

# Part I—INTRODUCTORY

## CHAPTER ONE

### DEFINITION OF ECONOMICS

#### A Preliminary Idea

It looks strange that one should be required to say what Economics is before one has studied the subject. For one can have a clear idea about the subject only after he has studied it. But the first question that a beginner of a new subject asks is what it is and what it is about. However, at this stage, we can only give him a working definition, because it is not easy to define Economics fully in the very beginning. One can define it fully only when one has read it. Only then can one have a clear and complete picture of the subject in one's mind. All the same, it is necessary to have some rough idea about the subject when one starts its study. Presently, we shall explain the definition more fully.

**Limited Means and Unlimited Ends.** To give the student a rough idea about Economics, we give an example. Mohan has just joined a college. Suppose his father has agreed to give him Rs. 400 per month to enable him to carry on his studies in the college. With this limited sum at his disposal, he has to meet all his needs. He has to pay tuition fee, hostel fee, mess charges and other dues of the college; he has also to meet other bills like the bill of the college canteen and the washerman's bill. He may like to go to a picture house or entertain friends at a restaurant, buy books, stationery, etc. In fact, he wants to do or to buy so many things. But the amount of money that he has is limited whereas his wants, as we have seen, are unlimited. Economics helps him in such a situation. It will help him to derive maximum satisfaction from the limited amount of money he has.

**Choosing between Ends.** Economics tells us how a person tries to satisfy his unlimited wants with his limited means; in other words, how to use scarce goods that he has to his best advantage or how to economise. A man has only a limited amount of cash and housing accommodation and other things. But he wants to put them to so many uses. With the limited amount of cash he has, he wants to buy so many things, but he cannot buy them all. He must, therefore, choose what to buy and what not to buy. This is Economics. **Economics is a science of choice when faced with scarce means and unlimited ends.**

**Deriving Maximum Satisfaction.** In short, Economics teaches us to make the best use of our limited resources. It tells us how the scarce means at our disposal can be put to several alternative uses so as to derive the maximum benefit out of them. It thus merely means prudence or wisdom in the use of things. We should use them in such a manner as to get the greatest amount of satisfaction possible. Economics tells us how to do it.

**Income and Employment.** Recent thinking in Economics is that besides studying the behaviour of an individual consumer or producer deriving

maximum benefit from the use of his limited resources, Economics is also concerned with the levels of income and employment in a country as well as causes of their fluctuation. Its study is thus intended to promote economic stability.

**Economic Development.** In respect of under-developed economies, Economics concerns itself with the study of economic growth. The theory of economic growth and the theory of income and employment are the two recent additions to the study of Economics.

Thus, Economics is a very wide subject. It concerns itself not only with the behaviour of individual consumers and individual producers or firms, but also with industries, national income and economic growth.

## VARIOUS DEFINITIONS

With this preliminary idea about Economics, we can now proceed to consider some well-known definitions of Economics. Economics has been defined in different ways by different writers. We discuss below some of these definitions.

### **Economics: A Science of Wealth**

**Definition.** Adam Smith in his book 'Wealth of Nations' (1776) defined Economics as "*An Enquiry into the Nature and Causes of the Wealth of Nations*". Many other earlier economists also gave similar definitions. Among them may be mentioned the French economist J.B. Say and the American economist F. A. Walker. According to say, "**Economics is the science which treats of wealth**". Walker said much the same thing, though the words are slightly different. In his words, "**Economics is that body of knowledge which relates to wealth.**"

**Comments.** But the definition of Economics as a science of wealth cannot be regarded as being a correct one. In this definition, attention was exclusively paid to wealth as if wealth was everything. Little attention was paid to man for whom wealth is really meant. Writers like Carlyle and Ruskin condemned this worship of Mammon (the god of wealth). They accused Economics of selfishness and meanness and, therefore, called it a '**dismal**' science. This definition was, therefore, rejected.

Later economists held a different view. They regarded Economics as a **science of man rather than of wealth**. No doubt, wealth is still there, because that is the centre of all economic activity. But they emphasized that wealth is only a means to an end, the end being human welfare. Man is primary and wealth occupies only a secondary place. Emphasis was, therefore, shifted from the study of wealth to that of man. This point is clearly brought out in the following well-known definition of Economics:—

**"Economics is the science which treats of those social phenomena that are due to the wealth-getting and wealth-using activities of man."**—(Ely).

### **Marshall's Definition: Science of Material Welfare**

The next definition which came to be generally accepted for a long time was by Dr. Alfred Marshall.

**Definition.** According to him, "**Economics is a study of man's actions in the ordinary business of life; it enquires how he gets his income and how he uses it. Thus it is on one side a study of wealth and on the other, and more important side, a part of the study of man.**"

## **SCOPE OF ECONOMICS**

While discussing the subject-matter and definition of Economics, we have said something about the scope of Economics too. But there are a few more things which we have to discuss in considering the scope of Economics.

'Scope' means the sphere of study. We have to consider what Economics studies and what lies beyond it. The scope of Economics will be brought out by discussing the following:—

- (a) The subject-matter of Economics.
- (b) Economics is a Social Science.
- (c) Whether Economics is a Science or an Art?
- (d) If Economics is a science, whether it is a positive science or a normative science?

We have already discussed at length the subject-matter of Economics; hence we now need consider the other four of the above aspects.

### **Economics—a Social Science**

We have seen that Economics studies human beings. But it does not study them as isolated individuals living aloof in jungles or in mountain caves. Rather, it studies man living in organized society, exchanging his goods for those of others, influencing them by his actions and being influenced by them in turn. He depends on them, and they on him. Economics is thus a social science and not one dealing with individual isolated human beings. Interest has now almost completely shifted to the economy as a whole, how it grows and develops, the factors that hinder its growth and the measures that would help or accelerate it.

### **Positive Science or Normative Science?**

A positive science explains the 'why' and 'wherefore' of things, i.e., their causes and effects. A normative science, on the other hand, discusses the rightness or wrongness of things. Economists hold different views on this point. Some economists think that Economics is only a positive science and as such explains why things are **as they are**. It is neutral as regards ends. Others think that it is a normative science and tells us as the things **ought to be**.

Our view is that Economics is both a positive and a normative science. It not only tells us why certain things happen, it also says whether it is the right thing to happen. For example, we know that a few people in the world are very rich while the masses are very poor. Economics should explain not only the causes of this unequal distribution of wealth, but it should also say whether this is good or bad. It might well say that wealth ought to be fairly distributed. Further, it should suggest the methods of doing it.

### **A Science or an Art?**

When a student joins a college, he has to choose between two groups of subjects—**Science subjects and Arts subjects**. In the former group are included

Physics, Chemistry, and Biology, and in the latter History, Civics, Economics, Philosophy, Sanskrit, etc. According to this classification, Economics falls in the Arts group. But this is not a sound classification, and does not help us in deciding whether Economics is a science or an art.

Let us first understand what the terms "science" and "art" really mean. A science is a systematized body of knowledge. A branch of knowledge becomes systematized when relevant facts have been collected and analysed in a manner that we can "trace the effects back to their causes and project causes forward to their effects." Then it is called a science. In other words, when laws have been discovered explaining facts, it becomes a science. Facts are like beads. But mere beads do not make a necklace. When a thread runs through the beads, it becomes a necklace. The laws or general principles are like this thread and govern the facts of that science. A science lays down general principles which help to explain things and guide us.

The knowledge of Economics has advanced a great deal. It has reached a stage when its facts have been collected and carefully analysed, and 'laws' or general principles explaining facts have been laid down. Thus, the study of Economics has become so thoroughly systematized that it is entitled to be called a science.

But Economics is also an art. An 'art' lays down precepts or formulae to guide people who want to achieve a certain aim. The aim might be the removal of poverty from a country, or the production of more wheat from an acre of land.

Many English economists consider that Economics is a pure science and not an art. They claim that its function is merely to explore and explain and not to help in the solution of practical problems. Yet many others are of the opinion that Economics is also an art. Economics does undoubtedly help us in solving many practical problems of the day. It is not a mere theory; it has great practical use. It is both light-giving and fruit-bearing.

Hence, Economics is both a science and an art.

**Conclusion.** We may, then, sum up the scope of Economics by saying that it studies man's actions in relation to wealth from the social point of view. It does not merely explore and explain but it also advocates and condemns. It not only investigates facts and discovers truths, but it also prescribes rules of life and passes judgment as to what is right and what is wrong. It is also both an art and a science. The scope of Economics is very wide indeed.

## RELATION OF ECONOMICS WITH OTHER SCIENCES

Economics has relation with almost all other sciences. All sciences have been developed by man for the benefit of mankind. As a science, which is primarily concerned with man's welfare, Economics freely makes use of the other sciences in its study. It uses, in its own reasoning, the conclusions at which the other sciences may have reached. But its relation with social sciences like Politics, History and Ethics is the closest. Let us consider this relationship.

### Economics and Politics

Economics and Politics are very closely mixed up these days. All political events have their roots in economic causes. All political problems are economic in nature. If you follow discussions in the legislature, you will find that most of the time of the legislature is taken up by economic matters. Political institutions

also affect economic conditions, and vice versa. Dictatorship moulds economic conditions in a different manner from a democracy. Foreign rule in India was largely responsible for Indian poverty.

Thus, there is a very close connection between Economics and Politics.

### Economics and History

Economics makes use of History in understanding the background of the present-day economic problems. History is also useful in establishing or verifying economic theories and laws. But History is incomplete unless it discusses the economic condition of man. History must devote its attention to the discussion of the economic condition of the people. It does not merely tell a tale of kings. Thus,

Economics without History has no root,  
History without Economics has no fruit.

### Economics and Ethics

Ethics is a science of what ought to be. It tells us whether a thing is right or wrong. Now ethical or moral considerations govern all economic activity. The economist cannot justify immoral activities. Some modern economists (e.g., Robbins), however, think that Economics is a pure science and as such it is not concerned with right or wrong. It is said to concern itself merely with means, and ends lie outside its scope. It is regarded as neutral as regards ends. The ends may be good or the ends may be bad, Economics is not concerned.

But our view is that Economics cannot be dissociated from Ethics. Ethics is indeed a handmaid of Economics. The economists are being called upon more and more to give their advice in economic affairs, and they should not shirk this task. That is why it is said that Economics is both a positive science and a normative science.

## CHAPTER SEVEN

### DEMAND ANALYSIS

Two techniques are used in the analysis of consumer's behaviour or demand analysis, (i) Utility Analysis or the Marshallian approach, and (ii) the Indifference Curve technique or modern approach. This chapter will be devoted mainly to the Utility Analysis and only towards the end in the appendix we briefly refer to the Indifference Curve Technique. Let us take up Utility Analysis first.

#### UTILITY ANALYSIS OF DEMAND

#### LAW OF DIMINISHING MARGINAL UTILITY

##### Statement and Explanation of the Law

A very important law in consumption relates to the fact that as we go on consuming a commodity, the satisfaction derived from its successive units goes on decreasing. It is well known that familiarity breeds contempt. **The more we have of a commodity, the less we want to have more of it.** It is the experience of every consumer that as he goes on consuming a particular commodity, each successive unit of the commodity yields him less and less satisfaction. In other words, at each step its utility (marginal utility, not total utility) goes on decreasing.

Thus, if we are very thirsty and buy a drink to quench our thirst, the drink will yield a great deal of satisfaction at first. After the consumption of the first drink, however, we would not like to have another, because our want has been practically satisfied. This is the case with most of the commodities.

Dr. Marshall states the law thus:—

**"The additional benefit which a person derives from a given increase of his stock of anything diminishes with the growth of the stock that he has."**

In this statement of the law, the word "additional" is very important. It is only *additional* (marginal) benefit which decreases and *not the total* benefit as we shall see in the following table.

The following table relating to an imaginary consumer consuming 'rasgullas' illustrates the law:

As the consumer goes on eating 'rasgullas', the **additional or marginal utility goes on decreasing**. The 7th 'rasgulla' yields no additional satisfaction and the 8th and 9th have a negative utility (see column 2). Their consumption, instead of giving satisfaction or pleasure, causes dissatisfaction.

If you look at column 3, you will find that the total utility goes on increasing up to a point. It also seems reasonable that the utility of two 'rasgullas' should be

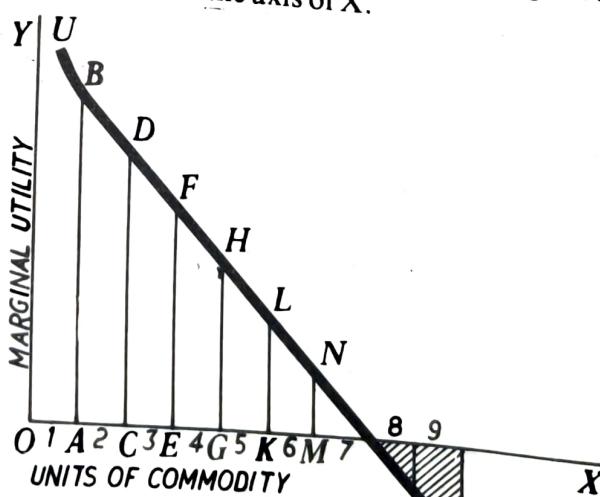
(1) No. of Rasgullas	(3) Marginal Utility	Total Utility (2)
1	15	15
2	13	28
3	10	38
4	8	46
5	4	50
6	2	52
7	0	52
8	-2	50
9	-5	45

more than that of one, and the total utility of three more than that of two, and so on. But if you look at it more carefully, you will notice that although the total utility does increase, it **increases only at a diminishing rate**. For example, when our friend consumes the second 'rasgulla', the increase in utility is 13; and when he consumes the third, the total utility increases by 10 only. Column 2 shows the rate at which utility increases. We can see that it increases at a diminishing rate. In other words, the marginal utility decreases. (We shall discuss marginal utility more fully presently).

### Diagrammatic Representation

This law can be understood better with the help of the following diagram:

OX and OY are the two axes. Along OX are represented the units of the commodity, 'rasgullas', and along OY is measured the marginal utility corresponding to the consumption of each unit;  $UU'$  is the utility curve. AB is the utility when one 'rasgulla' is taken. CD is the additional utility when two of them are taken: CD is less than AB. The additional utilities of other successive units are EF, GH, KL and MN. It can be seen that at each step, the additional utility becomes smaller and smaller. At the seventh unit, there is no addition at all, i.e., the marginal utility is zero, and then it becomes negative, which is represented by the shaded area below the axis of X.



Diminishing Marginal Utility  
Fig. 7.1

## CHAPTER TWENTY-THREE

# COST AND COST CURVES

### COST OF PRODUCTION

A study of demand has shown us that the force behind it is the marginal utility of the commodity to the consumer. Every consumer compares consciously or unconsciously the price that he has to pay and the satisfaction that he derives. He goes on buying more and more so long as the satisfaction that he derives is greater than the price he has to pay; and he stops buying at a point where the price and the satisfaction are just equal to each other. This point is the point of marginal utility. We see that price measures marginal utility.

A similar analysis of the supply will show that the supply of a commodity is influenced by its cost of production. This is the force behind supply. Let us then turn our attention to the study of the cost of production.

### SOME CONCEPTS OF COST OF PRODUCTION

The student should very clearly distinguish between some concepts of cost of production which are currently used in Economics. We give them below:

#### Nominal Cost and Real Cost

The costs are sometimes classified as nominal cost and real cost.

**Nominal or Money Cost.** Nominal cost is the money cost of production. It is also called expenses of production. These expenses are important from the point of view of the producer. These expenses are paid out by him to the factors he employs or for the raw materials he uses in production. He must make sure that the price he gets for the product covers, in the long run, these expenses including normal profit, otherwise he cannot continue in business.

**Real Cost.** The real cost of production has been variously interpreted. Adam Smith regarded pains and sacrifices of labour as real cost of production. Marshall included under it the "real cost of efforts of various qualities", and "real cost of waiting." This Marshall called as the social cost of production. Some economists define real cost as the next best alternative sacrificed in order to obtain a commodity. It is also called opportunity cost or displacement cost, which we explain below.

It is very seldom that money costs and real costs coincide, because the purchasing power of money in terms of efforts and sacrifices does not remain the same owing to fluctuations in the prices. Hence, there is very little connection between money costs and real costs. For example, land has no real cost. It is a free gift of nature to man. Its value depends on scarcity. Similarly, the earnings

of cinema stars on the one hand, and sweepers and coolies, on the other, seldom correspond to the respective efforts and sacrifices undergone by them.

### **Explicit Costs and Implicit Costs**

Costs of production can be classified as **Explicit Costs** and **Implicit Costs**. Explicit costs are also called paid-out costs. These costs the entrepreneur has to pay to those persons from whom he has obtained factors of production or services. For instance, he has to pay wages to the labour he has employed, interest on the capital that he has borrowed and rent of land or factory or business premises. These are *explicit costs*.

**Implicit costs**, on the other hand, are costs which have not to be paid out to others but the costs which the entrepreneur pays to himself, as it were. Perhaps he himself is the owner of the business premises, he may have invested his own capital side by side the capital he may have borrowed from others. He may be a wholetime worker in the business, for instance he may be a managing director for which he may not be drawing any salary. If he had lent out these factors to others, he would have received remuneration from them. Hence they must be taken into account while calculating profit. But since they are not actually paid out to anybody, they are called *implicit costs*.

**Opportunity Cost.** As mentioned already, in modern economic analysis, the term real cost is interpreted in the sense of opportunity cost. It is also called 'alternative cost' or 'transfer cost'. Opportunity cost of a commodity is the alternative sacrificed in order to obtain it. Suppose you have Rs. 5 with you and you have two alternatives before you, either to go to a cinema show or buy a pen. Suppose further that you decide to buy the pen and forego the cinema show. In this case, what is the price of the pen? Apparently, it is Rs. 5, but really it is the cinema show, the alternative you have foregone or sacrificed. This is its opportunity cost.

Since productive resources are limited, if they are used in the production of one commodity, they are not available for the production of another. The commodity which is sacrificed or not produced is the real cost of the commodity that is produced.

Thus, the cost of production, in the sense of opportunity cost, means not the efforts and sacrifices undergone, but the most attractive alternative foregone or the next best choice sacrificed. 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.

### **Production Costs**

Production costs refer to the total amount of money spent in the production of goods. They include the cost of raw materials and freight thereon, the costs of manufacture, i.e., the wages of workers engaged in the manufacture of the commodity and salaries of the manager and other office staff including those of peons, chowkidars, etc. They also include other overheads like rent, interest on capital, taxes, insurance and other incidental expenses like costs of repairs and replacements. They include both prime costs and supplementary costs (explained later in this section).

## Selling Costs

Selling costs are the costs of marketing, advertisement and salesmanship. These costs are incurred to attract customers, expand market and capture more business and retain the existing business. These costs are essential costs of the competitive economy. They are especially important in the case of imperfect competition in which goods are not identical but substitutes. The manufacturers resort to what is called *product differentiation* in order to change the demand curve of a particular seller to his advantage. Instead of improving the quality or lowering the price, high pressure salesmanship is resorted to to win customers and this is found more profitable. Selling costs do not necessarily vary with the volume of sales. A minimum cost of advertisement is essential to retain the existing markets. But it may also be found that sales can be increased by increasing selling costs. In that case, these costs will be variable. Selling costs like production costs are also subject to the law of diminishing returns or increasing costs.

On the whole, selling costs may be regarded as a social waste, because they add to the cost of the commodity without improving its quality or increasing its utility. Their result may be simply to redistribute the market among the existing sellers. Only in cases where the market is expanded may the costs be reduced, but the reduction in costs may not be reflected in the lowering of the price.

Selling costs are a peculiarity of an imperfect market and have no place in a fully competitive market where the dealers are supposed to be fully aware of the quality of the goods and the conditions of the market.

## FIXED AND VARIABLE COSTS

The cost of production of a commodity is composed of two types of costs: **Variable Costs** and **Fixed Costs**, also called Prime and Supplementary costs respectively.

**Prime or Variable Costs.** Prime costs mean variable or direct costs. They include the money cost of the raw material used in making a commodity, the wages of the labour directly spent on it, and the extra wear and tear of the machine that makes it. For example, if you ask a carpenter what he would charge for a chair, he would first think of the wood and cane that he used and the number of days he spent in making it. This is the prime cost.

It is clear that the prime cost of a commodity varies with the quantity produced. If more chairs are made, more money will have to be spent on carpenter's wages as well as on wood. If production is stopped, the prime costs disappear. **Prime costs, therefore, are also called the Variable Costs.**

**Supplementary or Fixed Costs.** Will the carpenter charge for the chair only for the wood and his wages? These things are, of course, the first that he will think of. But this is not the only amount he will charge for it, and he would be a fool if he did. Besides, these, he will think of including in the cost a portion of rent that he is paying and also interest on the capital invested, the municipal taxes, etc. A big company will further have to include a portion of the salaries of the manager, the clerks, the peons, the cost of advertisement and salesmanship,

etc. These costs must also be covered. They are called **supplementary costs, on-costs or over-head charges or fixed costs**.

The supplementary costs do not vary with the volume of production. Whatever the quantity of goods produced, big or small, charges on account of rent, taxes, interest, salaries, etc., must be paid. Even if the orders cease to flow in and the factory is closed, these costs will continue. They are fixed costs.

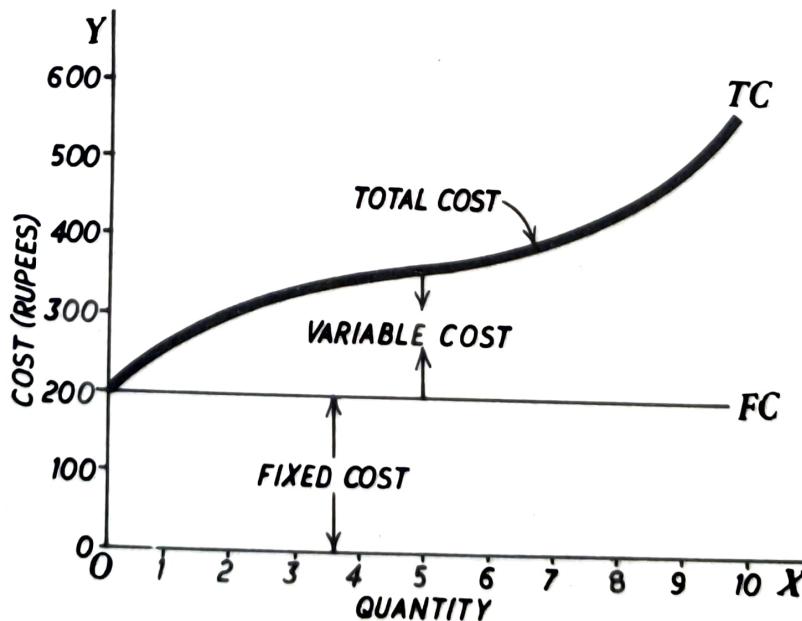
Normally, or in the long run, a producer must recoup himself for both prime and supplementary costs. Each article sold must fetch a price sufficient to compensate the producer for the raw material used, the wages paid to make it, and a fair proportion of the supplementary costs or over-head charges.

But if times are not normal, for example, if there is depression in business, or dumping is being done by foreign competitors, then it will not be possible to recover both the prime and supplementary costs. Rather than close down the factory, the manufacturers may rest content with only the prime costs and perhaps a small proportion of the supplementary costs besides.

It may be noted that the distinction between the variable and fixed costs applies only to the short period, because nothing can really remain fixed in the long run. For instance, in the long run, even the strength and the salary bill of the staff may change; the amount of capital invested may be different, hence the amount of interest would vary; and the dimensions of the factory may have to be changed, and hence the amount of rent would vary. In this way, all costs, which were regarded as fixed in the short run, may vary in the long run. Thus, in the long run, all costs are variable.

**Diagrammatic Representation.** As we have explained, total cost is made up of both the fixed cost and the variable cost. They are represented in the diagram 23.1. OX and OY are the two axes; along OX is represented the quantity produced and along OY the cost. FC, a straight horizontal line, represents the fixed cost, and the area above it the variable cost, so that the TC is the total cost curve.

$$\text{Total Cost} = \text{Fixed Cost} + \text{Variable Cost}.$$



Fixed Cost, Variable Cost, Total Cost  
Fig. 23.1

### Average and Marginal Costs

We have seen above what the total cost (i.e., fixed cost + variable cost) is. Now let us familiarise ourselves with the concepts of average and marginal costs. Average cost is the total cost divided by the number of units produced. Thus

average cost at any output =  $\frac{\text{total cost}}{\text{units of output}}$ . Average cost is the sum of average

variable cost and average fixed cost. It is also called average total cost. If the total cost of producing 60 units of a good is 1,200 rupees, then average cost will be  $\frac{1200}{60} = \text{Rs. } 20$ .

On the other hand, marginal cost is the cost of producing an additional unit of output. In other words, **marginal cost is the addition made to the total cost by producing one more unit of output**. For example, if the total cost of producing 60 units is 1,200 rupees and the total cost of producing 61 units is 1,218 rupees, the marginal cost in this case will be equal to 18 rupees ( $1,218 - 1,200$ ). The concepts of total cost, average cost and marginal cost can be understood easily from the following table:

Total, Average and Marginal Costs

Output	Total Cost	Average Cost	Marginal Cost
1	Rs. 30	Rs. 30	Rs. 30
2	40	20	10
3	45	15	5
4	48	12	3
5	50	10	2
6	72	12	22
7	105	15	33
8	160	20	55
9	270	30	110
10	450	45	180

In the above table, marginal cost of the second unit is found out by subtracting Rs. 30 from Rs. 40 ( $40 - 30 = 10$ ). Marginal costs of subsequent units are obtained in the same manner. We repeat, marginal cost is the addition made to the total cost at each step.

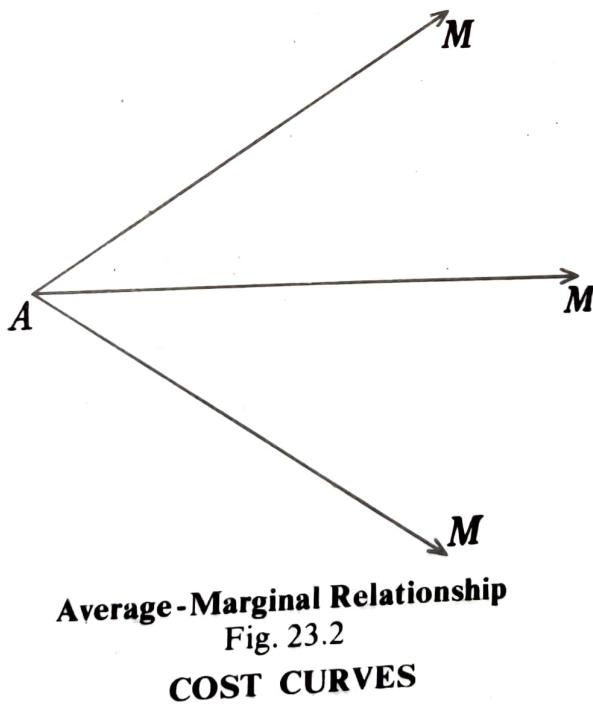
### Relation Between Marginal Cost and Average Cost

It should be noted that average and marginal costs are related together. This relationship should be carefully understood. From the table given above, it will be clear that **when the average cost is falling, the marginal cost is less than the average cost and when average cost is rising, the marginal cost is higher than the average cost**. But if marginal cost neither goes up nor comes down, the average and marginal costs are equal. In the table, up to 5th unit average cost is falling. It will be seen from the fourth column that from second to fifth unit of output marginal cost is less than its corresponding average cost. From 6th to 10th unit average cost is rising. It will be seen from the table that marginal cost is higher than average cost in this range.

A simple arithmetical illustration will bring out clearly the average-marginal relationship. Suppose a cricket player's batting average is 50. If in the next match, he scores less than 50, say 45, his batting average will decrease, because his additional (i.e., marginal) score (45) is less than his average score (50). But, if in the next match, he scores more than the average (50), say 60, his average will go up for the obvious reason that this new or additional (i.e., marginal score 60) is higher than his average score (50). We, therefore, conclude that, if the marginal is rising, the average goes up, and if the marginal is falling, the average goes down. When, however, the marginal remains unchanged, the average and marginal are equal.

The following diagram (23.2) illustrates the average-marginal cost relationship:—

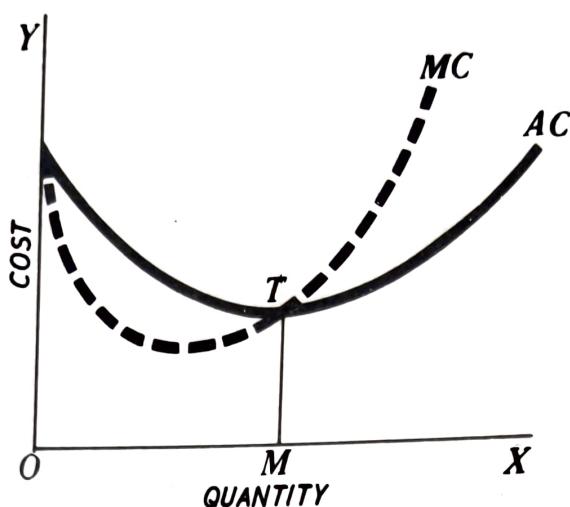
In this figure (23.2),  $A$  represents the average cost and  $M$  represents the marginal cost. It can be clearly seen that when marginal cost ( $M$ ) is above the average cost ( $A$ ), the average cost rises which is shown by the rising arrow. On the other hand, when the marginal cost ( $M$ ) is below the average cost ( $A$ ), then the average cost falls, as is shown by the falling arrow. But when the marginal cost is the same as the average cost (i.e.,  $AM$ ), the average cost remains constant, as if  $M$  is pulling  $A$  along horizontally.



Curves can be drawn to represent costs. The marginal cost (MC) and the average cost (AC) are shown in the following diagram (23.3).

$OX$  and  $OY$  are two axes, along  $OX$  is shown the quantity produced and along  $OY$  the cost. It will be seen that as output is increased, both average cost (AC) and marginal cost (MC) fall, but MC is below AC, i.e., marginal cost is less than the average cost. The fall is due to the economies of scale. But beyond a point (M), i.e., when output is expanded too much, both AC and MC start rising and now MC is above AC, i.e., the marginal cost is greater than the average cost. That is why MC cuts AC from below at its lowest point.

There are two types of other cost curves. They are the Average Variable Cost Curve and the Average Fixed Cost Curve. The average variable cost is

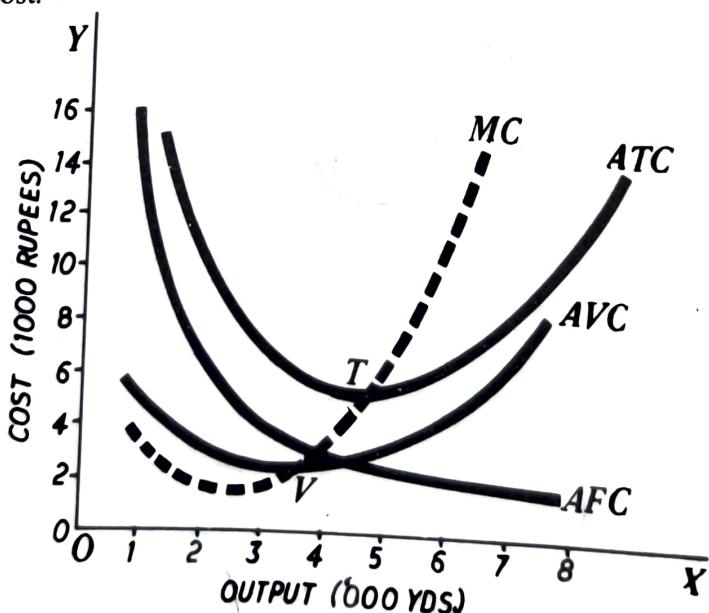


Average Cost and Marginal Cost

Fig. 23.3

obtained by dividing the total variable cost by the number of units produced. Average fixed cost is obtained by dividing the total fixed cost by the total units of output. The total fixed cost being fixed for all units of output, AFC is a falling curve in the shape of a rectangular hyperbola.

The average variable and average fixed cost curves can be represented as below (Fig. 23.4). OX and OY are the two axes. The output is represented along OX and cost along OY; AFC curve represents average fixed cost. AVC curve represents average variable cost, ATC curve represents average total cost (i.e., total of AFC and AVC and is called AC, i.e., average cost). MC curve represents marginal cost.



Average, Variable and Fixed Costs

Fig. 23.4

It is clear that as output is increased, the cost per unit decreases due to various internal economies. That is why AFC, AVC and hence ATC all start falling. But if the output is expanded beyond proper limit, diseconomies will result, and all these costs will go up, which is shown by the rising portions of

these curves. This is the third stage of the Law of Variable Proportions (discussed in the previous chapter). It will be seen that AFC continues to fall, it never rises, rather it helps AVC to fall too for some time, but after some time AVC starts rising quickly and raises ATC too. MC and AVC fall and rise at the same time. But it is to be carefully noticed that when MC and AVC are falling, MC is below AVC, but when they rise, MC is above AVC. When AVC is constant, MC is equal to it. In other words, MC cuts AVC and ATC at their lowest points.

## **Classification of Markets**

Markets can be classified on several bases as under:—

- (a) On the **geographical basis**, i.e., the area of their operations. We have a **local market, national market and the world market.**
- (b) On the **functional basis**, i.e., the manner in which they function or the business they transact, we have **mixed or general markets and specialised markets** like the produce exchange, stock exchange, money market and foreign exchange market.
- (c) On the basis of the **nature of competition** prevailing in the market, we have **perfect and imperfect markets.**

### **Perfect and Imperfect Markets**

A distinction may be made between a perfect market and an imperfect market. This corresponds to perfect and imperfect competition.

**Perfect Market:** “A market is said to be perfect when all the potential sellers and buyers are promptly aware of the prices at which transactions take place and all the offers made by other sellers, and buyers, and when any buyer can purchase from any seller and conversely. Under such a condition, the price of a commodity will tend to be the same (after allowing for cost of transport including import duties) all over the market.” Every quality of the commodity is regarded as a separate commodity. The prevalence of the same price for the same commodity or at the same time is the essential characteristic of a perfect market.

**Imperfect Market.** On the other hand, a market is said to be imperfect when some buyers or sellers or both are not aware of the offers being made by

**others.** Naturally, therefore, different prices come to prevail for the same commodity at the same time in an imperfect market, whereas in a perfect market the same price rules throughout the market.

### Conditions of a Perfect Market

The following are the main conditions which must be fulfilled before a perfect market can develop:—

(a) **Free Competition.** Competition between buyers and buyers on the one hand, sellers and sellers on the other, as well as between buyers and sellers, must be absolutely free. There should be no monopolist either on the buyers' side or on the side of the sellers. A monopolist is usually in a position to charge different prices from different persons. Only when there is free competition does the same price rule in the entire market.

(b) **Cheap and Efficient Means of Transport and Communication.** In order that the same price may rule in the market at the same time, it is essential that cheap means of transport and communications should be available to the buyers and sellers of the commodity. If commodities cannot be cheaply and quickly transported from one place to another, different prices might rule in a market. Similarly, in the absence of means of rapid communication like wireless, telegraphy and telephone, different prices may come to rule in different sectors of the same market. But, if the means of transport and communication are cheap and efficient, any considerable difference between prices can be removed by carrying goods from a region of low prices to that of high prices. This movement of goods will continue till the prices are equalized.

In a perfect market, all the potential buyers and sellers must be promptly aware of the prices charged and offered. There should be no ignorance about such matters.

(c) **Wide Extent.** It is also necessary that the market for the commodity should be as wide as possible. A limited market is usually an imperfect market. The extent of a market depends on the nature of the commodity, whether it is durable or perishable, and the nature of demand for it, whether it is steady or fluctuating. It also depends on several other factors discussed in the section below.

**Nature of Market in some Commodities.** For some commodities the market may be perfect and for others imperfect. For consumers' goods of a perishable nature the market is generally imperfect. For producers' goods like machinery it is perfect. Wholesale markets are generally more perfect than retail markets. A labour market is less perfect, for workers lack mobility. Markets for money, gold, silver, and stocks and shares are perhaps the most perfect. For real estate, the market is less perfect. For second-hand books, the market is imperfect there being no standard price.

### Extent of the Market

There are several factors which make the markets wide or narrow. Of these the following may be noted:—

**Extent of Demand.** If the demand for a commodity is universal and constant, it will have a wide market. In the case of limited or fluctuating demand, the market will be narrow. Naturally a certain type of garment, which is worn only in a particular region, cannot have a wide market.

**Portability.** For a wide market, the commodity should have large value in

small bulk, e.g., gold, silk, etc., so that it pays to carry it. Bulky and cheap articles like bricks are not considered portable and cannot have a wide market. The market for them is a narrow one.

**Durability.** If a good is perishable, e.g., fresh fruits and milk, it cannot have a wide market. Only durable articles like gold and those which do not quickly rot, e.g., wheat, can have a wide market. Such commodities can be carried over long distances without deterioration.

**Possibility of Sampling and Grading.** Those commodities have a wide market which can be easily graded or sold by sample. In such cases, even foreign customers can buy goods without being deceived. Non-standardised goods cannot have a wide market.

**Peace and Security.** Trade between distant places is not possible unless peace and security reign. The size of the market, therefore, depends on the state of law and order in the country. In a disturbed State, the traders in one region will feel great hesitation in entering into trade relations with traders living at a distance.

**Tariff Policy of the Government.** The extent of the market also depends on the policy of the Government. Tariff walls in the shape of import duties, import restrictions or quota system restrict the market. The Government can also ban or limit export. In this way, the Government policy determines the extent of the market.

## MARKET FORMS

The different market forms depend on the degree of competition prevailing in the market. Broadly speaking, we have the following market forms.

### Pure Competition

Pure competition is said to exist when the following two conditions are fulfilled:—

(i) **Large Number of Buyers and Sellers.** The first condition is that there should be operating in the market a large number of buyers and sellers. If that is so, no single producer or purchaser will be able to influence the market price by varying respectively his supply or demand. The output of any single firm is only a small portion of the total output and the demand of any single purchaser is only a small portion of the total demand. Hence, the market price has to be taken as given and unalterable by every purchaser and seller. This happens when the number of buyers and sellers is very large.

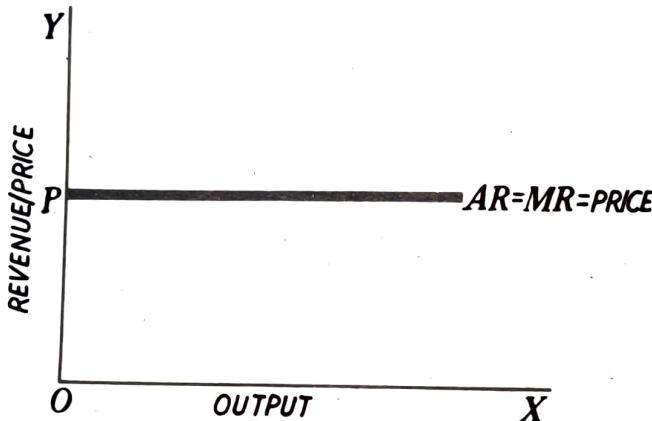
(ii) **Homogeneous Product.** The second condition is that the articles produced by all firms should be standardised or identical. In case of farm produce, e.g., Kalyan wheat, it is immaterial for the purchaser as to who has produced it. He can buy it as well from the one as from the other. This condition ensures that the same price rules in the market for the same commodity. In case the output is not standardised (i.e., it is differentiated), each individual firm will be in a position to influence the market price.

**Whether the products are identical or not has to be looked at from the purchaser's angle.** Even if the products are identical, the purchaser may have a prejudice against the output of a particular firm and may consider it different. That is, if the consumers regard the commodities as different, they should be considered different for purposes of classification in spite of the fact that they are actually identical. The consumers generally believe that the products are

different. They generally believe that the commodities that they purchase from a particular shop are superior, even though they may actually be of the same quality. When the quality is the same, the commodities are perfect substitutes of one another and their cross-elasticity is infinity. In these circumstances, if a firm raises its prices, it will lose all customers. It can sell as much as it likes at the prevailing price. Why should it then think of lowering its price? Hence it cannot raise its price and it need not lower it. That is why the prevailing market price is accepted and acted upon by all dealers.

Thus, if the above two conditions, viz., homogeneous products and a large number of buyers and sellers are found in a market, it is said to be under pure competition.

**Diagrammatic Representation.** Under pure competition, the average revenue curve (also called demand curve) of a firm will be a **horizontal straight line**, which means that any firm can sell any quantity at the prevailing price. Since the number of firms is very large, no individual firm has the power to vary the market price. Also, since the products are identical from the consumers' point of view, the price paid by them cannot be different. This is represented by the following diagram (Fig. 25.1).



**AR Curve Under Perfect Competition**

Fig. 25.1

$OX$  and  $OY$  are the two axes. Along  $OX$  is represented the output and along  $OY$  the price/Revenue. At  $OP$  price, the sellers can sell as much as they like. They cannot charge more and they will not charge less. If they raise the price, they will lose their customers, and if they charge less, they will be unnecessarily losing.

Examples of pure competition are to be found in the case of farm products, e.g., wheat, cotton, rice. There is a large number of producers, each producing an insignificant proportion of the total market supply. Their product is similar and none of them is in a position to influence the market price by his own individual action. In other fields, we seldom come across pure competition.

### **Perfect Competition**

Perfect competition, on the other hand, is a wider term. It includes the two conditions of pure competition mentioned above as well as some more conditions mentioned below.

The existence of the following conditions in a market will make it a perfect competition market:—

- (i) **Large number of buyers and sellers.**

**(ii) Homogeneous product.**

(They have already been discussed above.)

**(iii) Free Entry or Exit.** Under perfect competition, all firms in the industry will be earning normal profit. This will happen only if there are no restrictions on the firms' entry into, or exit from, that industry. If the profit is more, new firms will enter and the extra profit will be competed away; and if, on the other hand, profit is less, some firms will quit raising the profits for the remaining firms. But if there are restrictions on the entry of new firms, the existing firms may enjoy super-normal profit and the competition will be imperfect. Only when there are no restrictions on entry or exit, the competition is said to be perfect.

**(iv) Perfect Knowledge.** Another assumption of perfect competition is that the purchasers and sellers should be fully aware of the prices that are being offered and accepted. In case there is ignorance among the dealers, the same price cannot rule in the market for the same commodity. When the producers and the customers have full knowledge of the prevailing price, nobody will offer more and none will accept less, and the same price will rule throughout the market. The producers can sell at that price as much as they like, and the buyers also can buy as much as they like.

**(v) Absence of Transport Costs.** If the same price is to rule, it is necessary that no cost of transport has to be incurred. If the cost of transport is there, prices must differ in different sectors of the market.

**(vi) Perfect Mobility of the Factors of Production.** This mobility is essential in order to enable the firms to adjust their supply to demand. If the demand exceeds supply, additional factors will move into the industry, and, in the opposite case, move out. Mobility of the factors of production is essential to enable the firms and the industry to achieve an equilibrium position.

### Imperfect Competition

In real life, perfect competition or even pure competition are seldom met with. On the other hand, it is imperfect competition which is the rule, and perfect competition is the exception. However, there are **different degrees of imperfect competition**, ranging from what is called 'monopolistic competition' to 'simple monopoly'. In between these two forms of imperfect competition are 'oligopoly' and 'duopoly'.

**A Monopolistic Competition.** The main features of monopolistic competition are:—

(i) In monopolistic competition, the **number of dealers is quite large but not as large as under perfect competition**.

(ii) **The products are not homogeneous; they are, on the other hand, differentiated** by means of different labels attached to them, such as different brands of toilet requisites.

(iii) Either in ignorance or on account of transport costs or lack of mobility of the factors of production, **the same price does not rule in the market throughout**. Rather different prices are charged by different producers for products which are really similar but are made to appear different through advertisements, high pressure salesmanship and labelling and branding. The result is that each producer comes to have a hold on a clientele from whom he can charge higher prices.

(iv) Under monopolistic competition, the **demand curve or sales curve**, or

what is also called **average revenue curve**, is not a horizontal straight line. It is, on the other hand, a downward sloping curve, i.e., the seller can sell more by reducing price. Under perfect competition, he need not reduce the price, for he can sell any amount at the prevailing price. Under monopolistic competition, the seller can also charge higher prices because his customers are attached to him. He can thus have a **price policy of his own**, whereas a seller under perfect competition has no price policy; he has merely to accept the market price as given.

(v) Under imperfect competition, the demand for the product is not perfectly elastic; it is responsive to changes in price.

This form of market is a blend of monopoly and competition and has been called monopolistic competition by Chamberlin, an American economist. In the real world, we have neither monopoly (i.e., absence of competition) nor perfect competition but imperfect competition, i.e., partly monopoly and partly competition. In this market form, the products are not perfect substitutes for one another but they are close substitutes.

**B. Duopoly.** In duopoly, there are two sellers, selling either a homogeneous product or a differentiated product. These two sellers between them enjoy a monopoly in the sale of the product produced by them.

**C. Oligopoly** The word 'oligopoly' is from the Greek words **Olig**, meaning 'a few' and '**poly**' meaning sellers. Thus, a market form, in which there are only a few sellers, is called oligopoly. They may be producing and selling either a homogeneous or a differentiated product, the former is called perfect oligopoly and the latter imperfect or differentiated oligopoly. In India, till recently, distribution of petrol was in the hands of Burmah Shell, Esso, Caltex and Indian Oil Company. The other example of oligopoly is the manufacture of motor cars by Hindustan Motors (Ambassador Car), Premier Automobiles (Fiat Cars) and Standard Motor Company (Standard Cars).

### Monopoly

In monopoly, a single producer or seller controls the market. There are no close substitutes for his product. He controls the supply and he can fix the price. He is the firm and he also constitutes the industry. Thus, under monopoly the distinction between the firm and industry disappears. The average revenue curve or the demand curve always slopes downwards to the right as in monopolistic competition, but it is less elastic in monopoly than in monopolistic competition. In monopoly, there is one seller and in monopolistic competition many sellers. Substitutes are available. It is one homogeneous product and completely under the control of the monopolist.

### Classification of Market Forms

The following chart shows at a glance different types of market forms on the basis of the nature of competition:

Type of the Market	No. of firms	Nature of the commodity
<b>A. Perfect competition</b>		
Perfect or pure competition	Infinite	Homogeneous

# *Break-Even Analysis*

## **69.1. BREAK-EVEN POINT**

The break-even point means the level of output or sales at which no profit or loss is achieved. It indicates the position at which marginal profit or contribution is just sufficient to cover fixed overheads. In other words, a business is said to break-even when its income equals its expenditure. When production exceeds the "Break-even point", the business makes a profit and when it is below the "Break-even point", the business makes loss. This is shown in chart 69.1.

### **Determination of the Break-Even-Point**

It may be determined in terms of physical units or in money terms i.e. sales value in rupees:

(i) **Break-Even-Point in terms of physical units.** Break even volume is the number of units of a product which must be sold to earn enough revenue just to cover all expenses. The break-even-point (BEP) is reached when sufficient number of units have been sold so that the total contribution margin of the units sold is equal to the fixed costs.

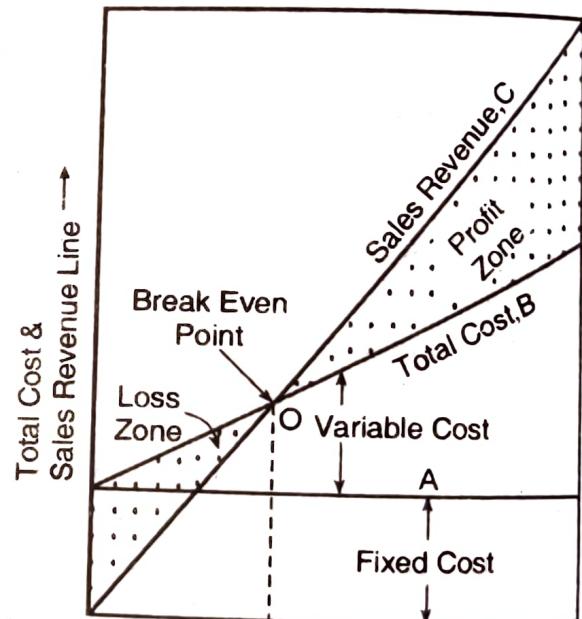


Fig. 69.1.

$$\text{B.E.P.} = \frac{\text{Fixed costs}}{\text{Selling Price} - \text{Variable cost per unit}}$$

(ii) **Break-Even-Point in terms of Sales Value.** Multi product firms are not in a position to measure the BEP in terms of any common unit of product. In these firms it is convenient to determine their BEP in terms of total rupee sales. In this case BEP would be the point where the contribution margin (Sales value-Variable costs) would be equal to fixed costs contribution margin is expressed as a ratio to sales.

$$\text{B.E.P.} = \frac{\text{Fixed costs}}{\text{Contribution ratio}}$$

where, Contribution ratio =  $\frac{\text{Sales value} - \text{Variable costs}}{\text{Sales value}}$

**Margin of Safety.** This is shown on the chart by the distance between B.E.P. and the output being produced. It shows that if this distance is short then a small decrease in output or sales will reduce the profit greatly. If the distance is long it means the business could still be making profit after a great reduction in output.

**Angle of Incidence.** By cutting sales line on to a total cost line an angle known as "Angle of Incidence" is formed. Chart shows that if the angle is large it is an indication of large profits and if it is small it shows that profit are being earned under less favourable conditions.

### Position of Break-Even Point

If B.E.P. is over to the left of the chart with a large angle of incidence it shows that output can be raised considerably. If B.E.P. is over to the right of the chart, the margin of safety is low, which means :

- (i) the fixed overheads are too great for the amount of sales being done, and
- (ii) the fixed and variable costs are high while the profit is small.

If the production volume is below B.E.P., the company will be running in loss and beyond it profit can be had.

Break even-point may be determined in terms of physical units or in money terms.

(i) *B.E.P. in terms of physical units.* This is convenient for the single product firm. It represents the number of units of a product which must be sold to earn enough revenue just to cover all expenses.

(ii) *B.E.P. in terms of sales value.* Multi-product firms are not in a position to measure the B.E.P. in terms of any common unit of product. In these firms it is convenient to determine this B.E.P. in terms of total rupee sales.

## 69.2. BREAK-EVEN POINT THEORY

The break-even point of any two variable situations is the point or the value at which they become equal as the result of a common variable.

There are following two methods to obtain break-even point :

(a) Mathematical method and

(b) Graphical method.

then cost equations will be

$$C_1 = f_1(x) \dots \text{a function of } (x) \quad \dots(1)$$

$$C_2 = f_2(x) \dots \text{another function of } (x) \quad \dots(2)$$

*C<sub>1</sub>* - may be as total cost, annual cost, cost per item or cost per day etc. for situation 1.

*C<sub>2</sub>* - same as *C<sub>1</sub>* but application to situation 2.

*x* - variable effecting *C<sub>1</sub>* and *C<sub>2</sub>*.

To solve for the value of *x*, let

$$C_1 = C_2 \quad \dots(3)$$

i.e.,

$$f_1(x) = f_2(x)$$

Equation 3. can be solved for obtaining the value of *x*. The value of *x* making the cost equal in both the situations, is called "Break Even Value". Below this value of *x* one situation will be

economical while above it another situation will be economical.

**Example 1.** A 25 H.P. unit is required to drive a pump to remove water from a tunnel. The number of hours for which the power unit will run per year is dependent on weather conditions. The power unit is to be used for 4 years.

For the supply of power following two plans are under consideration.

**Plan I.** This plan requires the construction of power line and purchase of electric motor at a total cost of Rs. 16,000. The salvage value of which is Rs. 4000 after 4 years of working. Cost of electricity per hour of operation is Rs. 6.80. Equipment being automatic, no attendant is needed. Maintenance is estimated to Rs. 2400 per annum.

**Plan II.** This plan needs a gasoline engine, which costs Rs. 11,000. The engine will be condemned at the end of 4 years. The cost of fuel and oil per hour of operation is estimated as Rs. 8.40. Hourly wages of operator is Rs. 2.00. Maintenance is estimated at Rs. 3 per hour of operation.

Solve by "Break-even point" theory, which of the plan will be economical?

### Solution

**Plan I.** Let,  $N$  = No. of hours of operation per year

Then, total annual cost

$$\begin{aligned} &= \left\{ \frac{16,000 - 4,000}{4} \right\} + 6.8 N + 2400 \\ &= 5400 + 6.8 N \end{aligned} \quad \dots(1)$$

**Plan II.** Similarly, total annual cost

$$\begin{aligned} &= \frac{11,000}{4} + 8.4 N + 2 N + 3 N \\ &= 2750 + 13.4 N \end{aligned} \quad \dots(2)$$

There is one value of  $N$  for which the cost of Plans I and II will be equal. Hence  $N$  may be determined by equating equations (1) and 2).

$$5400 + 6.8 N = 2750 + 13.4 N$$

$$13.4 N - 6.8 N = 5400 - 2750$$

$$6.6 N = 2650$$

$$\therefore N = 401 \text{ hours.}$$

For given conditions, annual costs of the two alternatives are calculated to be equal for 401 hours of usage per annum. If usage comes to be less than 401 hours per annum, selection of plan II is economical. For more than 401 hours, the selection for automatic equipment, i.e. plan I will be more economical.

(b) **Graphical method.** Although the break-even point may be calculated mathematically, but it is usually represented graphically because it enables manager to see more clearly the break-even point and the possibilities for profits and losses. By using these charts one can predict probable profits at various levels of output.

A break-even chart given in Fig. 69.1 is used to determine break-even point and amount of profit or loss under varying conditions of output and costs. Sales or expenditure in rupees is represented on vertical axis, while output (either in quantity or in percentage capacity) is rep-

resented on horizontal axis. Line A represents the "fixed cost", line B represents total cost or total expenses, while line C represents sales revenue and indicates income at various levels of output. The point where lines B and C intersect each other, is "Break Even Point". The space between lines B and C to the right of the "Break Even Point" represents potential profit, whereas to the left of the "Break Even Point" potential loss. The amount of loss or profit can be measured on vertical scale.

This method can be applied to various management problems. For example, suppose a manager wants to replace an old lathe machine being used for manufacturing screws by automatic screw machine. Then he must first know whether it will be profitable or not, for which he must adopt break-even point theory and construct the chart as explained in Fig. 69.2. The figure shows that for a production less than  $Q$ , it must not be changed whereas for production more than  $Q$ , automatic machine or new machine will be economical or in other words below  $Q$  manual lathe is cheaper; beyond  $Q$ , automatic machine is cheaper. This break-even point is also known as "cut even point".

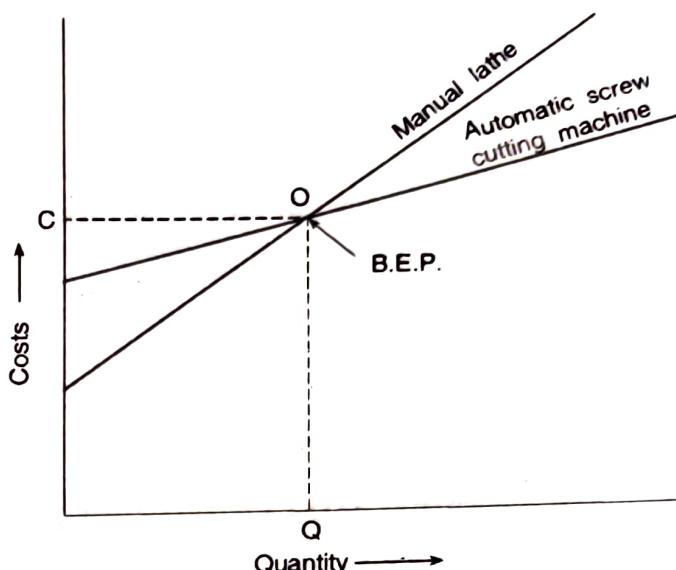


Fig. 69.2.

### Some Important Definitions

(i) **Angle of incidence.** It is the angle at which income line or sales line cuts the total cost line. If the angle is large, it is an indication that profits are being made at a high rate, on the other hand, if the angle is small it indicates that less profits are being made and are achieved under less favourable conditions.

(ii) **Margin of safety.** It is the output at full capacity minus the output at "Break Even Point". It is expressed as percentage of output at full capacity. If the margin of safety is small, a small drop in production capacity will reduce the profit greatly. It can also be expressed as:

$$\text{Margin of safety} = \left( \frac{\text{Sales at full capacity} - \text{Sales of B.E.P.}}{\text{Sales at full capacity}} \right) \times 100$$

(iii) **Contribution.** It is the difference between sales and variable cost (marginal cost). It is also called as Marginal Profit or Gross Marginal. The marginal profit provides the contribution towards fixed cost and profit.

Contribution = (Sales-Variable cost) which in turn will be equal to Fixed cost + Profit.

### Break-Even Point Calculations

Let

$S$  = Sales price

$V$  = Variable cost

$F$  = Fixed cost and  $P$  = Profit

$$S = F + V + P$$

$$S - V = F + P$$

$$P = 0.$$

... (i)

Now  
or

At break-even point,

$$\therefore S - V = F \quad \dots(ii)$$

Multiplying both sides of Eq. (ii) by  $S$ .

$$\therefore S(S - V) = F \times S$$

or

$$S = \frac{F \times S}{(S - V)} = \frac{F}{\left(\frac{S - V}{S}\right)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

and Sales at B.E.P.

$$= \text{Rs. } \frac{F \times S}{(S - V)} \quad \dots(iii)$$

and No. of units at B.E.P.

$$= \frac{\text{Fixed cost}}{\text{Contribution/unit}} = \frac{\text{Fixed cost}}{\text{Marginal profit unit}} \quad \dots(iv)$$

### 69.3. BREAK-EVEN ANALYSIS (COST ANALYSIS)

This is also known as cost analysis. Break-even analysis is concerned with finding the point at which revenues and costs are exactly equal. This point is known as BREAK-EVEN-POINT. Thus this is a volume of output at which neither a profit is made nor a loss is incurred. Therefore production or sale must not be allowed to fall beyond this point.

This analysis can be carried out either algebraically or graphically.

#### Break-even chart

A breakeven chart is a graphical representation of the relationship between costs and revenue at a given time, and determines the break-even-point and profit potential under varying conditions of output and cost.

#### Functions of Breakeven Chart

- (i) To represent economical position of production on graph.
- (ii) To tell likely profits or losses at various levels of output.
- (iii) To help the management to decide the production level.
- (iv) To indicate margin of safety.

#### Assumptions underlying Break-Even Analysis

1. All the costs are either perfectly variable or absolutely fixed over the entire range of production.
2. All revenue is perfectly variable with the physical volume of production.
3. The volume of sales and the volume of production are equal.
4. In case of multi product firms, the product mix should be stable.

#### Limitations

1. Since Break Even Analysis is based on accounting data therefore, it can be sound and useful only if the firm in question maintain a good accounting system.
2. It is based on the assumptions of given relationships between costs and revenues, on one hand, and input on the other.
3. Cost data of the past period may not hold good for the current period.
4. Selling costs may not remain constant.
5. The cost revenue-Volume relationship is linear. But this is realistic only over narrow

ranges of output.

6. Break even analysis is not an effective tool for long range use and its use should be restored to the short run only.

#### 69.4. APPLICATIONS

Break even analysis not only highlights the areas of economic strength and weaknesses in the firm but also helps in finding out the ways which can enhance its profitability. With the help of this analysis management of a production firm can take decisions related to the following :

- (i) *Safety margin*. It decides the extent to which the firm can afford to decline in sales, before it starts incurring losses.
- (ii) Volume needed to attain target profit.
- (iii) Change in price, and its effect.
- (iv) Whether to expand production capacity or not.
- (v) Whether to add a new product or drop production of any product.
- (vi) Whether to make or buy.
- (vii) Selection of production machinery so as to get maximum profit for a particular volume of the product out of the available machineries.
- (viii) Improving profit performance by
  - (a) increasing the volume of sales, and or
  - (b) increasing the selling prices, and or
  - (c) reducing the variable expenses per unit, and or
  - (d) reducing the fixed costs.

**Example 2.** Fixed costs in a factory is Rs. 10,000 per year, the variable costs are Rs. 2.00 per unit and the selling price is Rs. 4.00 per unit, calculate B.E.P.

$$\text{Solution. B.E.P.} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{10,000}{4 - 2} = 5000 \text{ Units. Ans.}$$

#### Check

Sales

$$= 5000 \times 4 = \text{Rs. } 20,000$$

Cost of goods sold

$$= \text{Variable cost + Fixed costs} = 5000 \times 2 + 10,000$$

$$= \text{Rs. } 20,000$$

∴ Net profit

$$= \text{Nil}$$

**Example 3.** If in example 1 sales are 8000 units, calculate safety margin. If desired profit is Rs. 6000, calculate target sales volume.

**Solution.** Safety margin

$$= \frac{(\text{Sales} - \text{BEP})}{\text{Sales}} \times 100$$

$$= \frac{8000 - 5000}{8000} \times 100 = \frac{3}{8} \times 100 = 37.5\% \text{ Ans.}$$

Target sales volume

$$= \frac{10,000 + 6,000}{4 - 2} = 8000 \text{ units. Ans.}$$