specifically, the MRTS of X for Y corresponds to the rate at which one input (X) can be substituted for another (Y), while maintaining total output constant. It is shown by the absolute value of the slope of the isoquant; thus in moving from point B to point C the MRTS is 1, meaning that if two more workers are used we can give up two machines and still produce 80 units of output. The slope of the isoquant is decreasing in absolute magnitude from left to right. This means that as more and more labour is used to produce a given output, the less easily the capital input can be substituted for it. The reason for this is the occurrence of the law of dimin- ishing returns, explained in the previous section. Thus as more labour is used and less capital, the marginal product of additional labour falls and the mar- ginal product of the capital lost increases. It means that as less and less machinery is used it becomes harder to produce a given output with increasing amounts of labour.

At this stage another parallel with consumer theory can be seen: in that case the slope of the indifference curve was shown by the marginal rate of substitution (MRS). This was also decreasing in absolute magnitude from left to right, because of the law of diminishing marginal utility.

It was also seen that the MRS was given by the ratio of the marginal utilities of the two products. It should not be too difficult for the reader to draw another parallel at this point: the MRTS is given by the ratio of the marginal products of the two inputs. The mathematical proof of this is analogous to the one relating to the MRS.

When the firm moves from point B to point C it gains output from using more labour, given by $\Delta L x MP_L$, and it loses output from using less capital, given by $\Delta K x$ MPK. Since the points are on the same isoquant and therefore must involve the same total output, the gains must equal the losses, thus:

$$\Delta L \text{ X MPL} = \Delta K \text{ X MPK}$$

Since the slope of the isoquant is given by $\Delta K / \Delta L$, we can now express the absolute magnitude of the slope as:

$$\Delta K / \Delta L = \text{MPL} / \text{MPK}$$

There are two extreme cases of input substitutability.

Zero substitutability occurs when the inputs are used in fixed proportions, for example when a machine requires two workers to operate it and cannot be operated with more or less than this number of workers. Isoquants in this case are L-shaped, meaning that the MRTS is either zero or infinity. Perfect substitutability is the opposite extreme, resulting in linear isoquants; this means that the MRTS is constant. It also implies that

output can be produced using entirely one input or the other. These extremes are shown in Figure 13.3

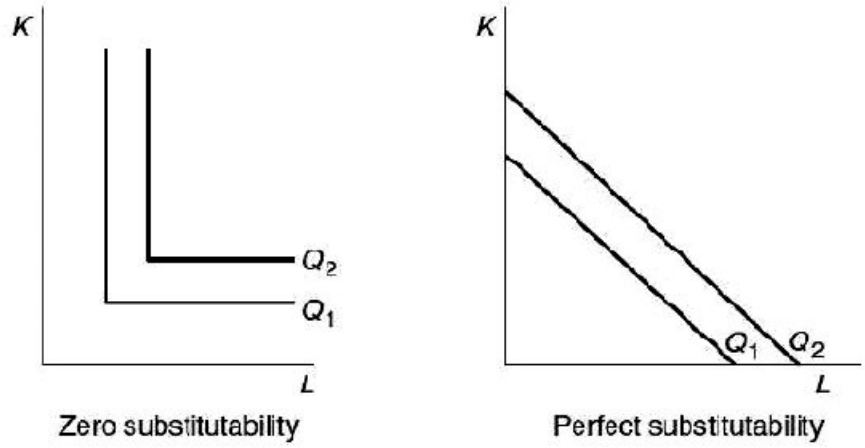

Figure 13.3 Extreme cases of input substitutability

13.7 THE OPTIMAL COMBINATION OF INPUTS

The isoquants that were considered in the previous analysis all assume that the firm is producing with technical efficiency, which, as we have seen, means that the outputs involved are assumed to be the maximum that could produced from the combinations of inputs employed. However, for each iso- quant there is only one combination of inputs that is economically efficient, meaning minimizing cost, given a set of input prices. The determination of this input combination requires information regarding both the production function, determining the relevant isoquant, and the prices of the inputs employed. This involves moving into aspects of cost analysis, the subject of the next chapter, but there is a difference of perspective. At this point it is assumed that there is a target level of output that is given.

a. Isocost Lines

The prices of the inputs can be used to compute an isocost line. This line shows the different combinations of inputs that can be employed given a certain level of cost outlay. We can now see that an isocost line corresponds to the concept of a budget line in consumer theory. Thus the slope of the isocost line is given by the ratio of the input prices, PL/PK. Likewise we can derive the firm's optimal position in the same way that we derived the consumer's optimal position.

Let us at this point review the concept of the consumer's optimal position or equilibrium, since it will shed light on the similarities of, and differences between, the optimization procedures involved. In consumer theory the objec- tive was to maximize total utility subject to a budget

constraint. The objective that we are now considering in production theory is to minimize cost subject to an output constraint, meaning that we have to produce a certain output. This is called the dual of the problem in consumer theory; this corresponds to a kind of mirror image. The differences are as follows:

1. The objective is one of minimization rather than maximization.
2. The isoquants represent maximum outputs that are constraints in produc- tion theory, whereas indifference curves represent utilities that are to be maximized in consumer theory.
3. Isocost lines represent costs that are to be minimized in production theory, whereas budget lines represent budgets that are constraints in consumer theory.

In spite of dealing with the 'mirror image' of the problem in consumer theory we can essentially use the same technique of analysis. The optimal point is where the isoquant is tangential to the lowest isocost curve. This is the 'mirror image' of the optimal point in consumer theory, where the budget line is tangential to the highest indiffer- ence curve.

For example in any company if labour costs £400 per worker per week and capital costs £500 per machine per week. The isocost line C1 represents a total cost of £3,000 per week, C2 represents £4,000 per week and C3 represents £5,000 per week. It can be seen from the graph that the minimum cost to produce an output of 80 units is £4,000, shown by point C, and that the input combination required is five workers and four machines.

Other combinations of inputs required to produce the same output would cost more than £4,000; for example, the combination at point B, three workers and six machines, costs £4,200

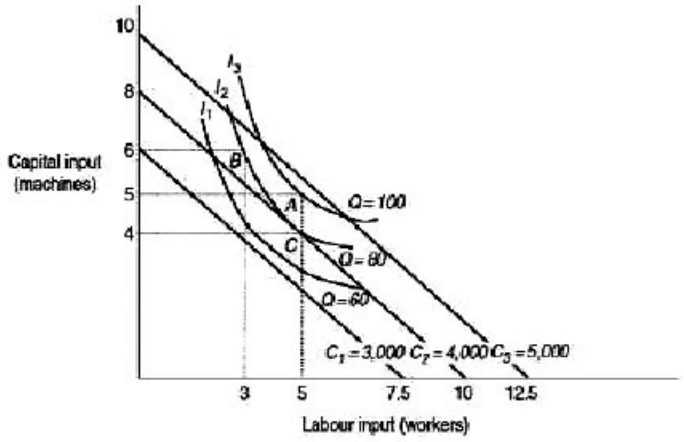

Figure 13.4 Determining the optimal combinations of inputs

b. Conditions for cost minimization

The cost minimization problem can be examined in more general terms. We have just seen that the condition for optimality is that the

isoquant is tangen- tial to the lowest isocost curve. Thus we can equate the slopes of the two curves. The slope of the isoquant is given by the marginal rate of technical substitution, which we have also seen to be given by the ratios of the marginal products, MPL/MPk. The isocost line has the equation:

$$C = P_L L + P_K K$$

where PL and PK represent the prices of labour and capital. The slope of this line, in absolute terms, is given by the ratio of the input prices, PL / PK. Thus:

$$MP_L / MP_K = P_L / P_K; \text{ or } MP_L / P_L = MP_K / P_K$$

This means that a firm should produce using the combination of inputs such that the ratio of the marginal product of each input to its own price is equal across the last units employed of all inputs. This principle can be generalized to apply to any number of inputs. It is analogous to the principle in consumer theory that a consumer should spend so that the marginal utility of the last unit of money spent on each product is the same. This was expressed mathematically as:

$$MU_X / P_X = MU_Y / P_Y$$

c. Dual nature of the optimization problem

It has already been indicated that the optimization problem in production theory is in many ways the mirror image of the optimization problem in consumer theory. However, in saying this we are assuming that the nature of the firm's situation is that it has a given target output which it is trying to produce at minimum cost. This is not always the situation. For example, in the public sector the budget may be the given factor and the objective may be to produce the highest output with that given level of budget. This is an output- maximization problem rather than a cost-minimization problem and it exactly parallels the situation of utility maximization in consumer theory. The optimal combination of inputs is again given by the point where the isocost line (in this case a fixed single line) is tangential to the highest isoquant (in this case a variable line).

d. Changes in input prices

The levels of input prices determine the position and slope of the isocost curves. If the relative prices of the inputs change this will affect the slope of the curves, which we have seen is given by PL/PK. If, for example, labour becomes more expensive relative to capital the slope of the isocost curves will become steeper. This will result in the point of tangency moving along the relevant isoquant, upwards and to the left, and a higher level of cost, assuming a given target output. Not surprisingly, less of the more expensive input is used than before, and more of the input that is now relatively cheaper. The situation is illustrated in Figure 13.5 In this example it is assumed that the labour input increases in price from £400 to £500 per week. The isocost curve C'

= 4,000 shows the effect of the price increase and the fact that the output of 80 units can no longer be achieved at the cost of £4,000. To attain this output, assuming economic efficiency, now involves a cost outlay of about £4,400.

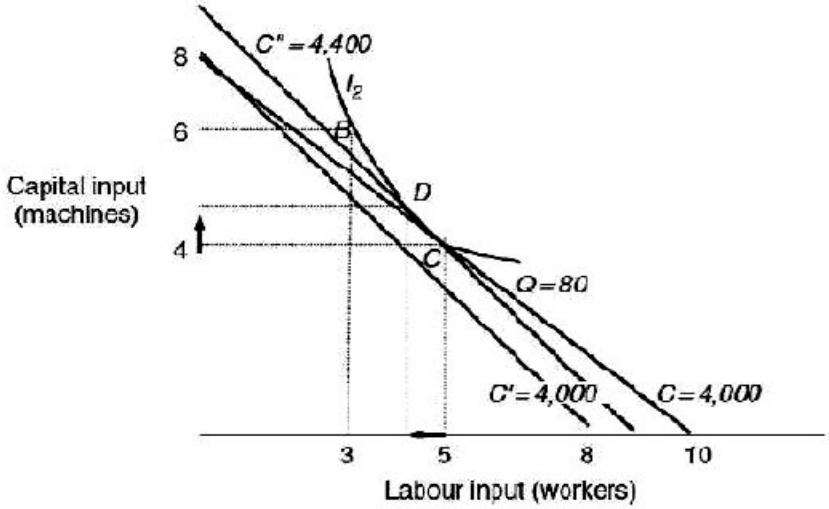

Figure 13.5 Effect of changes in input prices.

e. Expansion paths

Another application of this type of analysis is to consider what happens when the firm's target output increases, or to express the situation in terms of its dual, when the firm's budget increases. As the firm attains higher and higher output levels the optimal combinations of inputs involved will trace an expansion path. This is illustrated in Figure 13.6 The expansion path goes through all the points of tangency, X, Y and Z. This path can be used to determine the long-run relationships between cost and output. The graph in Figure 13.6 assumes that the prices of the inputs remain constant, or at least that their ratio remains constant.

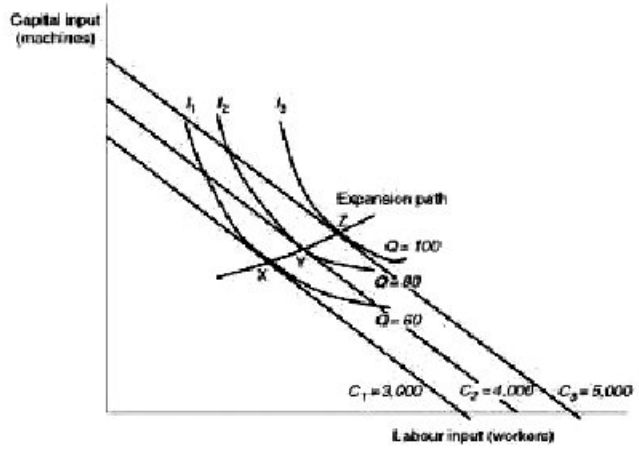

Figure 13.6 Derivation of Expansion Path.

Activity 3

1. Define Isoquants? Discuss the properties of isoquants.

2. Discuss the marginal rate of technical substitution.

3. Discuss optimal combinations of inputs.

UNIT 14

ECONOMIES AND DISECONOMIES OF SCALE , THEORY OF PRODUCTION

OBJECTIVES

After going through this unit, you should be able to understand :

- The economies and diseconomies of scale ;
- The law of returns to scale.

STRUCTURE

14.1 INTRODUCTION

Economies and diseconomies of scale are of two types- internal and external. Internal economies and diseconomies are those which a firm reaps as a result of its own expansion. On the other hand, external economies and diseconomies are those which a firm accrues as a result of the growth of industry as a whole. They are external because they accrue to the firms from outside. The internal economies and diseconomies of scale affect the shape of the long run average cost curve. Internal economies of scale cause the long run average cost to fall, while internal diseconomies of scale causes the long run average cost to rise as output increases. On the other hand, external economies and diseconomies of scale affect the position of both the short run and long run average cost curves. External economies shift down the cost curve, while external diseconomies shift up the cost curve.

14.2 ECONOMIES OF SCALE

Economies of scale (EOS) can be defined as aspects of increasing scale that lead to falling long-run unit costs. They can be classified in various ways,

1. Internal Economies of Scale

Internal economies of scale are the advantages of large scale production. They are enjoyed by the firm when it increases its scale of production. They accrue to the firm from their own actions. They affect the shape of the long-run average cost curve. They are responsible for increasing returns to scale. According to many economists, internal economies arise due to indivisibility of some factors. As the output increases the large indivisible factors can be used more efficiently and, therefore, the firm experiences increasing returns to scale.

A) Real Economies of Scale

Real economies are delineated as those which are associated with a reduction in the physical quantity of inputs such as raw materials, varying types of labour and various types of capital. They are mostly associated with indivisibilities or lumpiness of units of factors of production. The important kinds of real economies are:

1. Production economies
2. Marketing economies
3. Managerial economies
4. Transport and storage economies

1. **Production Economies:** Production economies arise from the use of factors of production in the form of (i) labour economies (ii) technical economies and (iii) inventory economies.

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

the 'cumulative effect'. This 'cumulative volume' experience leads to higher productivity. Hence, as the size of output increases the unit cost falls.

- **Technical Economies:** The important technical economies result from the use of specialized capital equipment, which comes into effect only when the output is produced on a large scale. Technical economies also arise from the indivisibilities, which are the characteristics of the modern techniques of production. In other words, as the scale of production increases the firm reaps the advantages of mechanization of using mass production methods. This will reduce the unit cost of production.
- **Inventory Economies :** The role of inventories is to aid the firm in meeting random changes in the input and the output sides of the operations of the firm. The purpose of inventories is to smooth out the supply of inputs and the supply of outputs. Inventories on spare parts, raw materials and finished products increase with the scale of production, but they do not increase proportionately with the increase in the size of output. Therefore, as the size of output amplifies the firm can hold smaller percentage of inventories to meet random changes.

2. **Marketing Economies:** They are allied with the selling of the product of the firm. They arise from advertising economies. Since, advertising expenses increase less than proportionately with the increase in output, the advertising costs per unit of output falls as the output increases. Similarly, other sales promotion expenditures like samples, salesmen force etc. also increase less than proportionately with the output. Further, a large firm can have special arrangements with exclusive dealers to maintain a good service department for the product of the firm. Hence, the average selling costs fall with the increase in the size of the firm.

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

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

B) Pecuniary Economies

Pecuniary economies (i.e. monetary economies) are those economies accrued by the firm from paying lower prices for the factors used in production and distribution of the product due to bulk buying by the firm. They add to the firm on account of discounts it can obtain due to its large scale production. They reduce the money costs of the factors for a particular firm. The pecuniary economies are realised by a firm in the following ways:

- The firm will be able to get raw materials at lower prices due to bulk buying.
- A large firm can get funds at lower cost, that is, at a lower rate of interest due to its reputation in the money market.
- The large firm may be given lower advertising rates if they advertise at large.
- Transport rates may be also low if the amount of commodities transported is large.

2. External Economies

The external economies arise outside the firm as a result of improvement in the industrial environment in which the firm operates. They are external to the firm, but internal to the industry to which the firms belong. They may be realised from the actions of other firms in the same industry or in another industry. Their effect is to cause a change in the prices of factors employed by the firm. They cause a shift in the short-run and long-run cost curves of the firm.

- **Cheapening of Materials and Equipments:** Expansion of an industry increases the demand for various kinds of materials and capital equipments. This will lead to large scale production of materials and equipments. Large scale production will reduce their cost of production and therefore, their prices. Hence, the firms using them will get them at lower prices.
- **Growth of Technical Know-how:** Expansion of an industry may lead to the discovery of new technical know-how. As a result of this the firms may be able to use improved and better machinery which will increase the productivity of the firms and therefore, reduce the cost of production.
- **Development of Skilled Labour:** As the industry grows the training facilities for labour will increase. This helps the

development of skilled labour, which will increase the productivity of workers in the firms.

- **Growth of Subsidiary and Ancillary Industries:** Expansion of an industry may facilitate the growth of subsidiary and ancillary industries to produce tools, equipments, machines etc. and to provide them to the main industry at the lower prices. Likewise, firms may also come up to transform the waste of the industry into some useful products. This tends to reduce the cost of production
- **Development of Transportation and Marketing Facilitates:** The expansion of an industry may expedite the development of transportation and marketing facilities which will reduce the cost of transportation.
- **Development of Information Services:** External economies also arise from the interchange of technical information between firms. With the expansion of an industry the firms may give the information about the technical knowledge through the publication of trade and technical journals. The firms may also set up jointly research institutes to develop new improved techniques.

14.3 DISECONOMIES OF SCALE

Diseconomies of scale (DOS) are aspects of increasing scale that lead to rising long-run unit costs. Again they can be internal or external, physical or monetary, and can arise at the level of product, plant or firm. There are various types of diseconomies of scale:

a. Technical diseconomies

Increased specialization can lead to problems as well as benefits. Workers doing repetitive jobs can suffer from low motivation, which reduces productivity and increases the chance of industrial unrest. The number of days lost through strikes tends to be higher in industries that feature such processes, for example car manufacturing, mining, engineering and transportation and communications. Furthermore, a stoppage in such industries, whether caused by industrial unrest or by some other event like a machine breakdown, can cause the whole production process to come to a halt because of the interdependence of operations.

b. Managerial diseconomies

Large firms are more difficult to manage because communications tend to break down, both vertically and horizontally. This creates inefficiencies as cooperation and co-ordination within the firm suffer. Firms may try to combat this tendency by employing more administrative workers, but this is also going to increase unit costs. This communications problem is a major reason why many large firms are trying to contract

services out to other firms and create flatter organizational structures, for example IBM and GM.

c. Marketing diseconomies

Although larger firms can often gain discounts in buying raw materials in bulk, there may be offsetting disadvantages of buying inputs in large quantities. If the firm is relying on local sources that are in limited supply, the high demand may drive up the price of such inputs; for example, the firm may have to offer higher wages to attract the desired quantity of workers.

d. Transportation diseconomies

Larger firms, particularly if they only use one plant, may face additional transportation costs as they try to increase the size of their market; the average transportation distance of goods to customers will increase. Again the above diseconomies relate only to cost disadvantages of large firms, or conversely the cost advantages of small firms. Larger firms may have other disadvantages, in terms of having less flexibility, a slower speed of response to environmental changes and the reduced ability to offer personal service to their customers.

Activity 1

1. Define Economies of Scale? Discuss internal economies.

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2. Discuss the diseconomies of scale.

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14.4 LAW OF RETURNS TO SCALE

Laws of returns to scale refer to the long-run analysis of the laws of production. In the long run, output can be increased by varying all factors. Thus, in this section we study the changes in output as a result of changes in all factors. In other words, we study the behaviour of output in response to changes in the scale. When all factors are increased in the same proportion an increase in scale occurs.

Scale refers to quantity of all factors which are employed in optimal combinations for specified outputs. The term 'returns to scale' refers to the degree by which output changes as a result of a given change in the quantity of all inputs used in production. We have three types of returns to scale: constant, increasing and decreasing. If output increases by the same proportion as the increase in inputs we have constant returns to scale. If output increases more than proportionally with the increase in inputs, we have increasing returns to scale. If output increases less than

proportionally with the increase in inputs we have decreasing returns to scale. Thus, returns to scale may be constant, increasing or decreasing depending upon whether output increases in the same, greater or lower rate in response to a proportionate increase in all inputs. Returns to scale can be expressed as a movement along the scale line or expansion path which we have seen in the previous section. The three types of returns to scale are explained below.

1. **Constant Returns to Scale**

If output increases in the same proportion as the increase in inputs, returns to scale are said to be constant. Thus, doubling of all factor inputs causes doubling of output; trippling of inputs causes trippling of output to scale is sometimes called linear homogenous production function. This is illustrated with the help of isoquants in Fig. 14. 1 where the line OE is the scale line. The scale line indicates the increase in scale. It can be observed from fig 14.1 that the distance between successive isoquants is equal, that is, Oa = ab = bc. It means that if both labour and capital are increased in a given proportion the output expands in the same proportion.

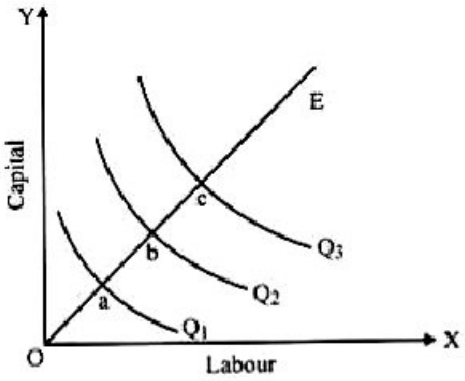

Figure 14.1 Constant Returns to Scale

2. **Increasing returns to scale**

When the output increases at a greater proportion than the increase in inputs, returns to scale are said to be increasing. It is explained in Fig. 14.2. When the returns to scale are increasing, the distance between successive isoquants becomes less and less, that is, Oa >ab >bc. It means that equal increases in output are obtained by smaller and smaller increments in inputs. In other words, by doubling inputs the output is more than doubled.

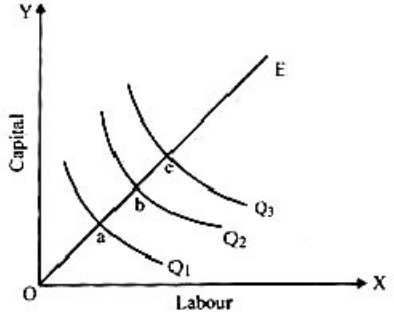

Figure 14.2 Increasing Returns to Scale

3. Decreasing returns to scale

When the output increases in a smaller proportion than the increase in all inputs returns to scale are said to be decreasing. It is explained in Fig 14.3 below.

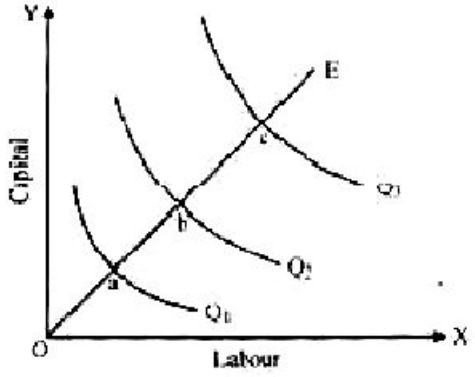

Figure 14.3 Increasing Returns to Scale

It can be seen from Fig. 14.3 that is, Oa < ab < bc. It signifies larger and larger increases in inputs. In other words, if the inputs are doubled, output will increase by less than twice its original level. The decreasing returns to scale are caused by diseconomies of large scale production.

Activity 2

1. Explain the law of increasing return to scale.

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2. Explain the law of decreasing returns to scale.

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UNIT-15

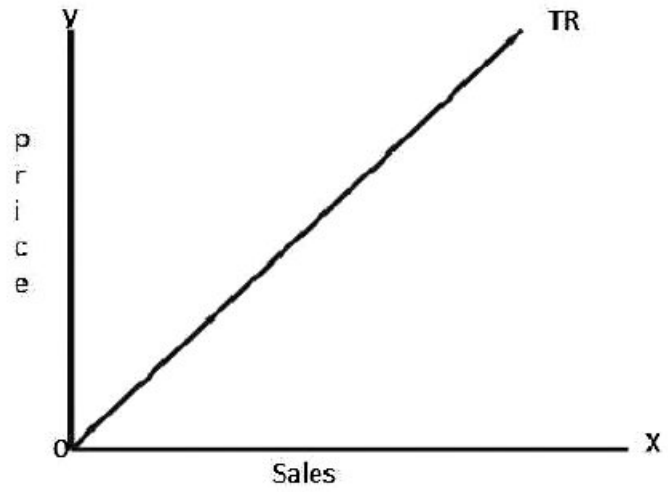
REVENUE ANALYSIS

Total revenue (TR):

Total revenue refers to the total amount of money that the firm receives from the sale of its products, i.e. .gross revenue. In other words, it is the total sales receipts earned from the sale of its total output produced over a given period of ime. We may show total revenue as a function of the total quantity sold at a given price as below:

TR = f (q). It implies that higher the sales, larger would be the TR and vice versa. TR is calculated by multiplying the quantity sold by its price. Thus, TR = PXQ.

For e.g. a firm sells 8000 units of a commodity at the rate of Rs. 4 per unit, then TR would be TR = P x Q = 4 x 8000 = 32000



Average revenue (AR)

Average revenue is the revenue per unit of the commodity sold. It can be obtained by dividing the TR by the number of units sold.

Then, AR = TR/Q AR = 150/15= 10

When different units of a commodity are sold at the same price, in the market, average revenue equals price at which the commodity is sold for e.g. 2 units are sold at the rate of Rs.10 per unit, then total revenue would be Rs. 20 (2x10). Thus AR = TR/Q 20/2 = 10. Thus average revenue means price.

Since the demand curve shows the relationship between price and the quantity demanded, it also represents the average revenue or price at which the various amounts of a commodity are sold, because the price offered by the buyer is the revenue from seller's point of view. Therefore,

average revenue curve of the firm is the same as demand curve of the consumer.

Marginal Revenue (MR):-

It is the additional revenue earned by selling an additional unit of output by the seller. MR differs from the price of the product because it takes into account the effect of changes in price. Suppose a firm is selling 4 units of the output at the price of Rs.14 per unit. Now if it wants to sell 5 units instead of 4 units and thereby the price of the product falls to Rs.12 per unit, then the marginal revenue will not be equal to Rs.12 at which the 5 the unit is sold. 4 units, which were sold at the price of Rs.14 before, will all have to be sold at the reduced price of Rs.12 and that will mean the loss of 2 rupees on each of the previous 4 units. The total loss on the previous units will be equal to Rs.8. Therefore, this loss of 8 rupees should be deducted from the price of Rs.12 of the 5th unit while calculating the marginal revenue.

Total revenue when 4 units are sold at the price of Rs.14=4X14=Rs.56 Total revenue when 5 units are sold at the price of Rs.12=5X12=Rs.60 Therefore, Marginal revenue or the net revenue earned by the 5 th unit = 6056= Rs.4.

Thus, Marginal revenue of the nth unit = difference in total revenue in increasing the sale from n1 to n units or Marginal revenue = price of nth unit minus loss in revenue on previous units resulting from price reduction.

The concept is important in micro economics because a firm's optimal output (most profitable) is where its marginal revenue equals its marginal cost i.e. as long as the extra revenue from selling one more unit is greater than the extra cost of making it, it is profitable to do so. It is usual for marginal revenue to fall as output goes up both at the level of a firm and that of a market, because lower prices are needed to achieve higher sales or demand respectively.

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

= WHERE ▲TR REPRESENT CHANGE IN TR
And ▲ Q indicates change in total quantity sold.
Also MR = TRn – TRn1

Marginal revenue is equal to the change in total revenue over the change in quantity

Marginal Revenue = (Change in total revenue) divided by (Change in sales)

Units	Price	TR	AR	MR
1	20	20	20	-
2	18	36	18	16
3	16	48	16	12
4	14	56	14	8
5	12	60	12	4

According to the table, people will not buy more than 4 units at a price of Rs.14.00. To sell more, price must drop. Suppose that to sell 5 units, the price must drop to Rs.12. What will the marginal revenue of the 5th unit be? There is a temptation to answer this question by replying, Rs.12. A little arithmetic shows that this answer is incorrect. Total revenue when 4 are sold is Rs.56. When 5 units are sold, total revenue is (5) x (Rs.12) = Rs.60. The marginal revenue of the 5th unit is only Rs.4. To see why the marginal revenue is less than price, one must understand the importance of the downward sloping demand curve. To sell another unit, seller must lower price on all units. He received an extra Rs.4 for the 5th unit, but lost Rs.8 on 4 units he was previously selling. So the net increase in revenue was Rs.12 minus Rs.8 or Rs.4.

There is another way to see why marginal revenue will be less than price when a demand curve slopes downward. Price is average revenue. If the firm sells 4 units for Rs.14, the average revenue for each unit is Rs.14.00. But as seller sells more, the average revenue (or price) drops, and this can only happen if the marginal revenue is below price, pulling the average down. If one knows marginal revenue, one can tell what happens to total revenue if sales change. If selling another unit increases total revenue, the marginal revenue must be greater than zero. If marginal revenue is less than zero, then selling another unit takes away from total revenue. If marginal revenue is zero, than selling another does not change total revenue. This relationship exists because marginal revenue measures the slope of the total revenue curve.

Relationship Between Total Average and Marginal Revenue

The revenue of a firm jointly with its costs ascertains profits. Now let us discuss the concepts of revenue. The term revenue denotes to the receipts obtained by a firm from the scale of definite quantities of a

commodity at various prices. The revenue concept relates to total revenue, average revenue and marginal revenue.

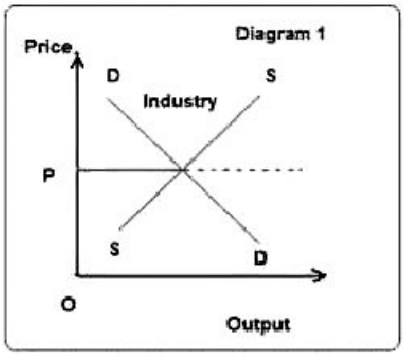
1. Total Revenue – It is the total sale proceeds of a firm by selling a commodity at a given price. If a firm sells 3 units of an article at Rs. 24, its total revenue is 3 x 24. Thus total revenue is price per unit proliferated by the number of units sold, i.e. TR = P x Q, where TR is the total revenue, P the price and Q the quantity.

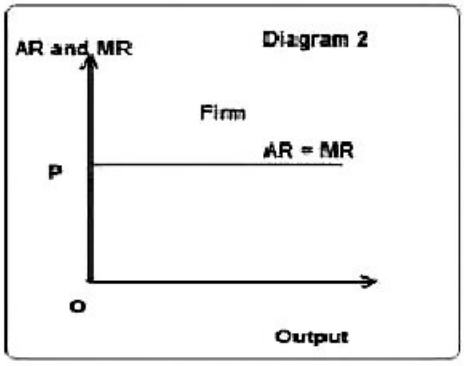
2. Average Revenue – It is the average receipts from the sale of certain units of the commodity. It is obtained by dividing the total revenue by the number of units sold. The average revenue of a firm is in fact the price of the commodity at each level of output since TR = P x Q, therefore, AR = TR / Q = P x Q / Q = P.

3. Marginal Revenue MR – In addition to total revenue as a result of a small hike in the sale of a firm. Algebraically it is the total revenue earned by selling N units of the commodity instead of N-1 i.e., MRn = TRn – TRn-1.

AR and MR under different Situations

1. Under Ideal Rivalry – The average revenue curve is a horizontal straight line parallel to X axis and the marginal revenue curve coincides with it. This is since under ideal rivalry the number of firms selling an identical product is very huge. The price is determined the market forces of supply and demand so that only one price tends to prevail for the whole industry.



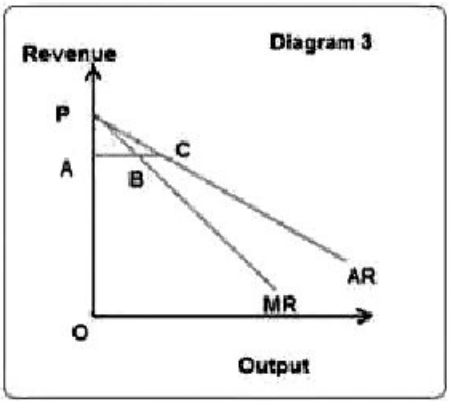


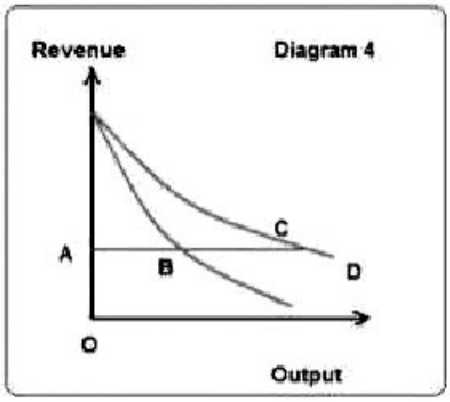
In the diagram 1, each firm can sell as much it wishes at the market price OP. Thus the demand for the firm's product becomes infinitely elastic.

In the diagram 2, since the demand curve is the firm's average revenue curve, the shape of AR curve is horizontal to the X axis at price OP and the MR curve coincides with it. Any change in the demand and supply circumstances will change the market price of the product and consequently the horizontal AR curve of the firm.

2. Under Monopoly or Imperfect Competition, the average revenue curve is the downward inclining industry demand curve and its

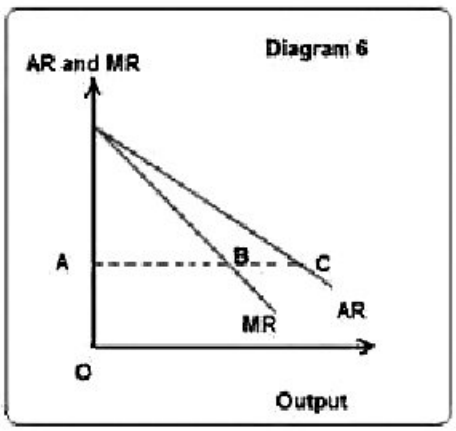
related marginal revenue curve lies below it. The marginal revenue is lower than the average revenue. Given the demand for his product the monopolist can increase his sales by lowering the price, marginal revenue also falls but the rate of fall in marginal revenue is greater than that in average revenue.

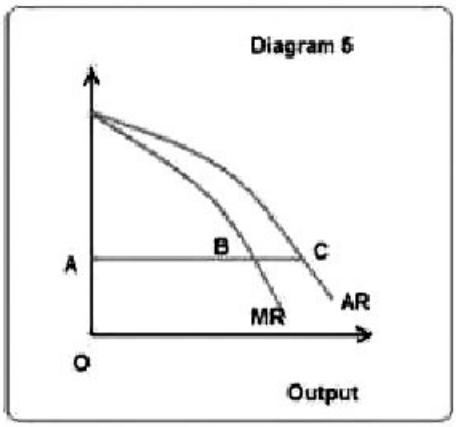




In the diagram 3, the MR curve falls below the AR curve and lie half a way on the perpendicular drawn from AR to Y axis. This relation will always exist amidst straight line downward sloping AR and MR curves.

In diagram 4, AR curve is convex to the origin, the MR curve will cut any perpendicular from a point on the AR curve at more than half – way to he Y axis. MR passes to the left of the midpoint B on the CA.

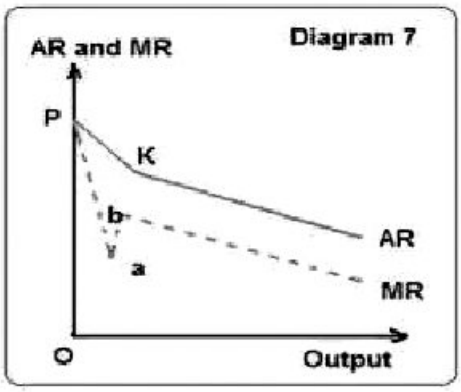


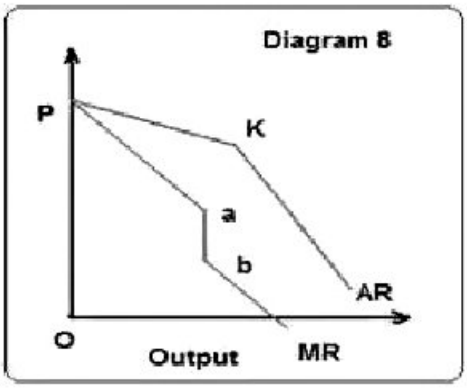


Alternatively, if the AR curve is concave to the origin, MR will cut the perpendicular at less than half way towards y axis, in the diagram 5, MR passes to the right of the midpoint B on the CA.

3. Monopolistic Competition – The relationship between AR and MR is the same as under monopoly. But there is an exclusion that the AR curve is more elastic and it is represented in the diagram 6. This is since products are close substitutes under monopolistic competition. The firm can hikes sales by a reduction in its price.

4. Under Oligopoly – The average and marginal revenue cures do not have a smooth downward slope under oligopoly. They acquire kinks. As the number of sellers under oligopoly is small, the effect a price cut or price hikes on the par of one seller will be followed by some changes in the behaviour of the other firms. If a seller raises the price of his product, the other seller will experience a fall in demand for his product.





His average revenue curve is represented in the diagram 7 becomes elastic after K and its consequent MR curve rises discontinuously from a to b and then persists its course at the new higher level.

Alternatively, if the oligopolistic seller reduces the price of his product, his rival also follows him in reducing the prices of their products so that he is not able to enhance his sales. His AR curve becomes less elastic from K onwards and it is represented in the diagram 8. The consequent MR curve falls vertically from a to b and then slopes at a lower level.

Importance of Revenue Analysis

The AR and MR curves form significant tool for economic analysis.

- Profit Determinants – The A curve is the price line for the producer in all market situations. By relating the AR curve to the AC curve of a firm, it can ascertain whether it is earning supernormal or normal profits or incurring losses. If the AR curve is tangent to the AC curve at the point of equilibrium, the firm earns normal profits. If the AR curve is above AC curve, it makes super normal profits. In case, AR curve is below the AC curve at the equilibrium point, the firm incurs losses.
- Determination of Full capacity – It can also be known from their relationship whether the firm is producing at is full capacity or under capacity. If the AR curve is tangent to the AC curve at its minimum point, under perfect rivalry, the firm produces its full ccapacity. Where it is not so, under monopolistic competition, the firm posses idle capacity.

- Equilibrium Determination – The MR curve when intersected by the MC curve determines the equilibrium position of the firm under all market conditions. Their point of intersection in fact determines price, output, and profit and loss of a firm.
- Factor Pricing Determination – The use of the average marginal revenue helps in determining factor prices. In factor pricing they are inverted U shaped and the average and marginal revenue curves become the average revenue productivity and marginal revenue productivity curves ARP and MRP, also they are useful device in describing the equilibrium of the firm under different market conditions.

Activity

1- Explain the concepts of TR,MR and MR.

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_____

2- How is AR related to MR?

_____

_____

3- State the importance of Revenue Analysis.

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UNIT-16

CAPITAL BUDGETING AND PRACTICES

Significance of Capital Budgeting

The key function of the financial management is the selection of the most profitable assortment of capital investment and it is the most important area of decision-making of the financial manger because any action taken by the manger in this area affects the working and the profitability of the firm for many years to come.

The need of capital budgeting can be emphasized taking into consideration the very nature of the capital expenditure such as heavy investment in capital projects, long-term implications for the firm, irreversible decisions and complicates of the decision making. Its importance can be illustrated well on the following other grounds:-

(1) **Indirect Forecast of Sales :** The investment in fixed assets is related to future sales of the firm during the life time of the assets purchased. It shows the possibility of expanding the production facilities to cover additional sales shown in the sales budget. Any failure to make the sales forecast accurately would result in over investment or under investment in fixed assets and any erroneous forecast of asset needs may lead the firm to serious economic results.

(2) **Comparative Study of Alternative Projects :** Capital budgeting makes a comparative study of the alternative projects for the replacement of assets which are wearing out or are in danger of becoming obsolete so as to make the best possible investment in the replacement of assets. For this purpose, the profitability of each project is estimated.

(3) **Timing of Assets-Acquisition :** Proper capital budgeting leads to proper timing of assets- acquisition and improvement in quality of assets purchased. It is due to ht nature of demand and supply of capital goods. The demand of capital goods does not arise until sales impinge on productive capacity and such situation occurs only intermittently. On the other hand, supply of capital goods with their availability is one of the functions of capital budgeting.

(4) **Cash Forecast :** Capital investment requires substantial funds which can only be arranged by making determined efforts to ensure their availability at the right time. Thus it facilitates cash forecast.

(5) **Worth-Maximization of Shareholders :** The impact of long-term capital investment decisions is far reaching. It protects the interests of the shareholders and of the enterprise because it avoids over-investment and under-investment in fixed assets. By selecting the most profitable projects, the management facilitates the wealth maximization of equity share-holders.

(6) **Other Factors :** The following other factors can also be considered for its significance:-

(a) It assist in formulating a sound depreciation and assets replacement policy.

(b) It may be useful n considering methods of coast reduction. A reduction campaign may necessitate the consideration of purchasing most up-to date and modern equipment.

(c) The feasibility of replacing manual work by machinery may be seen from the capital forecast be comparing the manual cost and the capital cost.

(d) The capital cost of improving working conditions or safety can be obtained through capital expenditure forecasting.

(e) It facilitates the management in making of the long-term plans an assists in the formulation of general policy.

(f) It studies the impact of capital investment on the revenue expenditure of the firm such as depreciation, insure and there fixed assets.

Process of Capital Budgeting

The capital budgeting process is the process used to evaluate capital investments. The decision process might involve projects or assets such as land and equipment. The five steps in this process are,

Generating new ideas:

This is considered the most important step in the capital budgeting process. New ideas come from all levels within an organization and may include things like more land, new equipment, and new lines of business that involve different processes. Idea generation may work in a bottom-up or a top-down fashion, with each level of the organization contributing to the idea screening / development process in a different way.

Reviewing existing projects and facilities:

This process involves the evaluation of assets and resources, and the value associated with how they are currently deployed.

Preparing proposals:

Developing ideas into a presentation format and selling the proposals to the decision makers. Evaluating proposed projects and creating the capital budget: Decision makers determine the risk and value associated with investing in the proposed projects.

Preparing appropriation requests:

The formal request for resources to be applied to the new capital project / asset. These request procedures usually follow procedures specified in corporate policies.

Methods of Capital Budgeting

Capital budgeting methods are those methods which help us to make decisions in investing money in high risk projects, investments and business proposals. Most commonly used techniques are

1. Payback period method
2. Accounting rate of return method
3. Discounted cash flow methods
   - Net present value methods
   - Profitability index method
   - Internal rate of return method

1. Payback period

It is the length of time required to recover the initial cash outlay on the project. This method is based on the principle that every capital expenditure pays itself back within a certain period out of the additional earnings generated from the capital assets.

Payback period =Initial investment/annual cash flows

2. Accounting Rate of Return

Accounting rate of returns is calculated based on the accounting concept of profit rather than cash flow. Under this method the average profit after interest, depreciation and tax is calculated and then is divided by the total capital outlay of the project.

ARR=Average annual profit/net investment*100

Or

ARR=Average annual profit/Average investment*100

3 . Discounted cash flow method

The discounted cash flow method refers to any method of investments project evaluation and selection that adjusts cash flows over time for the time value of money.

There are three methods of discounted cash flow. They are:

Net present value- The sum of the present values of all the cash flows and cash out flows are associated with the project. This is generally considered to be the best method for evaluating the investment proposals.

t - The time of the cash flow

n - The total time of the project

r - The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.)

C_t - the net cash flow (the amount of cash) at time

The decision rule for a project under NPV method is to accept the project if the NPV is positive and reject if it is negative

- NPV>ZERO accept
- NPV<ZERO reject.

Internal rate of return-

It is the actual rate of return expected from an investment. The IRR is the discount rate that makes the investment's net present value equal to zero.

The internal rate of return method is that 'rate of return at which the present value of cash flows and cash out flows are equal.' This technique is known as yield to investment, marginal efficiency of capital, marginal productivity of capital rate of return and time –adjusted rate of return.

The internal rate of return is compared with the required rate of return

If IRR exceeds cutoff rate-accept the project

If IRR is less than cut off rate- reject

NET PRESENT VALUE VS INTERNAL RATE OF RETURN

NPV	IRR
The discounted rate is Predetermined or known are	The discount is not a predetermined one
Cash inflows are reinvested at the cutoff rate.	Cash inflows are reinvested at the internal rate of return
This method is used for the Selection of mutually Exclusive projects	It recognizes time value of money and can be applied in situations with even as well as Uneven cash flow at different Periods of time

$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$$

It takes into account the earnings Over the entire life of the project And the true profatibility of the Proposal can be evaluated

IRR is calculated by locating the PV factor in Annuity table

Calculation of NPV and IRR

Year	Project X
0	75000
1	90000

Rate=10%

Project x

PV factor= .909

Cash flow=90000

Present value=81810

NPV= Present value of cash inflow = 81810

Less-Initial outlay	= 75000
NPV	**6810**

IRR

PV Factor= initial outlay/annual cash flow

75000/90000 = **.8333**

= 20%(using annuity table)

Both the methods are useful in selecting the best possible investment and thereby these methods are widely used.

Activity

Describe the significance of capital budgeting.

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State the limitations of capital budgeting.

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_____

Write a note on methods of capital budgeting.

_____

_____

Uttar Pradesh Rajarshi Tandon
Open University

M.COM-203
Managerial Economics

Block

5

PRICE & PROFIT ANALYSIS

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ENG BLOCK V

MANAGERIAL ECONOMICS

There are four units in this Block V. The first unit of this block is related with structure of market and the market of perfect competition. The next one unit of this block is related with market of imperfect competition which is also known as a market of monopolistic competition. In this unit the market of duopoly, oligopoly & price leadership have also been discussed. The third unit of this block deals with the market of monopoly and the last unit of this block is related with profit theories and policies.

UNIT 17

MARKET AND PERFECT COMPETITION

OBJECTIVES

After reading this unit you should be able to:

- Know the concept and classification of market (forms of market structure).
- Rational of perfect competition.
- Price determination under perfect competition.

STRUCTURE

17.1 INTRODUCTION

Perfect competition is a market structure characterised by a complete absence of rivalry among the individual firms.Thus perfect competition in economic theory has a meaning diametrically opposit to the

every use of this term.In practice businessman use the word competition as synonyms to rivalry. In theory, perfect competition implies no rivalry among firms.

17.2 CONCEPT AND CLASSIFICATION OF MARKET

In common parlaners, by market is meant a place where commodities are bought and sold. There is market for everything which has a price. There are, Thus, markets also for things other than commodities. There is labour market, real estate market, capital market etc. In economics the term market does not reffer to a particular place but it refers to a commodities e.g. when we say a wheat market, we do not refer to a particular place where wheat is bought and sold and when buyers and sellers meet. Market refers to an arrangement where the buyers and seller come in close contact with each other directly or indirectly so that the prices obtained in one part of the market affect the prices paid in another part. With the development of means & transport and communications, buyers and sellers from different part of the world find it convenient to exchange commodities with each other. In a sense, therefore, we have a world or International market for some commodities. We have thus, many markets such as international market, national market, regional market and local market etc.

17.3 FORMS OF MARKET STRUCTURE

The market is a set of commidities in which buyers and sellers come in contact for the purpose of exchange. The market situations vary in their structure. Different market structures effect the behaviour of buyers & sellers, further different prices and trade volumes are influnced by different market structure. Hence the aspect of pricing processes should be analysed in relation to different types of market.

Economists usually classify market structure on the basis of two criteria: The number of firms in the market and the characterstics of product such as whether the products are homogenious or differentiated. Accordingly, the four basis patterns of market structure are commonly distinguished:

1- Pure or perfect competition

2- Monoposly

3- Monopolistic competition

4- Obligopoly

17.4 PERFECT COMPETITION

It is market situtation comprising a larger number if firms selling a

homogenious product. There in free entry and exist of firm in the market, so competiition between sellers is always stiff. In individual firms has no control over the price in such market. By and large, the perfect competition model fits into the market for farm products.

17.5 PURE AND PERFECT COMPETITIONS

A distinctiion is often made between perfect competition and pure competition, but this distinctive is a matter of mere degree and not of kind. For market to be purely competitive, there fundamental. Conditions must prevail. There are (i) A large numer of buyere and sellers, (ii) a homogenious product & (iii) Free entry and exit of a firm, for a market to be perfectly competitive three additional conditions viz- (i) perfect knowledge of market, (ii) perfect mobility of factors and no transport cost difference, must be fulfilled.

1. There is large number of actual and potential firms or sellers. Their number is sufficiently large and as such firm is acting independetly of the others. The indidvidual firm's supply is just fraction of the total market supply, hence, any variation in individual supply has no negligble effect on total supply. Thus an individual firm cannot exert any influence on the ruling market. The firm therefore, assumes the role of a price taker in perfectly or purely competitve market.

2. There is a sufficiently large number of actual and potential buyers, so that each individual buyer's demand constitutes just a fraction of the total market demand. Hence, no individual buyer is in a position to exert his influence on the prevailing price of the product.

   From the above two conditions, it follows that though and individual buyer or seller cannot' affect the price, all firms together or all buyers together can change the market supply or demand as a whole, so that the market price will be varied.

3. The commodity supplied by each firm in a perfectly competitive market is homogeneous. That means, the product of each seller is virtually standardised, i.e., there is no product differentiation. Since each firm produces an identitical product, their products can be readily substituted for each other. Hence, the buyer has no specific preference to buy from a articular setler only. His purchase from any particular seller is a matter of chance and not of choice, on account of the homogeneity condition of goods.

4. There is free entry of new firms into the market. There is no legal, technical, financial or any other barrier to their entry. Similarly, existing firms are free to quit the market. Thus, the mobility of firms ensures that whener there is scope in the business, new entry will take place and competition will remain always stiff. Due to the

natural stiffness of competition, inefficient firms would have to eventually quit the industry..

When these conditions are satisfied competition is said to be pure. For competition to be perfect in the market, certain other conditions have to be satisfied.

5. Perfect competition requires that alll the buyers and sellers must possess effect knowledge about the existing market conditions, especially regarding the market price and quality of the product. When there is such perfect knowledge, no buyer could be charged a price different from the market price. Similarly, no seller would unnecessarily lose by selling at a lower price than the prevailing market price. This way, perfect knowledge ensures transactions at a uniform price.

6. A necessary assumption of perfect competition is that factors of production are perfectly mobile. Perfect mobility of factors can only ensure easy entry or exit of firms. Again, it alos ensure that the factor costs are the same for all firms.

7. In a perfectly competitive market, all firms are assumed to have equal competitive power. Hence the element of transport cost difference is ruled out by assuming that either all the firms are quite close to the market place so that they have zero transport cost to bear or they are equally far away from the market so that all have to bear equal transport costs. If there is a transport cost difference, then, though they may be supplying indentical goods, the competitive strength of the two firms will not be the same in the exonomic sense.

Since theres last three conditions are difficult to realise in practice. American economists prefer to construct a "pure competition" market model. Joel Dean thus remarks: "perfect competition, thus defined probably does not exist, never has existed, and never can exist". Perfect competion in fact is just a concept, a suggestive norm. Actual competition is always imperfect. Pure competition substantiates the norm of perfect competition without fully attaining it. Thus, pure competition does exist in reality, but is is a rare phenomenon. Probably, agriculture, under free trade, serves as the best example of pure competition. For instance, in the markets for rice, wheat, cotton, jowar and other foodgrains, fruits, vegetables, eggs, etc. there is large number of buyers and sellers and for all practical purposes, the products are physically indentical. But, outside of agriculture, competition is rare. In practice, in a majority of cases, lack of homogeneity of goods, ignorance on the part of buyers and imperfect mobility of factors of production render competition imperfect.

17.7 ASSUMPTIONS

The model of perfect competition is based on the following assumptions.

Large numbers of sellers and buyers

The industry or market includes a large numbers of firms (and buyers),so that each indivisual firm,however large,supplies only a small part of the total quantity offered in the market. The buyers are also numerous so that no monopsonistic power can affect the working of the market. Under these conditions each firm alone cannot affect the price in the market by changing its output.

Product homogeneity

The industry is defined as a group of firms producing a homogeneous product.the technical characteristics of the product as well as the services associated with its sale and delivery are identical.there is no way in which a buyer could differentiate among the products of different firms.if the product were differentiated the firm would have some discretion in setting its price. This is ruled out ex hypothesi in perfect competition.

The assumptions of large numbers of sellers and of product homogeneity imply that the individual firm in pur competition is a price-taker: its demand curve is infinitely elastic, indicating that the firm can sell any amount of output at the prevailing market price (figure 17.1). The demand curve of the individual firm is alos its average revenue and its marginal revenue curve.

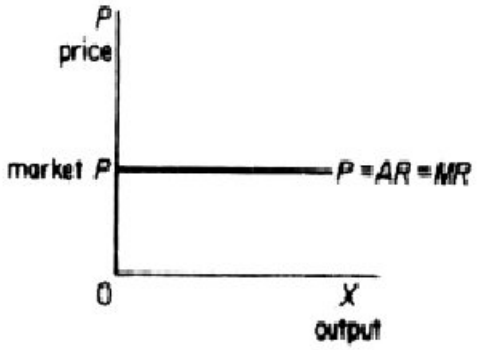


Figure 17.1

D = AR= MR.

Free entry and exit of firms

There is no barrier to entry or exit from the industry. Entry or exit may take time, but firms have freedom of movement in and out of the industry. This assumption is supplementary to the assumption of large numbers. If barriers exist the number of firms in the industry may be reduced so that each one of them may acquire power to affect the price in the market.

Profit maximisation

The goal of all firms is profit maximisation. No other goals are pursued

No Government Regulation

There is no government intervention in the market (tariffs, subsidies, rationing of production or demand and so on are ruled out).

The above assumptions are sufficient for the firm to be a price-taker and have an infinitely elastic demand curve. The market structure in which the above assumptions are fulfilled is called pure competition. It is different from perfect competition, which requires the fulfilment of the following additional assumptions.

Perfect mobility of factors of production

The factor of production are free to move from one firm to another throughout the economy. It is also assumed that workers can move between different jobs, which implies that skills can be learned easily. Finally, raw materials and other factors are not monopolised and labour is not unionised. In short, there is perfect competion in the markets of factors of production.

Perfect knowledge

It is assumed that all sellers and buyers have complete knowledge of the conditions of the market. This knowledge refers not only to the prevailing conditions in the current period but in all future periods as well. Information is free and costless. Under these conditions uncrtainty about future developments in the market is ruled out.

Under the above assumptions we will examine the equilibrium of the firm and the industry in the short run and in the long run.

17.8 SHORT-RUN EQUILIBRIUM

In order to determine the equilibrium of the industry we need to derive the market supply. This requires the determination of the supply of the individual firms, since the market supply is the sum of the supply of all the firms in the industry.

A. EQUILIBRIUM OF THE FIRM IN THE SHORT RUN

The firm is in equilibrium when it maximises its profits (IT), defined as the = TR - TC

Given that the normal rate of profit is included in the cost items of the firm, Pie is the profit above the normal rate of return on capital and the remuneration for the risk-bearing function of the entrepreneur. The firm is in equilibrium when it produces the output that maximises the difference between total receipts and

total costs. The equlibrium of the firm may be shown graphically in two ways. Either by using the TR and TC curves, or the MR and MC curves.

In figure 17.2 we show the total revenue and total cost cureves of a afirm in aperfectly competitive market. The total-revenue cureve is a straight line through the origin, showing that the price is constant at all levels of outpur. The firm is a price-taker and can sell any amount of outpurt at the going market price, with its TR increasing proportionately with its sales. The slope of the TR curve is the marginal revenue. It is constant and equal to the prevailing market price, since all units are sold at the same price. Thus in pure competion MR =AR = P.

The shape of the total cost curve reflects the U shape of the average-cost curve, that is the law of variable proportions. The firm maximises its profit at the outpur X, where the distance between the TR and TC curves is the greates. At lower and higher levels of output total profit is not maximised: at levels smaller than X A and larger thant X B the firm has losses.

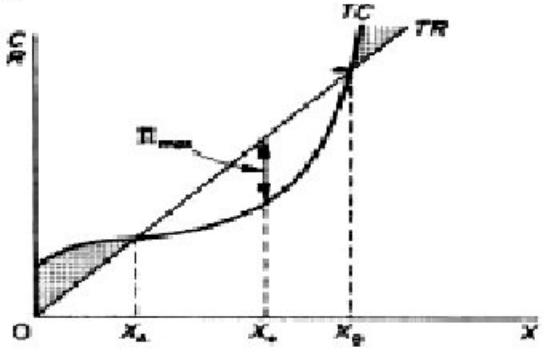


Figure 17.2

The total-revenu-total-cost approach is awkward to use when firms are combined together in the study of the industry. The alternative approach, which is based on marginal cost and marginal revenue, uses price as an explicit variable, and shows clearly the behavioural rule that leads to profit maximisation.

In figure 17.3 we show the average and marginal-cost curves of the firm together with its demand curve. We said that the demand curve is also the average revenue curve and the Marginal Revenue curve of the firm in a perfectly competitive market.

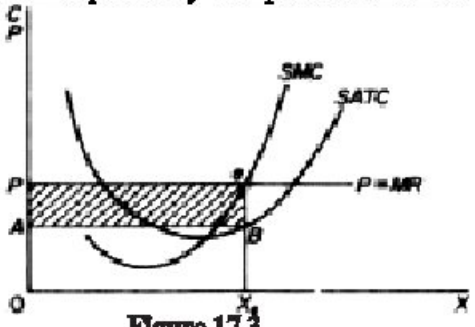


Figure 17.3

The marginal cost cuts the SATC at its minumum point. Both curves are U-shaped, reflecting the law of variable proportions which is operative in the short run during which the plant is constant.The firm is in equilibrium (maximises its profit) at the level of output defined by the intersection of the MC and the MR curves (point e in figure 17.3). To the left of e profit has not reached its maximum level because each unit of output to the left of Xe brings to the firm a revenue which is greater that its marginal cost. To the right of Xe each additional unit of output costs more than the revenue earned by its sale, so that a loss is made and total profit is reduced. In summary:

(a) If MC < MR total profit has not been maximised and it pays the firm to expand its output.

(b) IF MC > MR the level of total profit is being reduced and it pays the firm to cut its production.

(c) If MC = MR short- run profits are maximised.

Thus the first condition for the equilibrium of the firm is that marginal cost be equal to Marginal Revenue. However, this condition is not sufficient, since it may be fulfilled and yet the firm may not be in equilibrium. In figure 17.4 we observe that the condition

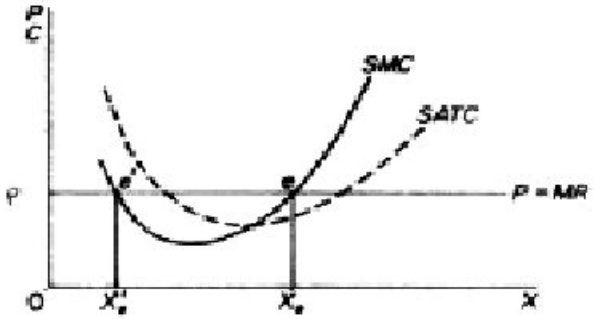


Figure 17.4

MC = MR is satisfied at point e, yet clearly the firm is not in equilibrium, since profit is maximised at Xe > Xe. The second condition for equilibrium requires that the MC be rising at the point of its intersection with the MR curve. This means that the MC must cut the MR curve from below, i.e. the slope of the MC must be steeper than the slope of the MR curve. In figure 1.4 the slope of MC is positive at e, while the slope of the MR curve is zero at all levels of output. Thus at e both conditions for equilibrium are satisfied

(i) MC = MR and

(ii) (slope of MC) > (slope of MR).

It should be noted that the MC is always positive, because the firm must spend some money in order to produce an additional unit of output. Thus at equilibrium the MR is also positive;

The fact that a firm is in (short-run) equilibrium does not necessarily mean that it makes excess profits. Whether the firm makes exess profits or losses depends on the level of the ATC at the short-run equilibrium. If the ATC is below the price at equilibrium (figure17.5) the firm earns excess profits (equal to the area PAB e). If,

however, the ATC is above the price (figure 17.6) the firm makes a loss (equal to the area FPeC). In the latter case the firm will continue to produce only if it covers its variable costs. Otherwise it will close down, since by discontinuing its operations the firm is better off it minimises its losses. The point at which the firm covers its variable costs is called ' the closing-down point. In figure 17.7 the closing-down point of the firm is denoted by point w. If price falls below P w the firm does not cover its variable costs and is better of it it closes down.

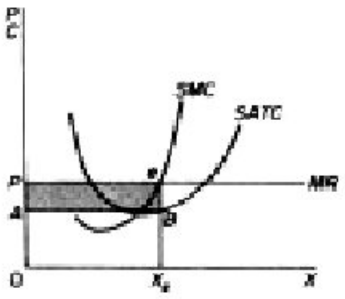


Figure 17.5

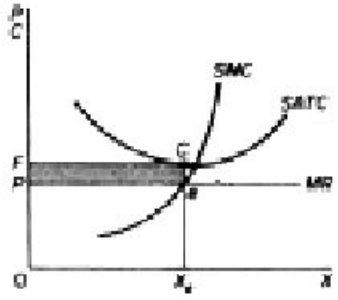


Figure 17.6

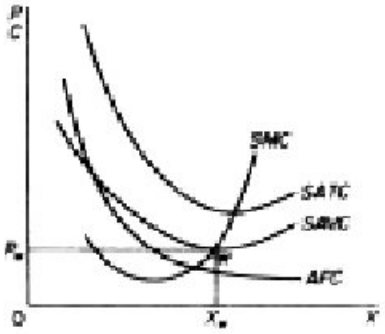


Figure 17.7

17.10 THE SUPPLY CURVE OF THE FIRM AND THE INDUSTRY

The supply curve of the firm may be derived by the points of intersection of its MC corve with sucessive demand cures. Assume that the market price incrases gradually. This causes an upward shift of the demand curve of the firm. Given the positive slope of the MC curve, each higher demand curve cuts the (given) MC curve to a point which lies to the right of the previous intersection. This implies that the quantity supplied by the firm increases as price rises. The firm, given its cost structure, will not supply any quantity (will close down) if the price falls below Pw because at a lower price the firm does not cover its variable costs (figure 17.8). If we plot the sucessive points of intersection of MC and the demand curves on a separate graph we observe that the supply curve of the individual firm is identical to its MC curve to the right of the closing-down point w. Below P w the quantity supplied by the firm is zero. As price rises above Pw the quantity supplied increases. The supply crve of the firm is shown in figure 17.9.

The industry-supply curve is the horizontal summation of the supply curves of the individual firms. It is assumed that the factor prices and the technolog are given and that the number of firms is very large. Under these conditions the total quantity supplied in the market at each price is the sum of the quantities supplied by all firms at that price. In figure 17.10 we show the industry supply as a straight line with a positive slope. It should, however, be noted that the particular shape of the market-supply cureve depends on the technology and on factor prices, as well as the size distribution of the firms in the industry. All firms are not usually of the same size. The particular size of each firm in perfect competion depends on the entreprencurial efficiency of the businessman, which is traditionally considered as a random attribute.

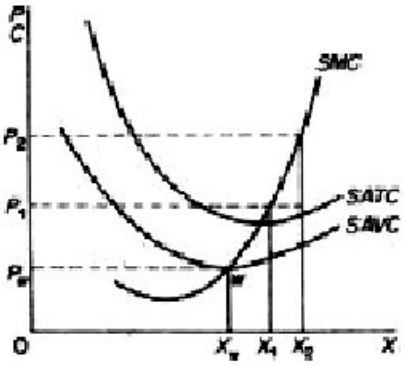


Figure 17.8

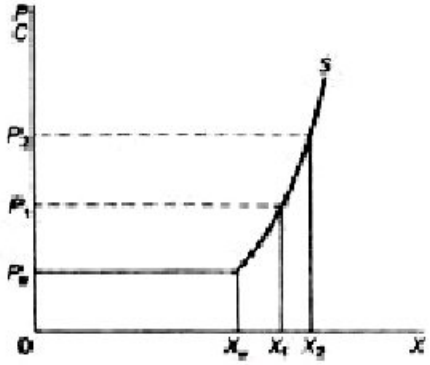


Figure 17.9

17.11 SHORT RUN EQUILIBRIUM OF THE INDUSTRY

Given the market demand and the market supply the industry is in equilibrium at that price which clears the market, that is at the price at which the quantity demanded is equal to the quantity supplied. In figure 17.10 the industry is in equilibrium at price P, at which the quantity demmanded and supplied is O. However, this will be short-run equilibrium, if at the prevailing price firms ar making excess profits (figure 17.11) or losses (figure 17.12). In the long run, firms that make losses and cannot readjust their plant will close down. Those that make excess profits will expand their capacity, while excess profits will also attract new firms into the industry. Entry, exit and readjustment excess profits will also attract new firms into the industry. Entry, exit and readjustment of the remaining firms in the industry will lead to a long-run equlibrium in which firms will just be earning normal profits and there will be no entry or exit from the industry.

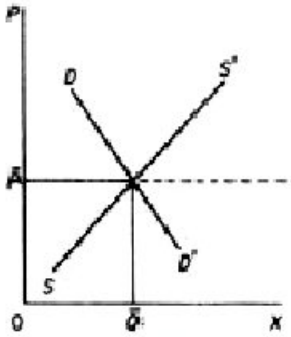


Figure 17.10 Short - run Industry equilibrium,

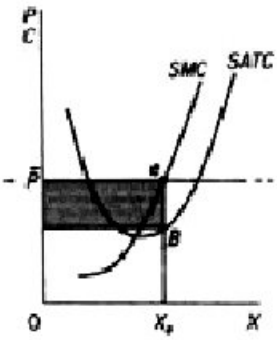


Figure 17.11 Short-run equilibrium of a firm (excess profits),

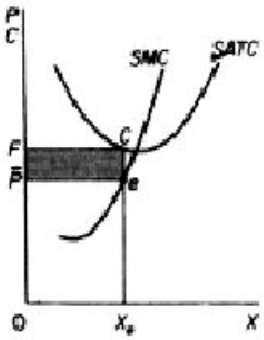


Figure 17.12 Short-run equilibrium of a firm (losses)

17.12. LONG- RUN EQUILIBRIUM

In the long run firms are in equilibrium when they have adjusted their plant so as to produce at the minumum point of their long-run AC curve, which is tangent (at this point) to the demand curve defined by the market price. In the long run the firms will be earning just normal profits, which are included in the LAC. If they are making excess profits new firms will be attracted in the industry; this will lead to a fall in price (a down-ward shift in the individual demand curves) and an upward shift of the cost curves due to the increase of the prices of factors as the industry expands. These chages will contitnue until the LAC is tangent to the demand curve defined by the market price. If the firms make losses in the long run they ill leave the industry, price will run and costs may fall as the industry contracts, until the remaining firms in the industry covr their total cossts inclusive of the normal rate of profit.

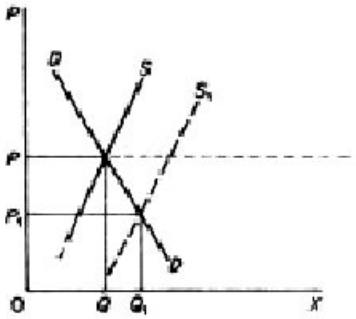


Figure 17.13

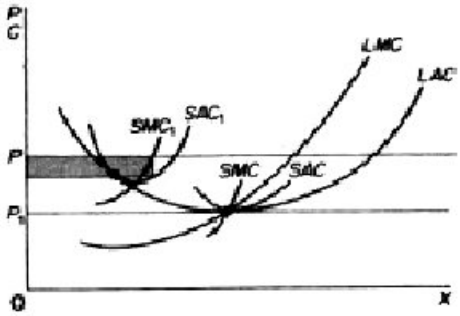


Figure 17.14

In figure 17.14 we show how firms adjust to their long-run equilibrium position. If the price is P, the firm is making excess profits working with the plant whose cost is denoted by SAC1. It will therefore have an incentive to build new capacity and it will move along its LAC.At the same time new firms will be entering the industry attracted by the excess profits. As the same time new firms will be entering the industry attracted by the excess profits. As the quantity supplied in the market increases (by the increased production of expanding old firms and by the newly established ones) the supply curve in the market will shift to the right and price will fall until it reaches the level of P1(in figure 17.13) at which the firms and the industry are in long-run equlilibrium. The LAC in figure 17.14 is the final-cost curve including any increase in the prices of factors that may have taken place as the industry expanded..

The condition for the long-run equilibrium of the firm is that the marginal cost be equal to the price and to the long-run average cost

$$LMC = LAC = P$$

The firm adjusts its plant size so as to produce that level of output at which the LAC is the minimum possible, given the echology and the prices of factors of production. At equilibrium the short-run marginal cost is equal to the long-run marginal cost and the short-run average cost is

equal to the long-run average cost. This, given the above equilibrium condition, we have

$$SMC = LMC = LAC = LMC = P = MR$$

This implies that at the minimum point of the LAC the corresponding (short-run) plant is worked at its optimal capacity, so that the minima of the LAC and SAC coincide. On the other hand, the LMC cuts the LAC at its minimum point, and the SMC cuts the SAC at its minimum point. Thus at the minimum point of the LAC the above equality between short-run and long-run costs is satisfied.

17.13 EQUILIBRIUM OF THE INDUSTRY IN THE LONG RUN

The industry is in long-run equilibrium when a price is reached at which all firms are in equilibrium (producing at the minum point of their LAC curve and making just normal profits). Under these conditions there is no further entry or exit of firms in the industry, given the technology and factor prices. The long-run equilibrium of the industry is shown in figure

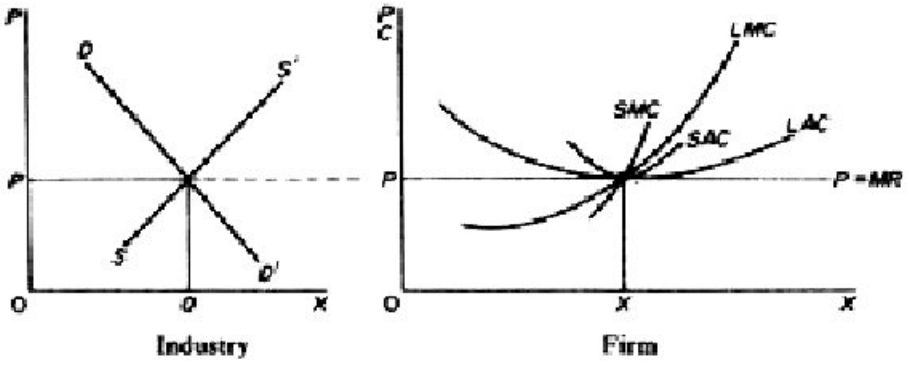


Figure 17.15

17.15. At the market price, P, the firms produce at their minumum cost, earning just normal profits. The firm is in equilibrium because at the level of output X.

$$LMC = SMC = P = MR$$

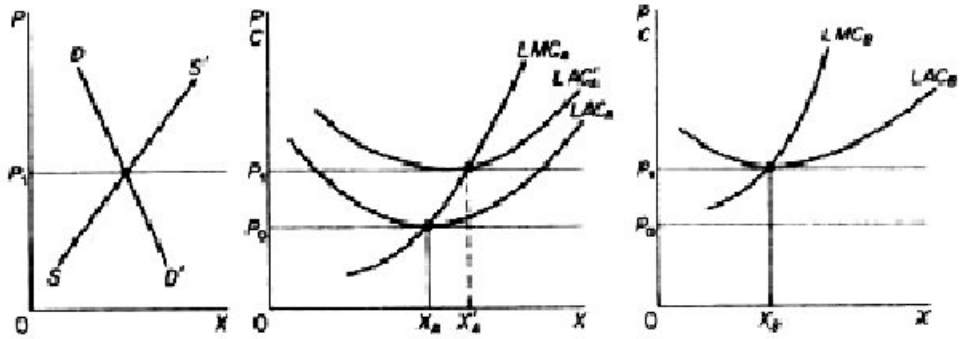
This equality ensures that the firms maximises its profit.

At the price P the industry is in equilibrium because profits are normal and all costs are covered so that there is no incentive for entry or exit. That the firms earn just normal profit (neiher excess profits nor losses) is shown by the equality

$$LAC = SAC = P$$

which is observed at the minimum point of the LAC curve. With all firms in the industry being in equilbrium and with no entry or exit, the industry supply remains stable, and, given the market demand (DD' in figure 17.15), the price P is a long-run equilibrium price.

Since the price in the market is uniqe, this implies that all firms in the industry have the same minumum long-run average cost. This, however, does not mean that all firms are of the same size or have the same efficency, despite the fact that their LAC is the same in equilibrium. The more efficient firms employ more productive factors of production and/ or more able managers, These more efficient factors must be remunerated for their higher productivity, otherwise they will be bid off by the new entrants in the industry. In other words, as the price rises in the market the more efficient firms earn a rent which they must pay to their superior resources. Thus rents of more efficient factors become costs for the individual firm, and hence the LAC of the more efficient firms shifts upwards as the market price rises, evern if the factor prices for the industry as a whole ramain constant as the industry expands. In this situtation the LAC of the old, more efficient, firms must be redrawn so as to be tangent at the higher market price. The LMC of the old firms is not affected by the rents accruing to its more productive factors. (It will be shifted only if the prices of factors for the industry in general increase). Thus the more efficient firms will be in equilibrium, producing that output at which the redrawn LAC is at its minimum (at which point the LAC is cut by the initial LMC given that factor prices remain constant). Uner these conditions, with the superior, more productive resources properly sosted at their opportunity cost, all firms have the same unit cost in their long-run equilibrium. This is shown in figure 17.16. At the initial price P0 the second firm was not in the industry as it could not cover its costs at that price.However, at the new price, P1. firm B enters the industry, making just normal profits. The established firm A earns rents which are imputed costs, so that the LAC shifts upwards and it reacheds a new long-run equilibrium producing a higher level of output (X4).



Market equilibrium | Equilibrium of a more efficient established firm | Equilibrium of a new entrant

Figure 17.16

17.14 SUMMARY

Modern economists like Mrs. Joan Robinson and Chamberlin have even challenged the very concept of perfect competition. The rightly point out that all the essential conditions of perfect competition can rarely be existing simultaneously. Especially, perfect mobility of factors is impossible. Thus, in reality there is imperfect competition rather than perfect one.

Though the assumption of perfect competition is regarded as unrealistic in economic analysis, still, it is the most fashionable model. This is because not only does it make a very convenient form of analysis, but on normative grounds it is held as the most ideal tool. The perfect competition model provides a standard to judge the economic efficiency of less competitive markets. Thus, it is honoured for its efficiency and optimum allocation of resources. It leads to such rational price determination at which total demand and supply are in the longrun optimally adjusted. Further, it has an egalitarian fragrance as well. It leads only to normal profits in the long-run. It causes distribution according to the marginal products of the factors, hence there is equity in the system. It is also argued by the defenders of the perfect competition model that all economic theories, being a simplification, perfect competition is a particular mode of simplification which provides a handy tool of analysis and inference and norm for evaluating other situations.Morever, the theory of perfect competition serves as the base for developing other theories like pure monopoly and monopolistic competition. Hence, the model of perfect competition has a general utility. Again, the long-run theory of perfect competition pin-points natural forces and actions of individuals in the society to pursue their own self-interest of utility and gain maximisation. This fact has to be recognised. And, perfect competition model alone recognises this,. Neverthless, one may be caustined that perfect competition model cannot be used indiscriminately in all the cases. In its application one must always have certain reservations.

17.16 FURTHER READING

(i) Alfread Marshall, Principal of Economics PP 290- 291.

(ii) Cooper, WW Theory of Firm P-120.

(iii) White, Michel, Theory of Firm P-189.

(iv) Hicks. J.R. The Theory of Monopoly -P-120.

UNIT 18

IMPERFECT COMPETION

OBJECTIVE

After going throug this unit, you should be able to know about the:

- Concept of imperfect competition or monopolistic competition.
- Definition, Assumptions & Equilibrium of the imperfect competition.
- Critiques of Prof. E.Chambelin's Model & comparision with pure competition.

STRUCTURE

18.1 INTRODUCTION

Up to the early1920s the classical theory of price included two main models, pure competition and monopoly. Duopoly models were consdidered as intellectual exercises rather than real-world situations. The general model of economicbehaviour from Marshall to Knight1 was pure competition. In the late 1920s economists became increasingly dissatisfied

with the use of pure competition as an analytical model of business behaviour. It was obvious that pure competition could not explain several empirical facts. The assumption of a homogeneous product, in the theory of competition, did not fit the real world. Furthermore advertising and other selling activities, practices widely used by businessmen, could not be explained by pure competition. Finally, firms expanded their output with falling costs, without however growing infinitely large, as the pure competition model would predict in the event of continuously decreasing costs.

It was in particular this last fact of falling costs that produced dissatisfaction and caused a widespread reaction against pure competition theories. The dissatisfaction gave rise to a long series of arguments and the publication of numerous articles which form the "Great Cost Controversy of the 1920s". The earlies summary of the Cost Controversy is to be found in piero Sraffa's article. Sraffa pointed out that the falling-cost dilemma of the classical theory could be resolved theoretically in various ways: by the introduction of a falling-demand curve for the individual firm; by adopting a general equilibrium approach in which shifts of costs induced by external economies of scale (to the firm and the industry) could be adquately incorporated; or by introducing a U-shaped selling-cost curve into the model. Of these solutions Sraffa adopted the first, that is, he argued that a model in which the individual-demand curve is negatively sloping is more operational and theoretically more plausible. 4 The same line was adopted in 1933. It should be noted that although both writers arrive at the same solution for the firm and market equilibrium, their analytical approach and methodology differ considerably. In this chapter we will develop Chamberlin's model of monopolistic competition. The concept ofimperfect competition was developed by Mrs. Jhon Robinson ("The Economics of Imperfect Competition, MacMillon on 1933") while monopolistic competition was coined for the very first time by Prof. E. Chamberlien (Harward Uni. Press, 1933).

18.2 Concept of Imperfect Competition or Monopolostic Competition

refers to the market organization in which there is a keen competion but neither perfect nor pure, among a group of large number of small producers or suppliers having some degrees of monopoly because of differentiation of their products. Thus monopolistic competition is a mixture of competition and certain degree of monopoly power. Prof. E. Chamberlin asserted that Monopoly and competition are not mutually exclusive. Rather monopoly and competition frequently blend together.

Monopolistic competition is commonly found in many field especially in retail trade in the service industries and in two branches of manufacturing. It is a market situation comprising a large number of firms but their products are differentiated from each other. The entry of new firms into this type of market is relatively open and easy. Thus, there is

tremendous scope for competition in such a market. On account of product differentiation, firms also enter in to non-price competition. The individual firm has only a slight control over price determination. In the shoe industry, petrol pumps, restaurants, tc., we may come across monopolistic competition.

Following are the important features of monopoloistic competition:

(1) It is a blending of monopoly and competition.

(2) There are large number of sellers.

(3) Product differentiation is its basic phenomenon. Each seller occupies a degree of monopoly power through product differentiation.

(4) Advertising and sales promotion efforts and expenses-selling costs are the prominent features of monopolistic competition.

(5) Monopolistic completion has two variations; (i) price competition and (ii) non-price competition; product competition and selling cost competition.

18.3 ASSUMPTIONS

The basic assumptions of Chamberlin's large-group model are the same as those of pure competition with the exception of the homogeneous product. We may summarize them as follows:

1. There is a large number of sellers and buyers in the 'group'.
2. The products of the sellers are differentiated, yet they are close substitutes of one another.
3. There is free entry and exit of firms in the group.
4. The goal of the firm is profit maximization, both in the short run and in the long run.
5. The prices of factors and technology are given.
6. The firm is assumed to behave as if it knew its demand and cost curves with certainty.
7. The long run consists of a number of identical short-run periods, which are assumed to be independent of one another in the sense that decisions in one period do not affect future periods and are not affecte by past actions. The optimum decision for any one period is the optimum decision for any other period. Thus, by assumption, maximization of short-run profits implies maximization of long-run profits.
8. Finally Chamberlin makes the 'heroic' assumption that both demand and cost curves for all 'products' are uniform throughout

the group. This requires that consumers' preferences bee evenly distributed among the different sellers, and that differences between the products be such as not to give rise to differences in costs.1 Chamberlin makes these assumptions in order to be able to show the equilibrium of the firm and the 'group' on the same diagram.

The above 'heroic' assumptions lead to a model which is very restrictive, since it precludes the inclusion in the 'group' of similar products which have different costs of production. Chamberlin himself recognizes that the 'heroic' assumptions are unrealistic and the relaxes them at a later stage.

COSTS

Chamberlin adopts without much justification the shape of costs of the traditional theory of the firm. The AVC, MC and ATC curves are all u-shaped implying that there is only a single level of output which can be optimally produced. The particular shape of costs is not important in Chamberlin's model so long as the slope of the MC curve is greater that the slope of the MR curve.

Chamberlin introduced "selling costs" in the theory of the firm for the first time. The recognistion of product differentiation provides the rationale for the selling expenses incurred by the firm: with advertising an other selling activities the firm seeks to accentuate the difference between its product and the product of other firms in the group; that is, Chamberlin assumes that advertising in general will shift the demand and will make it less elastic by strengthening the preferences of the consumers for the advertised product;

Chamberlin argues that the selling-costs curve is u-shaped, that is, there are economies and diseconomies of advertising as output changes. Initially expansion of output will not require an equiproportional increase in selling costs, and this leads to a fall in the average selling expenditure. However, beyond a certain level of output the firm will have to spend more per unit in order to attract customers from other firms: as output the firm has to attract customers which are well used to the product of other. The u-shaped selling cost, added to the u-shaped production cost, yields a shaped ATC curve.

PRODUCT DIFFERENTIATION AND THE DEMAND CURVE

Product differentiation as the basis for establishing a downward-falling demand curve was first introduced in economic theory by Sraffa. Yet it was Chamberlin who elaborated the implication of product differentiation for the pricing and output decisions well as for the selling strategy of the firm. Chamberlin suggested that the demand is determined not only by the price policy of the firm, but also by the style of the product, the services associated with it, and the selling activities ofthe firm. Thus Chamberlin introduced two additional policy variables in the

theory of the firm: the product itself and selling activities. The demand for the product of the indiviual firm incorporates these dimensions. it shows the quantities demanded for a particular style,associated services, offered with a specific selling strategy. Thus the demand curve will shift if:

(a) the style, services,or the selling strategy of the firm changes;

(b) competition change their price, output, services or selling polocies;

(c) tastes, incomes, prices or selling policies of products from other industries change.

Product differentation is intended to distinguish the product of one product from that of other producers in the industry. It can be real, when the inherent characteristics of the products are different, or fancied, when the products are basically the same, yet the consumer is persuaded, via advertising ot other selling activities, that the products are different. real differentiation exists when there are differences in the specification of the products or differences in the factors inputs, or the location of the firm ,which determines the convenience with which the products are easily accessible to the consumer, or the services offered by the producer. fancied differentiation is established by advertising differences in packaging ,differences in design ,or simply by brand name, (for example-, aspirins made by various manufacturers). Whatever the case, the aim of product defferentiation is to make the product uniqe in the mind of the consumer. Yet differentiation must leave the products closely related if they are to be included in the same product group' the products should be close substitutes with high price and cross-elasticities.

The effect of product differentiation is that the producer has some discretion in the determination of the price. He is not a price-taker ,but has some degree of monopoly power which he can exploit. However he faces the keen competition of close substitutes offered by other firms. hence the discretion over the price is limited. There are elements of monopoly and competitions under the above market conditions, hence the name of this model as "monopolistic competition". Product differentiation creates brand loyalty of the consumers and gives rise to a negatively sloping demand curve. Product differentiation, finally, provides the rationale of selling expenses. Product changes, advertising and salesmanship are the main means of product differentiation.

THE CONCEPT OF THE "INDUSTRY" AND "PRODUCT GROUP"

Product differentiation creates difficulties in the analytical treatment of the industry. Heterogenous products cannot be added to form the market demand and supply shcedules as in the case of homogeneous products.

The concept of the industry needs redefinition. Chamberlin uses the concept of 'product group', which includes products which are 'closely related'. The products shhould be close technological and economic substitutes. Technological substitutes are products which can

technically cover the same want. For example, all motor cars are technological substitutes in the sense that they provide transport. Economic substitutes are products which cover the same want and have similar prices. For example, a Hillman Avenger, and a Morris 1300 can be considered as economic substitutes while a Rolls-Royce and Mini clearly are not. An operational definition of the 'product group' is that the demand of each single product be highly elastic and that it shifts appreciallbly when the price of other products in the group changes. In other words, products forming 'the group' or 'industry' should have high price and cross-elasticities. Although this difinition may be theoritically ploausible and intutively attractive, it poses further measurement probles. How high should the price and cross-elasticities be? There is no general answer to this question. One has to use subjective judgement in each particular case.

Summation ot the individual demand and cost curves to form the 'industry' demand and supply requires the use of some common denominator. Even so, with product differntiation there is no such thing as a unique price (except under Chamberlin's 'heroic' assumptions, which are discussed below). Product differentiation allows each firm to charge a different price. There will be no unique equilibrium price but an equilibrium cluster of prices, reflecting the preferences of consumers for the products of the various firms in the group. When the market demand shifts or cost conditions change in a way affecting all firms, then the entire cluster of prices will rise or fall simultaneiously. This more realistic market situtation emerges from Chamberlin's analysis after the relaxation of his 'heroic assumptiions'.

EQUILIBRIUM OF THE FIRM

Product differentiation gives rise to a negatively sloping demand curve for the product of the individual firm. If the firm increases its price it will lose come but not all of its customers, while if it reduces its price it will increase its sales by attracting some customers from other firms. The individual firm's demand curve is depicted in figure 18.1. Although downward-sloping the demand is highly elastic, because of the assumption of a large umber of sellers in the group. Since the firm is one of a very large number of sellers, if it reduces its price the increase in its sales will produce loss of sales distributed more or less equally over all the other firms, so that each one of them will suffer a negligible loss in customers, not sufficient to induce them to change their own price. Thus the individual demand curve, dd, is a planned sales curve, drawn on the assumption that the competitors will not react to changes in the particular firm's price. (Of course the dd curve is also drawn on the usual ceteris paribus assumption, that tastes, incomes and prices in other industries do not change.)

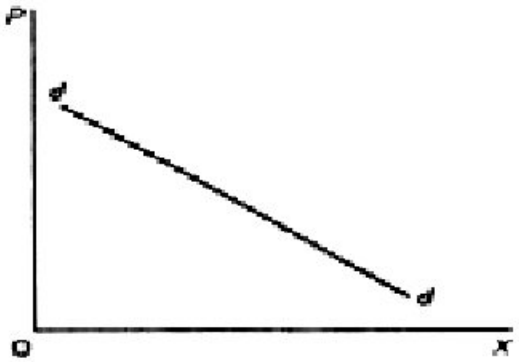


Figure 18.1

Chamberlin does not use MC and MR curves, but they are implicit in his analysis. We will include these curves in our exposition following Joan Robinson, since they facilitate the exposition and the comparison with other market structures.

In the short run the Chamberlinian firm acts like a monopolist. The firm, given its demand and cost curves, maximises its profit by producing the output at which marginal cost is equal to marginal revenue (MC = MR).

In order to be able to analyse the equlibrium of the firm andof the industry on the same diagram Chamberlin made two `heroic assumption', namely that firms have identical costs, and consumers' preferences are evenly distributed among the different products. That is, although the products are differenciated, all firms have identical demand and cost curves. Under these assumptions the price in the market will be unique. Chamberlin develops three distinct models of equlibrium. In the second model it is assumed that the number of firms in the industry is optimal (no entry or exit) and long run equilibrium is reached through price adjustments (price competition) of the existing firms. In the first model the existing firms are assumed to be in short-run equlibrium realizing abnormal profits; existing firms do not have any incentive to adjust their price, but long-run equilibrium is attained by new entrants who are attracted by the lucrative profit margins. The third model is a combination of the previous two: long-run equilibrium is achieved through price adjustments of the existing firms and by new firms entering the industry.

Model 1 : Equilibrium with new firms entering the industry

In this model it is assumed that each firm is in short-run equilibrium, maximising its profits at abnormally high levels. Such a situation is shown in figure 18.2. The firm, having the cost structure depicted by the SRAC and the LMC curves and faced with the demand curve dd', will set the price PM which corresponds to the intersection of the MR and the MC curves. This price yields maximum profits (equal to the area ABCPM).

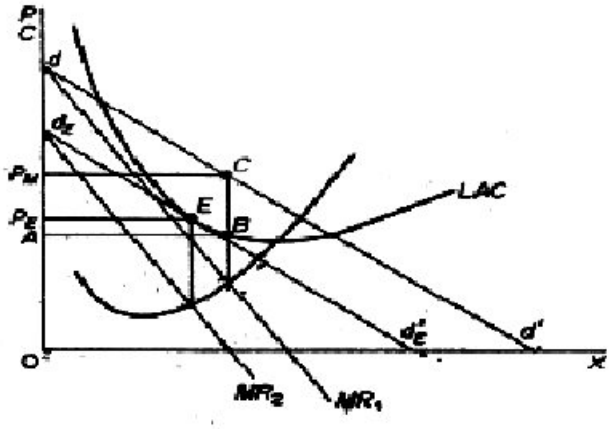


Figure 18.2

The firm, being in equilibrium (at C), does not have any incentive to change its price. The abnormal profits will, however, attracts new competitiors into the market. The result of new entry is a downward shift of the demand curve dd', since the market is shared by a larger number of sellers. Assuming that the cost curves will not shift as entry occurs, each shift to the left of the dd' curve will be followed by a price adjustment as the firm reaches a new equilibrium position, equating the new marginal revenue (on the shifted MR curve) to its marginal cost. The process will continue until the demand is tangent to the average-cost curve, and the excess profits are wiped out. In the final equilibrium of the firm the price will be PE and the ultimate demand curve dEd'E. This is an equilibrium position, since price is equal to the average cost. There will be no further entry into the industry, since profits are just normal. The equilibrium is stable, because any firm will lose by either raising or lowering the price PE.

MODEL 2 : Equilibrium with price competition

In this model it is assumed that the number of firms in the industry is that which is compatible with long-run equilibrium, so that neither entry nor exit will take place. But the ruling price in the short run is assumed to be higher than the equilibrium one.

The analysis of this case is done by the introduction of a second demand curve, labelled DD' in figure 18.3, which shows that actual sales of the firm at each price after accounting for the adjustments of the prices of other firms in the group. DD' is sometimes called actual-sales curve or share-of-the-market curve, since it incorporates the effects of actions of competitors to the price changes by the firm. The DD' curve shows the full effect upon the sales of the firm which results from any change in the price that it charges. DD' is thus the locus of points of shifting dd' curves as competitors, acting simultaneously, change their price. It should be clear that the change in the price does not take place as a deliberate reaction to other firms' reductions, but as an independent action aiming at the profit maximisation of each firm acting independently of the others. The DD' curve shows a constant share of the market, and, as such, it has the same elasticity as the market demand at any one price. Clearly the DD' curve is steeper than dd', because the actual sales from a reduction in P are smaller than expected on the basis of dd' as all firms reduce their price and expand their own sales simultaneously. A movement along DD' shows changes in the actual sales of existing firms as all of them adjust their price simultaneously and indentically, with their share remaining constant. A shift in the DD' is caused by entry of new firms or exit of existing firms from the 'industry' and shows a decline or an increase in the share of the firm.

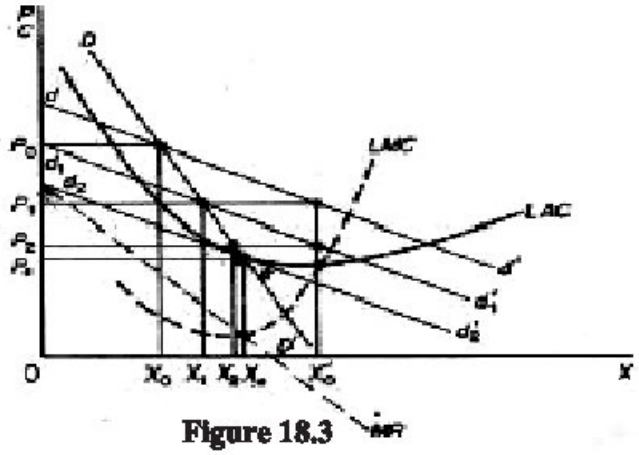


Figure 18.3

Assume that the firm is at the non-equilibrium position defined by price Po and quantity Xo. The firm, in an attempt to maximise profits, lowers the price at P1 expecting to sell, on the basis of its individual demand curve, quanitity Xo. This level of sales is not actually realised, because all other firms, faced by the same demand and cost conditions, have the incentive to act in the same way simultaneiously. Each one attempts to maximise its own profit, ignoring the reactions of competitiors, on the assumption that the effect on the demand of other firms in the group is negligible. Thus all firms, acting independently, reduce their price simultaneiously to P1. As a result the dd curve shifts downwards (d1 d1) and firm A, instead of selling the excepted quantity X'0,sells actually a smaller quantity X1 on the shifted-demand curved d1d'1 and along the share curve DD'. One might think that the firm would learn to anticipate similar shifts in the future if it decided to reduce its price. However, according to the model, the firm suffers from myopia and does not learn from past experience. It continues to behave on the assumption that its new demand (d1d'1) will not shift further, because the effect of its own decisions on other sellers' demand would be negligible. Thus the firm lowers its price again in an attempt to reach equilibrium, but instead of the expected sales X'0 the firm achieves actual sales X2, because all other firms act identically, though independently. The process stops when the dd' curve has shifted so far to the left as to be tangent to the LAC curve, Equilibrium is determined by the tangency of dd' and the LAC curve (point e in figure 2.3). Any further reduction in price will not be attempted since the average cost would not be covered.

In summary, the individual demand curve dd' explains why each firm is led to reduce its price. The DD' curve shows the firm's actual sales as the general downward cut in price takes place. The dd' curves slides downwards along the DD' curve as prices are lowered, and the adjustment process comes to a stop when the dd' is tangent to the LAC curve at the point of tangency the DD' curve cuts the dd' curve. Obviously it will pay no one firm to cut the price beyond that point, because its costs of

producing the larger output would exceed the price at which this output could be sold in the market.

Model 3 : price competition and free entry

Chamberlin suggests that in actual life equilibrium is achieved both by price adjustments of the existing firms and by new entry. Price adjustments are shown along the dd' curve while entry (and exit)cause shifts in the DD'curve. Equilibrium is stable if the dd' curve is tangent to the AC curve and expected sales are equal to actual sales, that is, if the DD' curve cuts the dd' curves at the point of its tangency to the AC curves. Let us examine how the equilibrium tangency solution is reached (figure 18.4).

It is assumed that profits at point e1 are abnormal. New firms are attracted until DD shifts to D'D'. One might think that e2 is a long-run equilibrium (with price P andoutput X) since only normal profits are earned . However, this is not the case, because each entrepreneur thinks that dd is the demand curve, and consequently he believes that if he reduced his price sales would

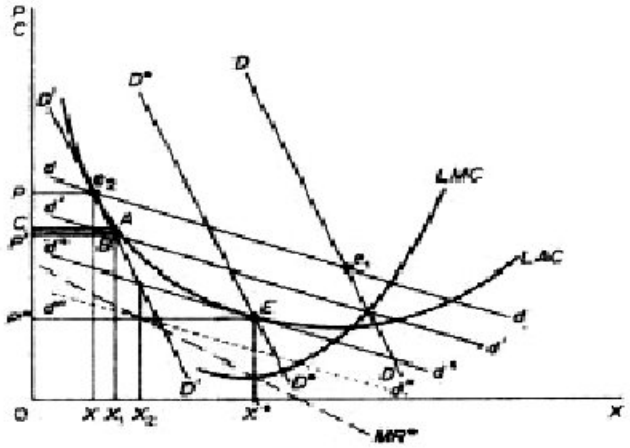


Figure 18.4 Long-run equilibrium

expand along dd and profits would increases. But each firm has exactly the same incentive and all firms reduce their price. As price is reduced by all firms dd slides down D'D' and each firm realises a loss instead of positive abnormal profits. For example, at position d'd' the firm has reduced its price to P' but, as all firms act similarly, X, is produced with a total loss equal to the shaded area ABP'C. However, the firm acts on the 'myopia curve' d'd' and so long as this lied above the LAC, it believes that it can obtain positive profits by cutting its price. The loss increases still further as dd slides further down along D'D'. One might think that the process would stop when dd becomes tangent to the LAC. The would be so if the firm could produce X*. However, there are too many firms in the industry and the share of the firm is only C2 (on D'D'). The firm still on the 'myopia assumption' believes that it can reach X* if it reduces price to P*. However, all firms do the sameand d*d* falls below the LAC with ever-increasing losses. The financially weakest firms will

eventually leave the industry first, so that the surviving firms willhave alarger share D'D' moves to the right together with dd. Exit will continue until dd becomes tangent to the AC curveand DD Cuts dd at the point of thetangency, E. Equilibrium is then stable at point E with normal profits earned by all the firms and noentry or exit taking place. The equilibrium price P* is unique and each firmhasashare equal to 0X*.

CRITIQUE OF CHAMBERLIN'S MODEL

Chamberlin's theory has been attacked on several grounds. Some of the critics are valid while others do not stand up to a closer examination.

1. The assumptions of product differentiation and of independent action by the competitors are inconsistent. It is a fact that firms are continuously aware of the action of competitors whose products are close substitutes of their own product.

2. It is hard to accept the myopic behaviour of businessmen implied by the model. Surely some firms would learn frompast mistakes,and those that did not would be competed out of existence by firms which do take past experience into account in decision-making.

3. The assumption of product differentiation is also compatible with the assumption of free entry, especially if the entrants are completely new firms as in Chamberlin's model. A new firm must advertise substantially and adopt intensive selling campaignsin order to make its product known and attract customers from already established firms product differentiation and brand loyalty of buyers createa barrier to entry for new firms.

4. The concept of the industry is destroyed by the recognition of product differentiation. Each firm is an industry in its own right since its product is unique. Heterogeneous products cannot be added to give the industry demand and supply curves. Such summation would be meaningful if the price were unique for the close substitutes constituting the industry. Chamberlin's heroic model' is clearly not acceptable as an approximation to the real world in which demands and costs are different among the various firms, giving rise to a cluster of prices rather than a unique price.

5. The model assumes a large number of sellers. But it does not define the actual number of firms necessary to justify the myopic disregard of competitors' actions. Hoe many firmsshouldthere be in an industry in order tovlassify itas monopolistically competitive rather that as oligopoly? What is the crucialnumber that determines whether firms act independently or recognise interdependence? Such problems are not discussed by Chamberlin.

6. We have mentioned the difficulties in grouping firms in an 'industry'. The model assumes that the products should be close substitutes with high price and high (positice) cross-clasticities.

However, this requirement is vague, since it is not clear what is the precise value of elasticities which would be necessary for the classification of products in the same group.

The assumptions of Chamberlin from which he derived the negatively sloping curve have been attacked by Andrews. He argues that Chamberlin's dd curve is of questionable adalytical use, because it includes only the consumes' demand, and because it implies irrationality of consumers' preferences in thelong run. Andrews argues that Chamberlin's demand curve (and any downeard-falling demand curve) is applicable only for those rare cases where a firm sells directly to the final consumer, and this only in a short-run analysis.

Comarison of emperfect competition with pure competition

We said that the long-run equalibirium of the firm is defined by the point of tangency of the demand curve to the LAC curve.At this point MC = MR and AC = P, but P > MC, while in pure competion we have the long-run equilibrium condition MC = MR = AC= P.

As a consequence of the different equilibrium conditions price will be higher and output will be lower in monopolistic competition as compaared with the perfectly competitive model. Profits, however, will be just normal in the long run in both models. In monopolistic competition there will be too many firms in the industry each producing an output less than optimal, that is at a cost higher than the minimum. This is due to the fact that the tangency of AC and demand occurs necessarily at the failling part of the LAC, that is, at a point where LAC has not reached its minimum level. Consequently production costs will be higher than in pure competition. Furthermore, in monopolistic competion firms incur selling costs which are not present in pure competion, and this is another reason for the total cost (and price) to be higher.

Monopolistic Competition has been attacked on the grounds that it leads to 'too many' too small' firms, each working with 'excess capacity', as measured by the difference between the 'ideal'output XF corresponding to the minimum cost level on the LAC curve and the output actually attained in long-run equilibrium XE (figure 18.5).

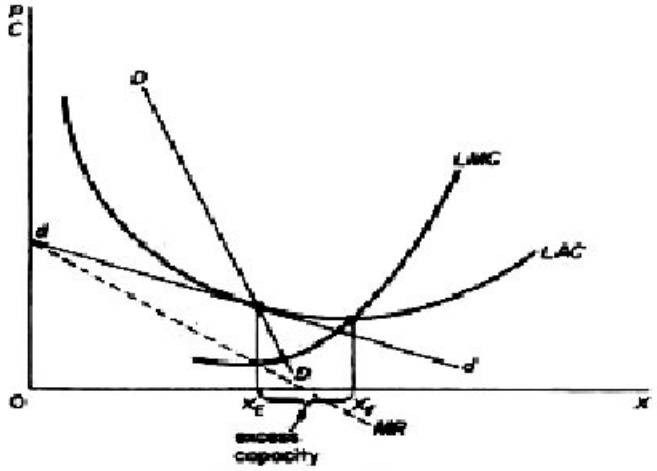


Figure 18.5

The term 'excess capacity' is misleading in this case. One should really talk of firms working at suboptimal scales having unexhausted economies of scale. There is a misallocation of resources in the long run because the firm in a monopolistically comeptitive market does not employ enough of the economy's resources to reach minumum average cost. Chamberlin has argued that the creititcism of exess capacity and misallocation of resources is valid only if one assumes that the demand curve of the individual firm is horizontal. Chamberlin argues that if the demand is downward-sloping and firms enter into active price competion while entry is free in the dindustry. Consumers desire variety of products: product differentiation reflects the desires of consumers who are willing to pay the higher price in order to have choice among differentiation products. The higher cost, resulting from production to the left of the minimum average cost, is thus socially acceptable. Consequently the difference between actiual output XEand minum cost output XF (figure 18.5) is not a measure of excess capacity but rather a measure of the

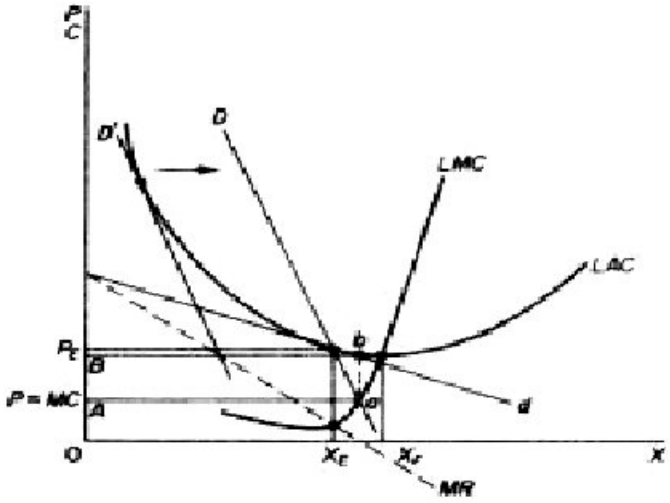


Figure 18.6 Price competition and free entry lead to Xg, which is the 'social optimum' (without excess capacity according to Chamberlin)

'social cost' of producing to the consumer greater variety. The output Xg. is a 'sort of ideal' for a market in which product is based on the assumptions of active price competition and free entlry. Under these circumstances Chamberlin (and later Harrod) because firms will be competing along their individual dd curves which are very elastic. However if firms avoid price competion and instead enter into non-price competion, there will be excess capacity in each firm and insufficient productive capacity in the industry, that is, unexhausted economies of scale for the firm and the industry. Chamberlin seems to argue that excess capacity (restriction of output) and higher prices are the result of non-price competition coupled with free entry. In this evernt the firm ignores its dd curve (since no price adjustments are made) and concern itself only with its market share.In other words, DD becomes the relevant

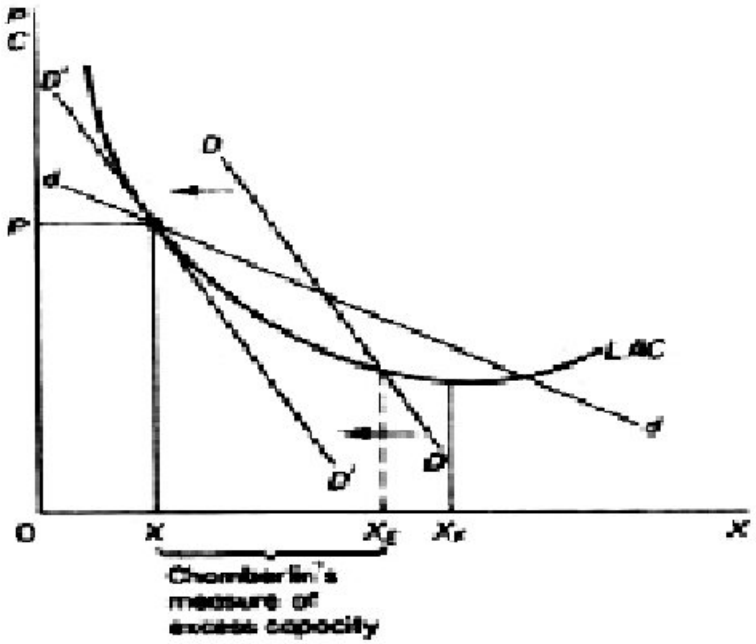


Figure 18.7 Non-price competion and free entry are the causes of excess capacity (according to Chamberlin)

demand cureve of the firm. In this event long-run equilibrium is reached only afir entry has shifted the DD curve to a position of tangency with the LAC curve, According to Chamberlin excess capacity is the difference bwtween X and Xg, the latter being the 'ideal' level of output in a differentiated market (figure 18.7).

From the point of view of social welfare monopolistic competion suffers from the fact that price is higher than the MC. Socially output should be increased until price euqls MC. However, this is impossible since alll firms would have to produce at a loss in the long run: the LRMC intersects the DD curve below the LAC (at point a in figure 2.8) so that any policy aiming at the equalisation of P and MC would imply a loss of ab per unit of output in the long run. Thus if firms wer coereced to produce a level of output at which P = MC, the firm would close down in the long run. In summaary, if the market is monopolistically competitive the output is lower than society would 'ideally' like it to be (that is, price is higher than MC); but the socially desired P = MC cannot be achieved without destroying the whole private enterprise system.

OBLIGOPOLY

1. Cournot's Duopoly Model

The earliest duoply model was developed in 1838 by the French economist Augustin Cournot.

The model may be presented in many ways.The original version is quite limited in that it makes the assumptions that the duopolists have identical costs. Actually Cournot illustrated his model with an example of two firms each owning a spring of mineral water which is produced at zero

costs. We will present briefly this version and then we will generalise its presentation by using the reaction curves approach.

Cournot assumed that there are two firms each owning a mineral well, and operating with zero costs. They sell their outputs in a market with a straight-line demand curve. Each firm acts on the assumptions that its competitor will not change its output, and decides its own outputs so as to maximise profit.

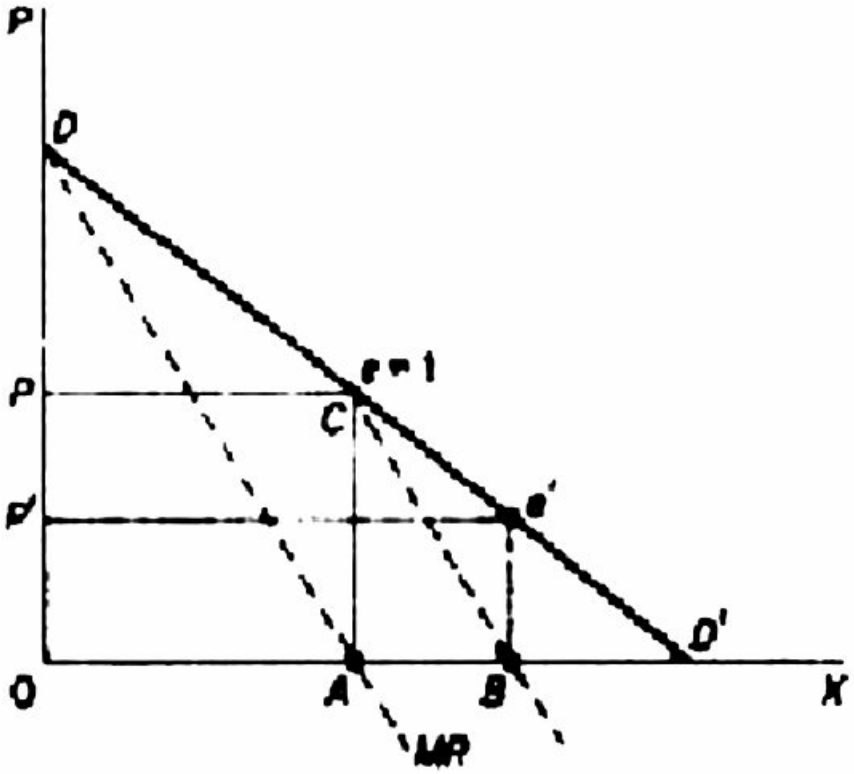


Figure 18.8

Assume that firm A is the first to start producing and selling mineral water. It will produce quality A, at the price P where profits are set at maximum (figure 18.8), because at this point MC = MR = 0. The elasticity of market demand at this level of output is equal to unity and the total revenue of the firm is a maximum. With zero costs, maximum R implies maximum profits, II. Now firm B assumes that A will keep its output fixed (at OA), and hence considers that its own demand curve is CD'. Clearly firm B will produce half the quantity AD' because (under the Cournot assumption of fixed output of the rival) at this level (AB) of output (and at price P) its revenue and profit is at a maximum `B' produces half of the market which has not been supplied by A, that is, B's of the total market.

Firm A, faced with this situation assumes that B will retain his quantity constant in the next period, So he will produce one-half of the

Price & Profit Analysis

market which is not supplied by B. Since B covers one-quarter of the market, A will, in the next period, produce $\frac{1}{2}(1 - \frac{1}{4}) = \frac{1}{2} \cdot \frac{3}{4} = \frac{3}{8}$ of the total makret.

Firm B reacts on the Cournot assumption, and will produce one-half of the unsupplied section of the market, i.e.

In the third period firm A will continue to assume that B will not change its quantity and thus will produce one-half of the remainder of the market, i.e.

$$\frac{1}{2}\left(1 - \frac{5}{16}\right)$$

This action-reaction pattern continues, since firms have the naive behavior of never learning from past patterns of reaction of their rival. However, eventually an equilibrium will be reached in which each firm produces one-third of the total market. Together they cover two-thirds of the total market. Each firm maximises its profit in each period, but the industry profits are not maximised. That is, the firms would have higher joint profits if they recognized their interdependence, after their failure in forecasting the correct reaction of their rival. Recognition of their interdependence (or open collusion) would lead them to act as 'a monopolist', producing one-half of the total market output, selling it at the profit-maximising price P, and sharing the market equally, that is, each producing one-quarter of the total market (instead of one-third).

The equilibrium of the Cornot firms may be obtained as follows :

1. The product of firm A in successive periods is

Period 1: $\frac{1}{2}(1 - \ldots) = \ldots$

Period 2: $1 \quad 1 \quad 1 \quad 1 \quad 1$

Period 3: $\frac{1}{2}\left(1 - \frac{5}{16}\right) = \frac{11}{32} = \frac{1}{2} - \frac{1}{8} - \frac{1}{32} \ldots$

Period 4: $\frac{1}{2}\left(1 - \frac{42}{128}\right) = \frac{43}{128} = \frac{1}{2} - \frac{1}{8} - \frac{1}{32} - \frac{1}{128}$

We observe that the output of A declines gradually. We may rewrite this expression as follows :

$$\left[\begin{matrix}\text{Product of A} \\ \text{in equilibrium}\end{matrix}\right] =$$

$$= \quad 8 \quad 8 \quad 4 \quad 8 \quad (4/8(4) \quad 23$$

The expression in parentheses is a declining geometric progression with ratio. Applying the summation formula for an infinite geometric series

2. The product of firm B in successive periods is

We observe that B's output increases, but at a declining rate. We may write

$$\left|\begin{matrix}\text{Product of B}\\ \text{in equilibrium}\end{matrix}\right| =$$

Applying the above expression for the summation of a declining geometric series we find

$$\left|\begin{matrix}\text{Product of B}\\ \text{in equilibrium}\end{matrix}\right| =$$

Thus the Cournot solution is stable. Each firm supplies of the market, at a common price which is lower than the monopoly price, but above the pure competitive price (which is zero in the Cournot example of costless production). It can be shown that if there are three firms in the industry, each will produce one-quarter of the market and all of them together will supply

of the entire market OD'. And, in general, if there are n firms in the

industry each will provide will be of the market, and the industry output . n. Clearly as more firms are assumed to exist in the industry, the higher the total quantity supplied and hence the lower the price. The larger the number of firms the closer is output and price to the competitive level.

Cournot's model leads to a stable equilibrium. However, his model may be criticised on several accounts :

(1) The behavioural pattern of firms is naive. Firms do not learn from past miscalculations of competitors reactions.

(2) Although the quantity produced by the competitors is at each stage assumed constant, a quantity competition emerges which drives P down, towards the competitive level.

(3) The model can be extended to any number of firms. However, it is a 'closed' model, in that entry is not allowed; the number of firms that are assumed in the first period remains the same throughout the adjustment process.

(4) The model does not say how long the adjustment period will be.

(5) The assumption of costless production is unrealistic. However, it can be relaxed without impairing the validity of the model. This is done in the subsequent presentation of the model, based on the reaction-curves approach.

The reaction-curves approach is a more powerful method of analysis of oligopolistic markets, because it allows the relaxation of the assumption of identical costs and identical demands. This approach is based on Stackelberg's indifference-curve analysis, which introduces the concept of isoprofit curves of competitors. We will first establish the shape of the isoprofit curves for substitute commodities, and from these cruves we will subsequently derive the reaction curves of the Cournot duopolists.

An isoprofit curve for firm A is the locus of points defined by different levels of output of A and his rival B, which yield to A the same level of profit (figure 18.8).

Similarly, an isoprofit curve for firm B is the locus of points of different levels of output of the two competitors which yield to B the same level of profit (figure 18.9).

From the above definitions it should be clear that the isoprofit curves are

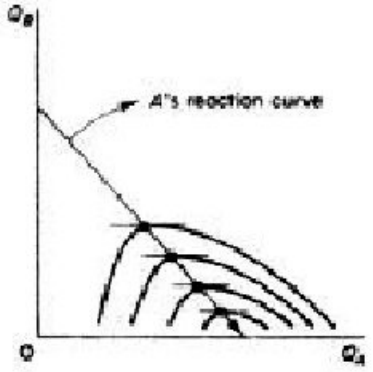


Figure 18.8 Isoprofit map of firm A

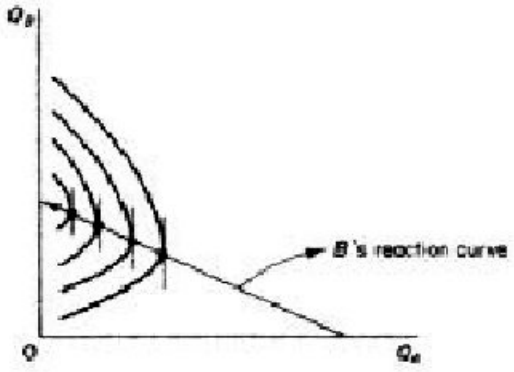


Figure 18.9 Isoprofit map of firm B

a type of indifference curves. There is a whole family of isoprofit curves for each firm which have the following properties :

1. Isoprofit curves for substitute commodities are concave to the axes along which we measure the output of the rival firms. For example, an isoprofit curve of firm A is concave to the horizontal axis QA. This shape shows how A can react to B's output decisions so as to retain a given level of profit. For example, consider the isoprofit curve in figure 18.10. Suppose that firm B decides to produce the level of output B1. A lineparallel to the horizontal axis through B1 intersects the isoprofit curve at points h and g. This shows that given the output that B decides to produce, firm A will realise the profit if it produces either of the two levels of output corresponding to points h and g, that is either Ah or Ag. Assume that firm A decides to react by producing the higher level Ag. If now firm B increases its output (say at the level B2), firm A must decrease its output (at Af) . If firm A continued to if it wants to

retain its profit at the same level produce Ag while B increased its productions, the total quantity supplied in the market would depress the price, and hence the profit of firm A would decline. Up to a certain point (e in figure 18.9) firm A must react to increases in B's output by reducing its own production, otherwise the market price would fall and A's profit would decrease. As firm A reduces its output, its costs also change, but the net profitremains at the same level, because

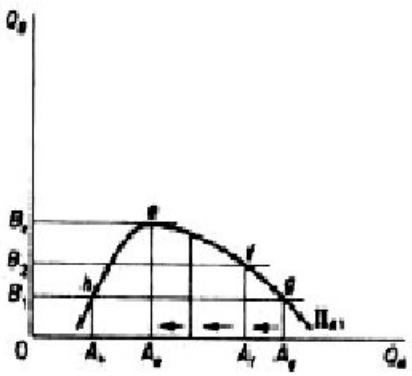


Figure 18.10

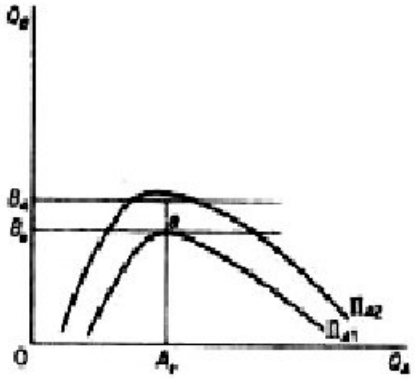


Figure 18.11

of market elasticity and/or decreasing costs arising from a better utilisation of A's plant.

Consider now point h. If firm A reacts to B's initial decision by producing the lower output Ah, it will clearly earn the same profit. If firm B decides to increase its output (at the levels B2, B3 and so on, up to Be), firm A will react by increasing its output as well; A's profit will remain the same despite the resulting fall in the market price, because of market elasticity and/or decrease in its costs due to a better utilisation of its plant.

2. The farther the isoprofit curves (for substitute commodities) lie from the axes, the lower is the profit. And vice versa, the closer to the quantity-axis as isoprofit curve lies, the higher the profitability of the firm is. Consider figure 18.10. If firm B were to increase its output beyond Be, firm A would not be able to retain its level of profit. Suppose that firm B decides to produce B4. Firm A can react in three ways; increase, decrease or retain its output constant (at Ae). If A retains its output constant while B increases its production, the ensuing fall in the market price will result in a reduction in the revenue and in the profits of A, given its costs. If firm A were to increase output beyond Ae, its profit would fall because of inelasticity of demand and/or increasing costs. If firm A were to reduce output below Ae, its profit would fall because of elasticity of demand and/or increasing costs. Thus firm A will earn a lower level of profit, no matter what its reaction, if B increased its output beyond Be. A line through B4 parallel to the QA axis lies above, and will intersect (or will be tangent) to an isoprofit curve which represents a lower profit for firm A. In figure 18.10 the isoprofit curve represents a lower profit than ∏ To summarise; for

any given output that firm B may produce, there will be a unique level of output for firm A which maximises the latter's profit. This unique profit-maximising level of output will be determined by the point of tangency of the line through the given output of firm B and the lowest attainable isoprofit curve of firm A. In other words, the profit-maximising output of A (for any given quantity of B) is established at the highest point on the lowest attainable isoprofit curve of A.

3. For firm A, the highest points of successive isoprofit curves lie to the left of each other. If we join the highest points of the isoprofit curves we obtain firm A's reaction curve. Thus, the reaction curve of firm A is the locus

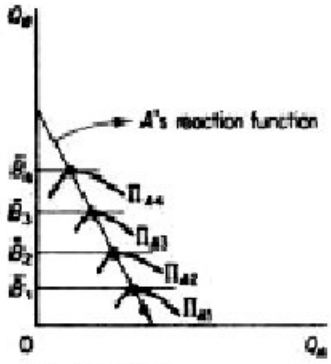


Figure 18.12

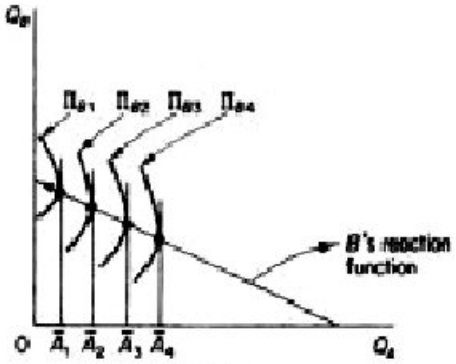


Figure 18.13

of points of highest profits that firm A can attain, given the levle of output of rival B. It is called 'reaction curve' because it shows how firm A will determine its output as a reaction to B's decision to produce a certain level of output. A's reaction curve is shown in figure 18.12.

B's isoprofit curves are concave to the QB axis. Their shape and position are determined by the same factors as the ones underlying firm A's isoprofit curves. The highest point of the isoprofit curves of B lie to the right of each other as we move to curves further away from the QB axis. If we join these highest points we obtain B's reaction function (figure 18.13). Each point of the reaction curve shows how much output B must produce in order to maximize its own profit, given the level of output of its rival.

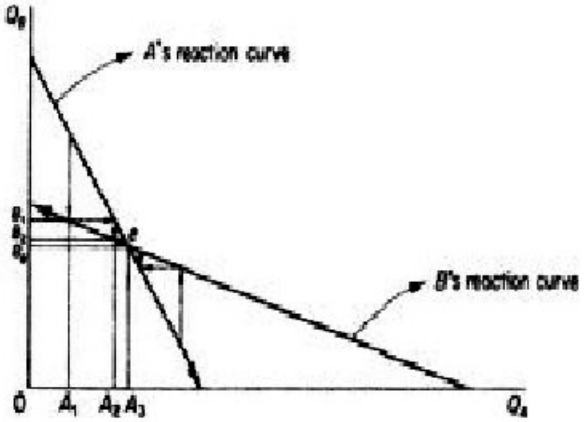


Figure 18.14

Cournor's equilibrium is determined by the intersection of the two reaction curves. It is a stable equilibrium, provided that A's reaction curve is steeper than B's reaction curve. (This condition is satisfied by the assumption we made that the highest points of successive isoprofit curves of A lie to the left of one another, while the highest points of B's isoprofit curves lie to the right of each other). To see that, let us examine the situation arising from A's decision to produce quantity A1, lower than the equilibrium quantity Ae (figure 18.14). Firm B will react by producing B1, given the Cournot assumption that firm A will keep its quantity fixed at A1. However, A reacts by producing a higher quantity, of A2, on the assumption that B will stay at the level B1. Now firm B1 reacts by reducing its quantity at B2. This adjustment will continue until point e is reached. The same equilibrium would be reached if we started from a point to the right of e. Thus e is a stable equilibrium.

Note that at point e each firm maximises its own profit, but the industry (joint profit) is not maximised (figure 18.15). This is easily seen by a curve similar to Edgeworth's contract curve which traces points of tangency of the two firms' isoprofit curves. Points on the contract curve are optimal in the sense that points off this curve imply a lower profit for one or both firms, that is, less industry profits as compared to points on the curve. Point e is a suboptimal point, and total industry profits would be higher if firms moved away from it on any point between a and b on the contract curve; at point a firm A would continue to have the same profit while firm B would have a higher profit. At point b firm B would remain on the same isoprofit curve while firm A would move to a higher isoprofit curve. Finally at any intermediate point between a and b, e.g. at c, both firms would realise

higher profits. The question arises of why the firms choose the suboptimal equilibrium e. The answer is that the Cournot pattern of behaviour implies that the firm do not jearn from past experience, each expecting the other to remain at a given position. Each firm acts independently, in that it does not know that the other behaves on the same assumption (behaviourial pattern). We will see in a subsequent section how Stackelberg modified this model, by assuming that one or both of the duopolists may be sufficiently alert to recognise that his rival will make the Cournot assumption about his behaviour.

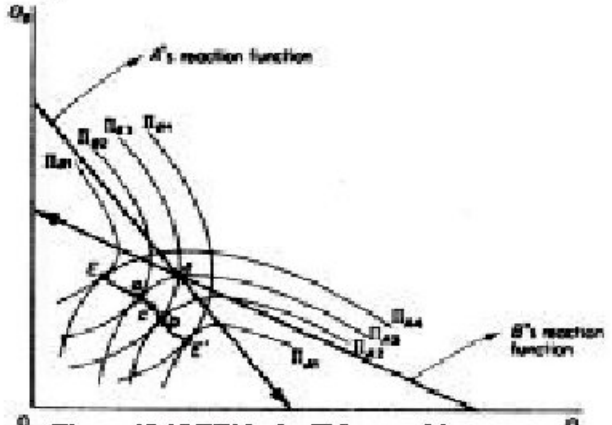


Figure 18.15 EE' is the 'Edgeworth's contract curve

COLLUSIVE OLIGOPOLY

One way of avoiding the uncertainty arising from oligopolistic interdependence is to enter into collusive agreements. There are two main types of collusion, cartels and price leadership. Both forms generally imply tacit agreements, since open collusive action is commonly illegal in most countries at present.

Although direct agreements among the obligopolists are the most obvious examples of cullusion, in the modern business would trade associations, professional organisations and similar institutions usually perform many of activities and achieve in a legal or indirect way the goals of direct collusive agreements. For example, trade associations issue various periodicals with information concerning actual or planned action of members. In this official way firms get the message and act accordingly.

In this chapter we will examine the two formal types of collusion, cartels and price leadership. Both forms have been exhaustively analysed by W. Fellner.

1. CARTELS

We saw that, in the absence of collusion, the monopoly solution in the industry (the solution at whichthe joint industry profit is maximised) can be achieved under the rare conditions that (a) each firm knows the monopoly price, that is, has a correct knowledge of the market demand and of the costs of all firms, (b) that each firm recognises its interpendence with the others in the industry, (c) all firms have indentical costs and identical demands. (Actually condition (c) implies condition (a).

We will examine two typical forms of cartels: (a) cartels aiming at joint-profit maximisation, that is, maximisation of the industry profit, and (b) cartels aiming at the sharing of the market.

A. CARTELS AIMING AT JOINT-PROFIT MAXIMISATION

Cartels imply direct (although secret) agreements among the ompeting oligopolist with the aim of reducing the uncertainty arising from their mutual interdependence. In this particular case the aim of the cartel is the maximization of the industry (joint) profit. The situation is identical with that of a multiplant monopolist who seeks the maximisation of his profit. We concentrate on a homogeneous or pure oligopoly, that is, an oligopoly where all firms produce a homogeneous product. The case of differentiated oligopoly will be examined in a separate section.

II. Price Leadership

Another form of collusion is priceleadership. In this form of co-ordinated behaviour of oligopolists one firm sets the price and the others follow it because it is advantageous to them or because they prefer to avoid uncertainty about their competitors' reactions even if this implies departure of the followers from their profit-

maximising position. Price leadership is widespread in the business world. It may be practised either by explicit agreement or informally. In nearly all cases price leadership is tacitsimce open collusive agreements are illegal in most countries.

Price leadership is more widespread than cartels, because it allows the members complete freedom regarding their product and selling activities and thus is more aceptable to the followers than a complete cartel, which requires the surrendering of all freedom of action to the central agency.

If the product is homogeneous and the firms are highly concentrated in a location the price will be identical. However, if the product is differentiated prices will differ, but the direction of their change will be the same, while the same price differentials will broadly be kept.

There are various forms of price leadership. The most common types of leadership are

(a) Price leadership by a low-cost firm.

(b) Price leadership by a large (dominant) firm.

(c) Barometric price leadership.

These are the form of price leadership examined by the traditional theory of leadership as developed by Fellner and others. The characteristic of the traditional price leader is that he sets his price on marginalistic rules, that is, at the level defined by the intersection of his MC and MR curves. For the leader the behavioural rule is MC = MR. The other firms are price-takers who will not normally maximise their profit by adopting the price of the leader. If they do, it will be by accident rather than by their own independent decision.

SUMMARY

Chamberlin's theory of monopolistic competion has exposed the classical myth of perfect competion. It has also brought a mini revulution in the corrential thinking on monoploy. In the modern thought on value theory, the importance of trade mark and of advertising and the need of the study of product structure and evolution have become more generally recognised. According to Professor Bain–Chamberling's contribution has a far reaching effect on the reformulation of price theory in a more relastic manner.

FURTHER STUDY

Cooper -- w.w. Theory of Firm Sum suggestions.

Mithani – D.M. Modern Economic Analysis.

UNIT 19

MONOPOLY

OBJECTIVES

After reading this unit you should be able to know about the :

- Meaning & Difinitions of Monopoly.
- Assumption's of Monopoly
- Equilibrium of firm under short term & long term and limitation of monopoly.

STRUCTURE

19.1 INTRODUCTION

It is a market situation where there is a single seller controlling the entire market. Thus, the firm itself becomes the industry. So, the distinction between firm and industry ceases to exit in a monopoly market. Apparently, there is absence of any competition in such a market, since the

entry of rivals is effectively prevented. Being the sole supplier, the monopolist has a strong control over price determination. In a locality where there is only a single grocery shop, the grocer has a monopoly. Pure monopoly is common in the form of many public utility enterprises under the complete control of the state.

The characteristic features of monopoly market for a product are:

(1) The monopolist is the only producer in the industry. Thus, firm and industry under monopoly are identical.

(2) There are no closely competitive competitive substitutes for the pruduct of the monopolist. So the buyers have no alternative or choice. They have to either buy the product from the monopolist or go without it.

(3) Monopoly is a complete negation of competition.

(4) The monopoly firm itself being the industry, it faces a downword-stoping demand curve for its product. That means it cannot sell more output unless the price is lowered.

(5) A pure monopolist has no immediate rivals due to certain barriers to entry in the field. There are legal, technological, economic or natural obstacles, which may block the entry of new firms.

(6) In a monopoly market, the price is solely determined at the distinction of the monopolist, since he has a control over the supply.

19.2 DEFINITION

Monopoly is a market structure in which there is a single seller, there are no close substitutes for the commodity it produces and there are barriers to entry.

The main causes that lead to monopoly are the following. Firstly, ownership of strategic raw materials, or exclusive knowledge of production techniques. Secondly, patent rights for a product or for a production process. Thirdly, government licensing or the imposition of foreign trade barriers to exclude foreign competitors. Fourthly, the size of the market may be such as not to support more than one plant of optimal size. The technology may be such as to exhibit substantial economies of scale, which require only a single plant, if they are to be fully reaped. For example, in transport, electricity, communications. There are substantial economies which can be realised only at large scale of output. The size of the market may not allow the existence of more than a single large plant. In these conditions it is said that the market creates a 'natural' monopoly, and it is usually the case that the government undertakes the production of the commodity or of the service so as to avoid exploitation of the consumers. This is the case of the public utilities. Fifthly, the existing firm adopts a limit-pricing policy, that is, a pricing policy aiming at the

prevention of new entry. Such a pricing policy may be combined with other policies such as heavy advertising or continuous product differentiation, which render entry unattractive. This is the case of monopoly established by creating barriers to new competition.

19.3 DEMAND AND REVENUE

Since there is a single firm in the industry, the firm's demand curve is the industry demand curve. This curve is assumed known and has a downward slops.

COSTS

In the traditional theory of monopoly the shapes of the cost curves are the same as in the theory of pure competition. The AVC, MC and ATC are U-shaped, while the AFC is a rectangular hyperbola. However, the particular shape of the cost curves does not make any difference to the determination of the equilibrium of the firm. Provided that the slope of the MC is greater than the slope of the MR curve.

One point should be stressed here. The MC curve is not the supply curve of the monopolist, as is the case in pure competition. In monopoly there is no unique relationship between price and the quantity supplied.

19.4 EQUILIBRIUM OF THE MONOPOLIST

A Short-run equlibrium

The monopolist maximises his short-run profits if the following two conditions are fulfilled : Firstly, the MC is equal to the MR. Secondly, the slope of MC is greater than the slope of the MR at the point of intersection.

In figure 19.1 the equilibrium of the monopolist is defined by point e, at which the MC intersects the MR curve from below. Thus both conditions for equilibrium are fulfilled. Price is PM and the quantity is XM. The monopolist realises excess profits equal to the shaded area APM CB. Note that the price is higher than the MR.

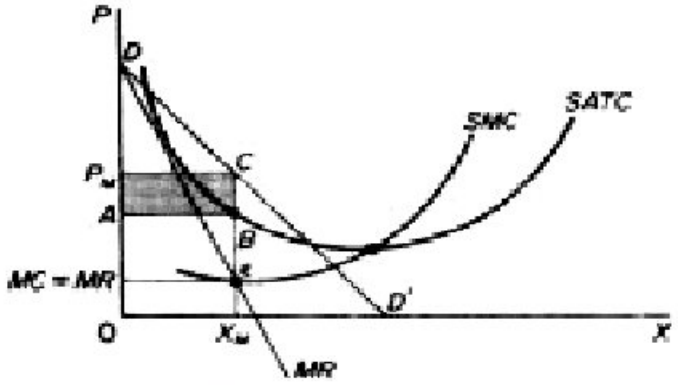


Figure 19.1

In pure competition the firm is a price-taker, so that its only decision is output determination. The monopolist is faced by two decisions : setting his price and his output. However, given the downward-sloping demand curve, thetwo decisions are interdependent. The monopolist will either set his price and sell the amount that the market will take at it, or he will produce the outputdefined by the intersection of MC and MR,which will be sold at the corresponding price, P. The monopolist cannot decide intependently both the quantity and the price at which he wants to sell it. The crucial condition for the maximisation of the monopolist's profit is the equality of his MC and the MR, provided that the MC cuts and MR from below.

We may now re-examine the statement that there is no unique supply curve for the monopolist derived from his MC. Given his MC, the same quantity may be offered at different prices depending on the price elasticity of demand. Graphically this is shown in figure 19.2. The quantity X will be sold at price P1 if demand is D1 while the same quantity X will be sold at price P2 if demand is D2. Thus there is no unique relationship between price and quantity. Similarly, given the MC of the monopolist, various quantities may be supplied at any price, depending on the market demand and the corresponding MR curve. In figure 19.3 we depict such a situation. The cost conditions are represented by the MC curve. Given the costs of the monopolist, he would supply OX1, if the market demand is D1, while at the same price P1 he would supply only OX2 if the market demand is D2.

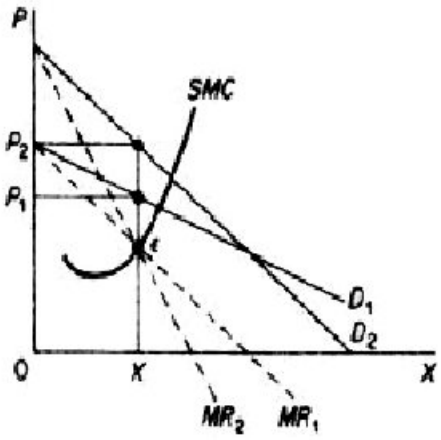


Figure 19.2

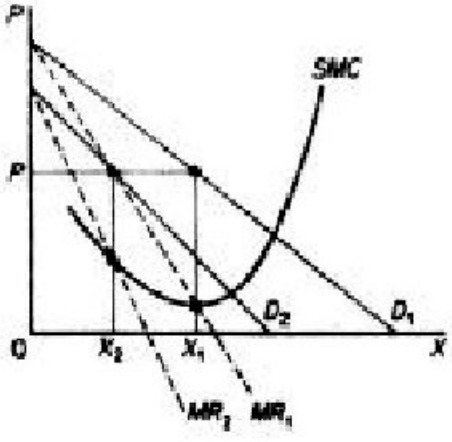


Figure 19.3

B. Long-run Equilibrium

In the long run the monopolist has the time to expand his plant, or to use his existing plant at any level which will maximum his profit. With entry blocked, however, it is not necessary for the monopolist to reach an optimal scale (that is, to build up his plant untill he reaches the minimum point of the LAC). Neither is there any guarantee that he will use his existing plant at optimum capacity. What is certain is that the monopolist will not stay in business if he makes losses in the long-run. He will most probably continue to earn supernormal profits even in the long run given

that entry is barred. However, the size of his plant and the degree of utilisation of any given plant size depend entirely on the market demand. He may reach the optimalscale (minimum point of LAC) or surpass the optimal scale (expand beyond the minimum LAC) depending on the market conditions. In figure 19.4 we depict

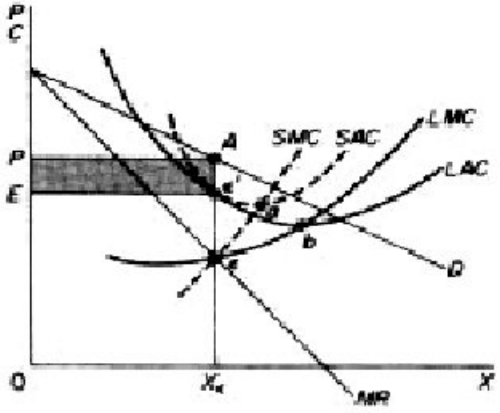


Figure 19.4 Monopolist with suboptimal plant and excess capacity

the case in which the market size does not permit the monopolist to expand to the minimum point of LAC. In this case not only is his plant of Sub-optimal size (in the sense that the full economies of scale are not exhausted) but also the existing plant is under utilised. This is because to the left of the minimum point of the LAC the SRAC is tangent to the LAC at its falling part, and also because the short-run MC must be equal to the LRMC. This occurs at e, while the minimum LAC is at b and the optimal use of the existing plant is at a. Since it is utilised at the level, there is excess capacity.

In figure 19.5 we depict the case where the size of the market is so large that the monopolist, in order to maximise his output, must build a plant larger than the optimal and overutilise it. This is because to the right of theminimum point of the LAC the SRAC and the LAC are tangent at a point of their positiveslope and also because the SRMC must be equal to the LAC. Thus the plant that maximum the monopolist's profits leads to higher costs fortwo reasons : Firstly because it is larger than the optimal size, and secondly because it is overutilised. This is often the case with public utility companies operating at national level.

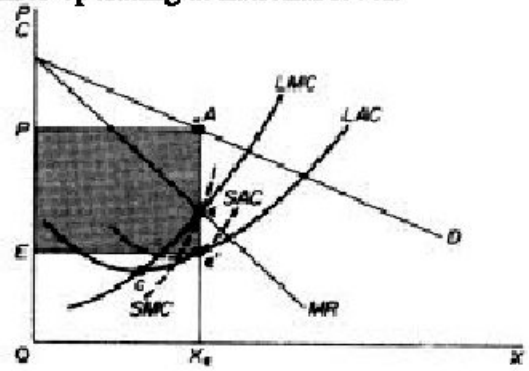


Figure 19.5 Monopolist operating in a large market: his plant is larger than the optimal (e) and it is being overutilised (at e).

Finally in figure 19.6 we show the case in which the market size is just large enough to permit the monopolis to build the optimal plant and use it at full capacity.

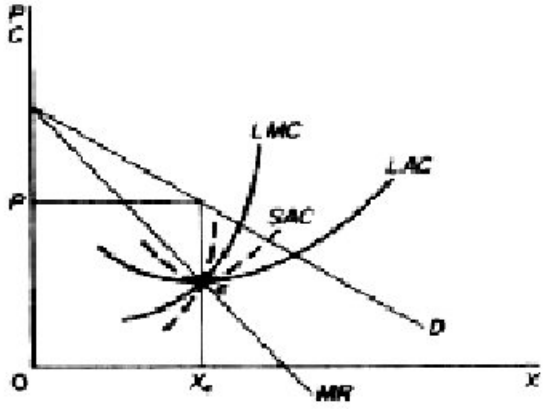


Figure 19.6

It should be clear that which of the above situations will emerge in any particular case depends on the size of the market (given the technology of the monopolist). There is no certainty that in the long run the monopolist will reach the optimal scale, as is the case in a purely competitive market, In monopoly there are no market forces similar to those in pure competition which lead the firms to operate at optimum plant size (and utilise it at its full capacity) in the long run.

19.6 PREDICTIONS OF THE MONOPOLY MODEL IN DYNAMIC SITUATIONS

In this section we will examine the effects on the monopolist's equilibrium of (a) a shift in the market demand, (b) a change in costs. (c) the imposition of a tax by the government.

A. Shift in the market demand

We saw that an upward shift in the market demand resulted (in the short run) in a new market equilibrium with a higher price and a lower quantity. In amonopoly market this may not be so. An upward shift of the market demand (provided that the new demand does not intersect the initial one) will result in a new market equilibrium in which the quantity produced will be larger, but the price may increase, remain constant or, decrease. Let us examine these possibilities.

In the new equilibrium the price may remain constant while the quantity supplied increases. This case is shown in figure 19.7. Assume that the new demand curve is D2, to the right of D1. The shift in D will lead to a shift of the MR curve (from MR1 to MR2). Given the marginal-cost curve of the monopolist, the new equilibrium position is e where the price is the same as before, but the quantity produced is larger (OX2 < OX1).

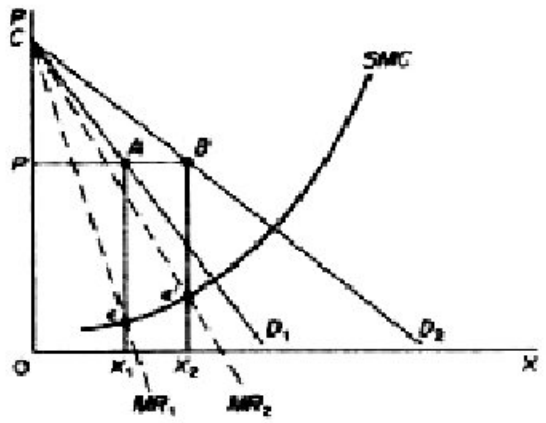


Figure 19.7

In this case the total revenue of the monopolist will increase (OPBX2 > OPAX1). Further more his profit will be larger, because the monopolist's SATC will be decreasing over the range between X1 and X2. this is so because the SMC curve cuts the SATC curve at its minimum point. Thus if at the initial equilibrium the monopolist was earning excess profits (equal to PKCA in figure 19.8), his SATC must have been above his SMC curve, and the SATC must have been declining,since it is impossible for it tostart rising before ithas been intersected by the SMC curve. Assume that the point of intersection of the SATC and SMC curves occurs at the level of output X3. It is clear that at X2 the SATC is smaller than at the level X1. Hence the total excess profit of the monopolist increases (if the price remainsconstant while his demand increases (PK'MB > PKCA in figure 3.8.)

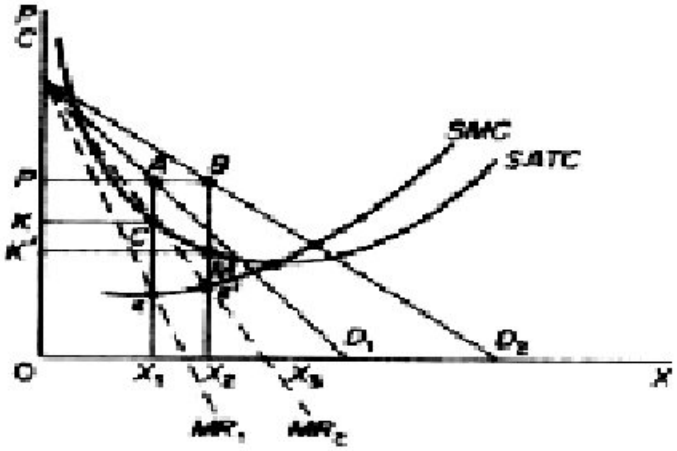


Figure 19.8

In the new equilibrium both the quantity and the price of the monopolist may be greateras compared to the initial equilibrium. This case is shown in figure 19.9. If the demand shifts to D2 (above D1) the new equilibrium is E', at which the price as well as the quantity supplied by the

monopolist are greater that at the original equilibrium E (clearly P2 > and OX2 > OX1).

In the new equilibrium the price may belower than the initial while the quantity is larger. This is shown in figure 19.10.

If demand shifts to D2 the quantity in the new equilibrium will be larger (OX2 > OX1) and it will be sold at a lower price (P2 < P1).

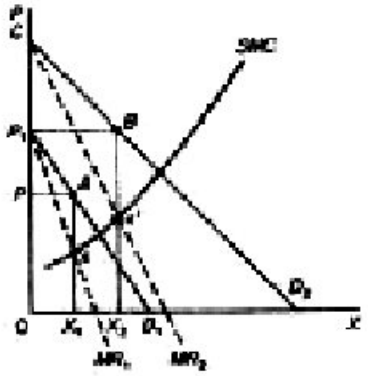


Figure 19.9

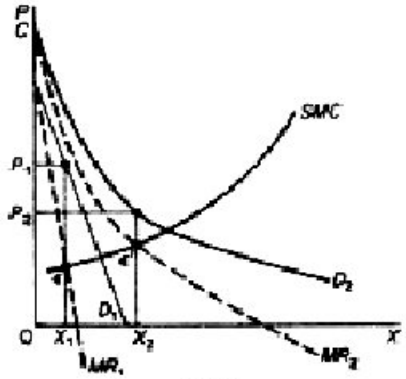


Figure 19.10

It should be clear that the effects of the shift in demand depend on the extent of the shift and on the price elasticity of demand. When demand shifts its elasticity is changing at any one price. If the new demand curve lies above the original and has a substantially greater elasticity (at the original price level), it may be profitable for the monopolist not only to increase his output, but also to sell it at a lower price.

19.7 COMPARISON OF PURE COMPETITION AND MONOPOLY

When comparing any two models we will be looking at the following aspects.

1. Goals of the firm
2. Assumptions of models regarding:
   - (a) Product
   - (b) Number of sellers (land buyers)
   - (c) entry conditions
   - (d) Cost conditions
   - (e) Degree of knowledge
3. Implications of assumptions for the behavious of the firm
   - (a) Shape of demand
   - (b) Atomistic behavious or interdependence
   - (c) Policy variables of the firm and main decisions

4. Comparison of basic magnitudes at equilibrium (long-run)
   (a) Price (and price elasticity of demand)
   (b) Output
   (c) Profit
   (d) Capacity utilisation (economies of scale)
5. Predictions of the models
   (a) Shift in market demand
   (b) Shift in costs
   (c) Imposition of a tax

Comparing perfect competition and monopoly in the light of the above method ological scheme we derive the following conclusion:

Goals of the firm

In both models the firm has a single goal, that of profit maximisation. Indeed the whole concept of rational behavious is defined in terms of profit maximisation: the firm is rational when its behaviour aims at the maximization of profit.

In both models the owner of the firm is also the manager-entrepreneus. There is no separation of ownership and management in these traditional models.

Assumptions

The product is homogeneous in pure competition. In monopoly the product may or may not be homogeneous. The main feature of monopoly is that total supply of the product is concentrated in single firm.

In pure competition entry (and exit) is free in the sense that there are no barriers to entry. However, in the short run entry is not easy: entry is a long-run phenomenon. In monopoly entry is blockaded by definition.

In both models the cost conditions are such as to give rise to U-shaped cost curves both in the short run and in the long run. The plandis planned to produce a single level of output with minimum cost. there is no flexibility (reserve capacity) in the plant. In the short run the U-shape is due to the inevitable results of the law of eventually diminishing returns of the variable factors (or law of variable proportions). In the long run all factors are variable, but eventually the efficiency of management declines and this causes the LAC curve to turn upwards beyond a certain (optimal) scale of output.

Perfect knowledge is assumed in both market structures. Uncertainty is dealt with (in the neoclassicalversions of pure competition) byassuming that the firm knows the results of anyaction up to a probability distrinution. Having this knowledge, the firm has a certain timehorizon

and aims at the maximization of the present value of its future stream of net profits.

Obtaining information about present or the future requires some expense. Information or search activity is decided on marginalistic rules, by equating the MC of informations to its MR.

Behaviour of the firm

Given the assumptions of large numbers and homogeneous product, the demand curve in pure competition is perfectly elastic, showing that the firm is a price-taker. In monopoly the demand of the firm is also the demand of the industry and hence is negatively sloping.

The only decision (and policy variable) of the firm in pure competition is the

determination of its output. There is no room for selling activities, since the firm can sell any amount of output it can produce. Some economists argue that there is no in couragement for research and development for the firm in the purely competitive market, since the firm can sell whatever it wishes without such activities. Others argue that the urge for technological research is strong in pure competition, since the firm can increase its profits only by decreasing its costs, something that can be achieved only with research and development in new methods of production. Such arguments are not conclusive, and empirical evidence can hardly be expected to support or refute them, since pure competition does not exist in most economic activities.

The monopolist can determine either his output or his price, but not both, since one of these policy variables is decided, the other is simultaneously determined. The monopolist may change the style of his product and/or indulge in research and development activities, especially if there is danger of development of close substitutes in other industries. Under these conditions the monopolist may also undertake heavy advertising and other selling activities. Thus the monopolist has more policy variables at his disposal (product, price, research and development, advertising, etc). Whether he will make use of these instruments and to what extent, is a matter highly debated in theory and in practice. In general the use of such instruments as product differentiation, advertising, R& D expenditures, depends on the threat of potential competition from new similar products, or on social and government at pressures.

In both markets the firm acts atomistically, that is, it take the decisions which will maximise its profit, ignoring the reactions of other firms. In both markets the decisions are taken by applying the marginalistic rule

$$MC = MR$$

Both models are basically static. Although a distinction is made between the short run and the long run, it is assumed that the long run consist of identical time periods, which are independent: the decisions taken in one period do not affect the profits in other periods. Thus short-run profit maximisation leads to long-run profit maximisation.

19.8 BILATERAL MONOPOLY

Bilateral monopoly is a market consisting of a single seller (monopolist) and a single buyer (monopsonist). For example, if a single firm produced all the copper in a country and if only one firm used this metal, the copper market would be a bilateral monopoly market. The equilibrium in such a market cannot be determined by the traditional tools of demand and supply. Economic analysis can only define the range within which the price will eventually be settled. The precise level of the price (and output), however, will ultimately be defined by non-economic factors, such as the bargaining power, skill and other strategies of the participant firms. Under conditions of bilateral monopoly economic analysis leads to indeterminacy which is finally resolved by exogenous factors.

To illustrate a situation of bilateral monopoly assume that all railway equipment is produced by a single firm and is bought by a single buyer. British Rail. Both firms are assumed to aim at the maximisation of their profit. The equilibrium of the producer monopolist is defined by the intersection of his marginal revenue and marginal cost curves (point e1 in figure 19.11). He would maxiimise his profit if he were to produce X1 quantity of equipment and sell it at the price P1.

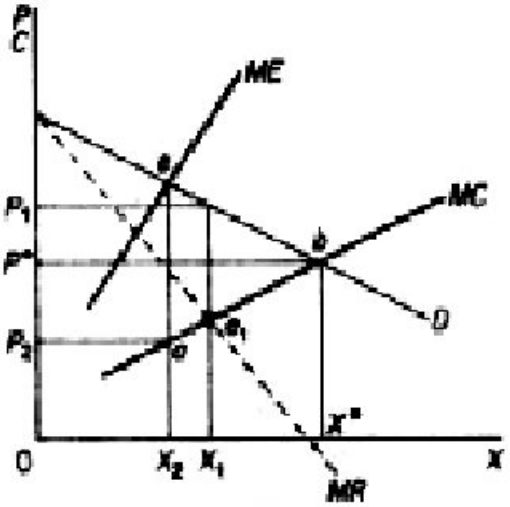


Figure 19.11

However, the producer cannot attain the above profit-maximising position, because he does not sell in a market with many buyers, each of whom would be unable to affect the price by his purchases. The producer-monopolist is selling to a single buyer who can obviously affect the market price by his purchasing decisions.

Price & Profit Analysis

The buyer is aware of his power, and, being a profit maximiser, he would like to impose his own price terms to the producer. What are the monopsonist's price terms? Clearly the MC curve of the producer represents the supply curve to the buyer: the upward slope of this curve shows that as the monopsonist increases his purchases the price he willhave to pay rises. The MC (= S) curve is determined by conditions outside the control of the buyer, and it shows the quantity that the monopolist-seller is willing to supply at various prices. The increasein the expenditure of the buyer (his marginal outlay or marginal expenditure) caused by the increases in his purchases is shown by the curve ME in figure 19.11. In other owrds, curve ME is the marginal cost of equipment for the monopsonist-buyer (it is a marginal-outlay curve to the total-supply curve MC, with which the buyer is faced). The equipment is an input for the buyer. Thus in order to maximise his profit he would like to purchase additional units of X until his marginal outlay is equal to his price, as determined by the demand curve DD. The equilibrium of the monopsonist is shown by point e in figure 19.11: he would like to purchase X2 units of equipment at a price P2, determined by point a on the supply curve MC (= S). However, the monopsonist does not buy from a lot of small firms which would be pricetakers (that is, who would accept the price imposed by the single buyer), but from the monopolist, who wants to charge price P1. Given that the buyer wants to pay P2 while the seller wants to charge P1, there is indeterminacy in the market. The two firms will sooner or later start negotiations and will eventuallyreach an agreement about price,which willbesettled somewhere in the range between P1 and P2, ($P2 < P < P1$), depending on the bargaining skill and power of the firms.

It should be obvious that a bilateral monopoly is rare for commodity markets, but is quite common in labour markets, where workers are organised in a union and confront a single employer (for example, the miners unions and the Coal Board) or firms organised in a trade association.

If a bilateral monopoly emerges in a commodity market the buyer may attempt to buy out the seller-monopolist, thus attaining vertical integration of his production. The consequences of such take-over are intresting. The supply curve MC (=S) becomes the marginal-cost curve of the monopsonist, and hence hisequilibrium will be defined by point b in figure 19.11 (where the 'new'marginal-cost curve intersects the price-demand curve DD): output will increase to the level X and the marginal cost will be p* lower that the price P1 that the ec-monopolist would like to change.

The result of the vertical integration in these conditions is an increase in the production of the input,which will lead to an increase in the final product of the ex-monopsonist and a reduction in his price, given that he is faced by a downward-sloping market-demand curve. The examination of the welfare implications of such a situation is beyond the scope of this elementary analysis.

19.10 Summary

It is a market situation where there is a single seller controlling the entire market. Thus, the firm itself becomes the industry. So, the distinction between firm and industry ceases to exit in a monopoly market.

Apparently, there is absence of any competition in such a market, since the entry of rivals is effectively prevented. Being the sole supplier, the monopolist has a strong control over price determination. In a locality where there is only a single grocery shop, the grocer has a monopoly. Pure monopoly is common in the form of many public utility enterprises under the complete control of the state.

Monopoly is a market structure in which there is a single seller, there are no close substitutes for the commodity it produces and there are barriers to entry.

Bilateral monopoly is a market consisting of a single seller (monopolist) and a single buyer (monopsonist). For example, if a single firm produced all the copper in a country and if only one firm used this metal, the copper market would be a bilateral monopoly market. The equilibrium in such a market cannot be determined by the traditional tools of demand and supply. Economic analysis can only define the range within which the price will eventually be settled. The precise level of the price (and output), however, will ultimately be defined by non-economic factors, such as the bargaining power, skill and other strategies of the participant firms. Under conditions of bilateral monopoly economic analysis leads to indeterminacy which is finally resolved by exogenous factors.

UNIT 20

PROFIT THEORIES AND POLICIES

OBJECTIVES

In capitalist system profit is the primary measure the success of a business firm. Profit is the reward earned by an enterpreneur for his contribution to the process of production.

After reading this unit, you should be able to about the :

1. Concept of profit and its origin.
2. Theories of profit.
3. Conclusion.

STRUCTURE

20.1 THE CONCEPT OF PROFIT

The concept of profit entails several different meanings :

Profit may mean the compensation received by a firm for its managerial function. It is called a normal profit which is minimum sum essential to induce the firm to remain in business.

Profit may be looked upon as reward for true enterpreseurial function. It is the reward earned by the enterpreneur for bearing the risk. It is termed super normal profit for analytical reason.

Profit may imply monopoly profit. It is earned by a firm through extortion because if its for monopoly power in the market. It is not related to any useful specific function. Thus monopoly profit is not a functional reward.

Characteristics of Profit :

Profit is earning of entrepreneur. To economist the most significant point about profit is that it is a residual income. However, the term profit has been different connotation in the accounting sense and in the economic sense. In accounting sense, when total cost is substrated from total revenue or total sales receipts of the firm the residual is termed profit.

Thus Profit = Total Revenue - Total Cost.

In economic sense,

Profit = Total Revenue - Total explicit and implicit costs.

Professor Sarage and Snell, therefore, define profit as what remains of the firms revenue after all inputs have been paid.

In this way in the economic sense, profit is looked upon as a surplus i. e. a surplus of firm's total receipt over the total costs. Another important feature of profit is that being a residual income it may even be negative. Negative profit is called loss. when total cost exceeds total revenue there is loss or negative profit. It is only the entrepreneur who has to suffer a negative reward.

Apparently, profit cannot be calculated in advance because it is uncertain variable and unpredictable by nature. Profit can be measured only when it is realized. It is thus a term basically used in exante sense viewing the balance sheet of any Joint Stock Company we can know the apparent rate of profit on capital invested for the past years but we can not know the rate of profit in future years well in advance due to high degree of uncertainty involved in modern business.

The following are the distimctive features of profit as a feature reward-

- It is not a pre-determined contractual payment.
- It is not a fixed remmuneration.
- It is a residual surplus.
- It is uncertain.
- It may be negative. Other factor rewards are always possitive.
- It is widely fluctuating while other factor incomes are generally stable over a period of time.

Gross Profit and Net Profit

In ordinary pariance, profit actually means gross profit. It is surplus of total revenue over total money expenditure incurred by a firm after the production process. Gross profit, thus includes many items of inputs, service and their miscellaneous costs so it can not be regarded as profit in the real sense. Thus, though, profit is residual income, the whole of it is not pure economic profit which is a return for the risk bearing function of the entrepreneur.

Gross profit includes the following items –

- Imputed costs like maintenance and depreciation charges. To arrive at
- net profit these are to be deducted form the gross profit.
- Implicit return, such as implicit rent, implicit wages and implicit wages for the factors for example, land, labour and capital, owned & supplied by the entrepreneur himself. In many business firms, the entrepreneur uses his own land, invests his own capital and also himself works as manager.
- Normal profit is also the implicit Costs of entrepreneurial input. It is imputed the minimum return for the entrepreneurs organizational function.
- Non entrepreneurial profit, includes wind fall gains, monopoly gains etc. which accrue to the entrepreneur as result of chance events and market imperfection. This profit element is not related entrepreneurial ability in the strict sense.
- Net profit - It is the pure economic profit earned by the entrepreneur for his service and efficiency.

In Short,

GROSS PROFIT = NET PROFIT + IMPLICIT RENT + IMPLICIT WAGES + IMPLICIT INTREST + NORMAL PROFIT + DEPRICIATION & MAINTINENCE CHARGES + Non entrepreneurial profit thus, it follows that-

NET PROFIT = GROSS PROFIT- (implicit rent, implicit wages + implicit interest + Normal profit + depreciation and maintenance charges +non entrepreneurial profit) Indeed net profit = Economic profit or pure business profit. It is the reward earned exclusively by the entrepreneur for the entrepreneurial function which are :

1. Efficiency in the organization of business. He coordinates different factors of production such as land, labour and capital in the productive process.
2. Risk bearing function. Pure business profit is the reward for risk borne by the entrepreneur. The entrepreneur alone bears the risk involve in the business, so he is entitled to pure profit.
3. Innovating function : Profit is also the reward earned by the entrepreneur for innovations. He may adopt new techniques, new products, new markets in order to earn excess profit.

It is the new profit which may be possitive or negative. A negative net profit means loss.

There are the following important theories of profit which are describe as follows :

Hawley's Risk Theory of Profit

To professor Hawley's since the enterpreneur under takes the risks of business he is entitled to receive profit as his reward. In fact the chance to make a profit induces businessmen to run the risk of loss, if there is no hope for substaintial profit no one will be willing to risk money by investing it in a business.

Profits are commensurate with risk. The more risky the business the higher is the expected profit rate. Professor D. M Holland's has impirically investigated the rate of profit on capitalisation earned by business firms,with a view to discovering the specturm of profit rates of business can be explained by the risk factor. He concludes that "The riskier the industry or firm the higher the profit rate but he also warns that this is tentative finding; therefore much remains to be refind and tested in depth".

The following criticisms have been levelled against the risk theory.

1. There can be no functional relationship between risk and profit. Those whoundertake high risks in certain besinesses may not necessarily earn high profits.
2. To some critics like Carveprofit is not based on enterpreneurs ability to undertake the risk of the business but rater as his capability of risk avoidance.
3. The Theory disregards many other factors attributable to profit and just concentrate on risks.

Knight's Theory of RiskUncertainty and Profit

A refinement was, however, made by Professor Knight in Hawley's risk bearing theory of profit. Knight's Theory of profit is considered as modern theory of profit.

Knight defines pure profit as "the difference between the returns actually realised by the entrepreneur and the competitive rate of interest on high class giltedged securities." Accourding to knoght, pure profits are linked the uncertaintly and risk-bearing. He, however, classifies risks into : (i) insurable risks, and (ii) non-insurable risks. Of the many risks involved in the business, some risks are predictable because they are certain and hence are insurable. For instance, fire, theft, flood, accident, etc., are risks in business, but these risks can be insured. Thus, business losses arising out of such risks are covered by insurance. Hence, in a modern economy, insurable risks are not the real risks attributed to entrepreseurial functions. True entrepreneurship lies in bearing non-insurable risks and uncertainties, Unforeseeable risks are non-insurable.

Accourding to Stonier and Hague, the difference between insurable and non-insurable risks lies in the fact that there is a possibility of statistical prediction of the probability of some events whose probability of occurrence cannot be predicted statistically. For instance, the probability of fire or accident, in general, can be estimated quite precisely by statisticians. Hence, the insurance companies calculate the risk and offer insurance policies at premiums which cover up the amount of claims they might have to pay. So the insurance company does not bear the actual risk. Similarly, entrepreneurs avoid risks by insuring against them. Again the insurance premiums paid by them are treated as costs of production, which are covered in the price of the product. Thus,. it follows that profit cannot be a reward for such insurable risk. But there are risks which are uncertain and non-calculable. Such risk, being unpredictable, no insurance company would be willing to cover them. Such non-insurable risks are:

1. **Demand fluctuations:** In a dynamic economy, changes in demand for a product may result from change in the size and age structure of the populations, change in fashion, change in distribution of income, etc. When demand fluctuates, the firm's revenue also changes. There cannot be an insurance against these changes. A sudden decrease in demand may cause a great loss to a firm; but such losses are non-insurable.

2. **Trade cycles:** In a capitalist economy, prosperity and depression are two major facts of modern business. During prosperity, a handsome profit may be reaped. But during a depression there is overall contraction of economic activities, leading to a sudden rapid decrease in demand for goods and resources, causing widespread losses. Recession and depression lack periodicity, hence alterations in revenue and cost conditions of firms, influencd by such phenomena, cannot be predicted nor can they be insured against.

3. **Technological changes:** When technology advances, a firm has to adopt new technology to retains its competitive strength. And technology has a direct bearing on the cost of productions. Discarding of old techniques, machineries, etc., amount to a loss which cannot be insured against.

4. **Competition:** Most of the markets are monopolistically competitive and there are no strong barriers to entry. Entry of new firms means a cut in the existing market share possessed by old firms. Competition from new rivals, then, leads to a fall in price and diminution of profit. But, there cannot be any insurance against the risks of competition. Again, no one can predict when exactly a new firm will enter the market and what will be its competitive strength.

5. **Structural changes:** In a dynamic economy, there are constant changes in consumer tastes, income, prices of substitutes, population growth, advertising, etc. These structural factors may

continually alter the sales of firms, so that a high degree of uncertainty abouts business is created, which is not insurable.

6. **Changes in Government Policies:** Government's economic policies, industrial, fiscal and monetary, etc. are always uncertain and unpredictable. Changes in government's economic policies widely affect business situations, for instance, when high taxes are imposed on certain goods, people's preferences may alter, so sales of such goods decline. If government relaxes its import policy, producers of import substitutes will face keen foreign competition, and may also experience a decline in their sales. Similarly, changes in licensing policy may alter the degree of monopoly power and sales position of many existing firms. Again, when, say, the Reserve Bank adopts a tight money policy by raising the bank and interest rates, cost conditions of many firms and their expansion projects may be adversely affected.

7. **Outbreak of war:** War affects businesses in a very uncertain manner yet, nobody can predict war.

All these risks are uncertain and unforseeable, and so are uninsurable. It is the main function of the entrepreneur to bear all such uncertainties of business. These uncertainties are distinct from risk, which is predictable. They coincide with risk which is unpredictable and uninsurable. Thus, all true profit is an exclusive reward for the entrepreneur_ for making business decisions for his firm under unpredictable. uncertain dynamic economic conditions.

In short, Knight's theory implies that:

(1) Profit is the reward for uncertainty-bearing.

(2) The unmeasurable risks are termed as uncertainty. These unmeasurable risks are true hazards of business.

(3) Pure profit is, however, a temporal and unfixed reward. It is tuned with uncertainty. Once the unforeseen circumstances become known, necessary adjustment would be possible. Then, pure profit disappears.

Knight's theory has been criticised on the following counts :

1. Uncertainty-bearing is not the sole determinant of profit. There are many factors influencing the earning of profit.
2. In fact, it is business ability rather that atmosphere of uncertainty which a leads to high reward of profits.
3. Knight fails to distinguish between ownership and control in modern joint stock companies, where shareholders are the owners but business control is in the hands of salaried managers. The

concept of profit and entrepreneurial function in such cases is not suitable exposed by the theory.

4. The theory does not suit well to expose the phenomenon of monopoly profit, when there is least uncertainty involved in a monopoly business.
5. Above all, the uncertainty element cannot be quantified to impute profit.

DYNAMIC THEORY OF PROFIT

J. B. Clark originated the 'Dynamic theory of Profit. In his view, dynamic changes in the economy should be regarded as the fundamental cause of the emergence of profits.

Clark defines profit as the different between selling price and costs, resulting on account of changes in demand and supply conditions. Briefly, profit is the surplus over costs.

Clark held that in a stationary state having static economic conditions of demand and supply, there can be no real or pure profit as a surplus. In a stationary economy, the quantum of capital invested, methods of production, managerial organisation, technology, demand pattern etc. remain constant. Under competitive conditions, thus, price tends to equal average costs, hence, the surplus is zero. So, no pure profit. However, there may be some frictional profits emerging due to frictions in the system. But, this cannot be regarded as real profit.

Profit is the outcome of dynamic changes in the economy. It is, thus a dynamic surplus of the dynamic economy. A dynamic modern economy is full of changes. According to Clark, following the 'general' changes cause profit to emerge:

1. Increase in Populations;
2. Changes in tastes and preferences;
3. Multiplication of wants;
4. Capital formation ;
5. Technological advancement ; and
6. Changes in the form of business organisation.

On account of these changes the economy tends to be dynamic. Demand and supply conditions are altered. Some entrepreneurs may get advantageous business positions against others and may reap surplus over costs, as a real profit. In short, those who takes advantage of changing situation can earn real profits accounting to their efficiency. Inefficient

and careless producers who fail to move with dynamic changes may not get any really profit and may even incur losses.

Clatk's dynamic theory of profit has an element of truth in it as it emphasizes the dynamic aspect of profit. But, it has been criticised on the following counts:

1. According to Taussig, Clark's theory gives an artificial dichotomy of 'profit' and 'wages of management'.
2. Clark's theory suggests that all dynamic changes lead to profit. Critics, however, point out that only unpredictable changes would give rise to profit. Predictable changes will not cause surplus to emerge on account of precise adjustments.
3. Clark's theory indicate that in a stationary state, there is only a frictional profit. But, the concept of frictional profit is vague. Rather, normal profit is earned in a stationary state.
4. Clark's theory not stress the element of risk involved in business due to dynamic changes. Thus, does best course is to combine elements of risk-dynamic changes to understand true nature of profit in a modern economy.

SCHUMPETER'S THEORY OF INNOVATION AND PROFIT

Schumpeter deemed profit as the reward to enterprise and innovation. In his view, the entrepreneur initiates innovation in the business and when he succeeds, he earns profit as his reward. Schumpeter emphasized this function of the entrepreneur to distinguish him from the bureaucratic executive or the manager, who simply runs an established business in a steady manner. Innovation and growth of a firm are the real job of the entrepreneur. As an innovator, the entrepreneur pursues new activities. Innovation means commercial application of new scientific inventions and discoveries. An innovator is, therefore a businessman with vision originality and is bold enough to bear high risks involved in undertaking new activities on a new basis. The innovator is not a scientist, himself but he successfully introduces new inventions on a commercial basis. To explain the phenomenon, we may refer an example given by Samuelson. The scientific theory of radio wave was the brain-work of Maxwell. It was experimented upon by Hertz, and its commercially profitable use was carried out by Marconi and Sarnoff, who are the innovators in radio manufacturing.

Innovation is always purposeful. It is sought for altering cost and revenue data in a profitable manner. There are, thus, two types of innovations : (i) product innovations, and (ii) market innovations. Under product innovations, there are technical improvements, changes in the

method of production and changes in the method of organization and operation etc. all of which affect the cost and quality of the product. When cost minimization techniques are introduced by the firm, it can yield, at least temporarily. a high rate of profit.

Under market innovations, there are changes influencing the market demand for the firm's products. Discovery and exploitation of new market, introducing new variety of products and product improvement, new modes of advertising and sales propaganda etc. may be regarded as market innovations.

Any form of innovation leads to a profit. It is described as innovational profit. Innovational profit is not an attribute of a particular factor unit such as monopoly profit. It is uncertain and unpredictable. It is temporary in nature. An innovator who is a pioneer of the business would earn innovational profit till other firms successfully imitate him and compete with it on a large scale.

Thus, innovational profits disappear when similar products enter the market. But once the innovational profit is competed away by rivals and imitators, the pioneer may search out another innovation. So, again he tends to earn innovational profit. In this way, innovational profit appears, disappears and reappears. So, these innovational profits exist continually in modern progressive business.

Since there is a high element of uncertainty involved in innovational profit on account of imitation, new inventions, etc, we can say that innovation, as a source of profit, is nothing but a special case of risk and uncertainty bearing.

PROFIT IN A SOCIALISTE ECONOMY

A socialist economy is a State, controlled economy. It is a centrally planned economy. In such an economy there is no chance for risks and uncertainties on account of comprehensive and perfect planning under the complete control of the government. Risks and uncertainties arise only when production is profit-oriented and is undertaken in anticipation of demand. In a socialist economy, distribution is also pre-determined, therefore, there is no question of uncertainties of demand. Thus, the concept of profit as a reward for risk and uncertainty bearing has least applicability to a socialist system. In a socialist economy all enterprises are state enterprises. State enterprise are run by the government executives public managers. Obviously, the decisions of public managers are in tune with the planning targets and of course, not based upon the objective of profit maximisation. Question of profit maximsation has no place in a socialist economic set up, because production is utility-oriented and not profit-based.

It, however, does not follow that there can be no profit-motive socialism. Innovational aspect of profit has its significance in a socialist economy. Again, profit-motive means the desire for personal gain. Pigou describes this attitude as "acquisitiveness." In this sense even in a socialist economy, everybody has a tendency to maximise his profits. If there is a liberal socialism, the worker or manager are found to have some occupational mobility, they move from one industry to another. Their mobility is guided by the profit motive. However, profit, as entrepreneurial income, is different from this profit motive behind mobility.

Hence, the question is whether profit as the difference between total revenue and total cost should be maximized in a socialist economy? Should the public managers be asked to exploit resources assigned to them in a way so as to earn the maximum net returns for the government ? This is easily possible because of sole public monopoly in all sectors. Again, when all profits belong to the government there is no question of social justice or the inequalities of income. But, maximization of profit cannot be an end by itself under socialism. Again, a socialist government does not need a maximum profit as a means of capital formation. Yet, the significance of profit cannot be ruled out in a socialist economy because it would serve as an indicator for the further expansion of a plant or an industry. The existence of profit in an industry indicates that the industry needs further expansion. With the increase in output, profits will tens to disappear. Again, profits will serve a guideline to the allocation of resources to the planners in the most desirable manner. Profits generated in the public organizations should be treated by public managers as an increase in allocation of investible funds for further expansion of their enterprises. Thus, the principle of profit maximization in a socialist economy implies the efforts on the part of public managers to keep down cost as low as possible.

According to G. N. Halm, profits in a liberal socialist system can appear legitimately in two ways : (i) the public managers may confront with a larger demand than visualised in a plan foremost, and (ii) there has been a development and use of new methods of production for the minimisation of costs. The second way is more legitimate.

The socialist system does permit incentives to managers and executives to involve managerial innovations that would minimise costs and improve returns thereby. Routine plans cannot bring a vigorous innovational activity as incentives under profit motive can do in a socialist economy. Any innovation is a stepping stone to progress.

Summary

Profit may mean the compensation received by a firm for its managerial function. It is called a normal profit which is minimum sum essential to induce the firm to remain in business.Profit is earning of entrepreneur. To economist the most significant point about profit is that it is a residual income. However, the term profit has been different connotation in the accounting sense and in the economic sense. In accounting sense, when total cost is substrated from total revenue or total sales receipts of the firm the residual is termed profit.

Thus Profit = Total Revenue - Total Cost.

In economic sense,

Profit = Total Revenue - Total explicit and implicit costs.

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Clark defines profit as the different between selling price and costs, resulting on account of changes in demand and supply conditions.

Briefly, profit is the surplus over costs. Socialist economy is a State, controlled economy. It is a centrally planned economy. In such an economy there is no chance for risks and uncertainties on account of comprehensive and perfect planning under the complete control of the government. Risks and uncertainties arise only when production is profit-oriented and is undertaken in anticipation of demand. In a socialist economy, distribution is also pre-determined, therefore, there is no question of uncertainties of demand. Thus, the concept of profit as a reward for risk and uncertainty bearing has least applicability to a socialist system. In a socialist economy all enterprises are state enterprises. State enterprise are run by the government executives public managers. Obviously, the decisions of public managers are in tune with the planning targets and of course, not based upon the objective of profit maximisation. Question of profit maximsation has no place in a socialist economic set up, because production is utility-oriented and not profit-based.

FURTHER STUDY

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Notes

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