**Unit five: Decision making under risk and uncertainty**

**5.1 The nature of decision making**

**Decision making:** Decision making is an integral part of modern management. Perhaps the most important function of the business manager is decision making. Decision making is the process of selecting one action from two or more alternative course of actions. Resources such as land, labour and capital are limited and can be employed in alternative uses, so the question of choice is arises.

Managers of business organizations are constantly faced with wide variety of decisions in the areas of pricing, product selection, cost control, asset management and plant expansion. Manager has to choose best among the alternatives by which available resources are most efficiently used for achieving the desired aims. Decision making process involves the following elements;

1. The identification of the firm’s objectives.

2. The statement of the problem to be solved.

3. The listing of various alternatives.

4. Evaluation and analysis of alternatives.

5. The selection best alternative

6. The implementation and monitoring of the alternative which is chosen

**5.2. Meaning and Measurement of Risk**

 **Introduction**: Due to imperfect knowledge about the future ,our activities are likely to result in outcomes ,which are different from our expectations. These deviations are not desirable .Risk is undesirable outcome that exists due to imperfect foresight about the future. The future is always uncertain and no one can be perfect about the future. The more knowledgeable the person is the more certain it will be concerning the future events .However ,the disappointing phenomena is that perfect foresight about the future is something impossible. Thus risk is becomes a fact that always remain side by side with human being activities.

Risk implies a chance for some unfavorable outcome to occur. From the perspective of security analysis or the analysis of an investment project, risk is the possibility that actual cash flows (returns) will be less than forecasted cash flows (returns). More generally, **risk** refers to the chance that you will encounter an outcome that differs from the expected outcome. When a range of potential outcomes is associated with a decision and the decision maker is able to assign probabilities to each of these possible outcomes, risk is said to exist. An investment decision is said to be *risk free* if the outcome (dollar returns) from the initial investment is known with certainty. A good example of a risk-free investment is government securities. There is virtually no chance that the Treasury will fail to redeem these securities at maturity or that the Treasury will default on any interest payments owed.

In contrast, bonds constitute a *risky* investment opportunity because it is possible that the issuer will default on one or more interest payments and will lack sufficient funds at maturity to redeem the bonds at face value. In summary, *risk* refers to the potential variability of outcomes from a decision. The more variable these outcomes are, the greater the risk.

**Risk** -- exists when:

o Possible outcomes and probabilities are known

o *e.g.,* roulette wheel or dice

• **Uncertainty** -- exists when:

» Possible outcomes or probabilities are unknown

» e.g., drilling for oil in an unknown field

An investment decision is *risk free* when the dollar returns and initial investment are certain. But most managerial decisions involve huge uncertainties. There is almost always a possibility that cash flows will be less than expected, and sometimes the possibility that the cash flows will be negative (a loss).

Variability in the outcomes can be described using *probability distributions*.

Variability is one common meaning of the idea of risk. The more variable are the possible outcomes, the riskier is the project.

Probabilities can be thought of as the percentage likelihood that each outcome, or state of nature, occurs. *Standard Deviation*, σ, measures the dispersion of outcomes around its expected value.

The standard deviation is an appropriate measure of risk when the decision alternatives being compared are approximately equal in size (that is, have similar expected values of the outcomes) and the outcomes are estimated to have symmetrical probability distributions. Because the standard deviation is an *absolute* measure of variability, however, it is generally not suitable for

comparing alternatives of differing size. In these cases the **coefficient of variation** provides a better measure of risk. The coefficient of variation (*v*) considers relative variation and thus is well suited for use when a comparison is being made between two unequally sized decision alternatives.

It is defined as the ratio of the standard deviation to the expected value.

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In general, when comparing two equally sized decision alternatives, the standard deviation is an appropriate measure of risk. When comparing two unequally sized alternatives, the coefficient of variation is the more appropriate measure of risk.

**Risk and Decision Analysis**

A commonly used classification scheme for decision analysis divides situations according to whether a decision is made by (i) an individual or (ii) a group, and according to whether it is made under conditions of (a) certainty, (b) risk, or (c) uncertainty. The distinction between an individual and a group is based on the compatibility of the objectives or interests of the participants in the decision making situation. If all the participants share the same underlying objectives, then the decision problem can be analyzed as if the decision were going to be made by one individual. If, however, conflict exists between the objectives of two or more participants, then the decision-making situation would be analyzed as one of group decision making. A group decision-making situation is analyzed using the techniques of cooperative game theory.

The classification of decision-making problems among the certainty, risk, and uncertainty categories is determined by the players’ knowledge of the possible outcomes.

We define a situation to be decision making under

1. **Certainty** if each action is known to lead invariably to a specific outcome;

2. **Risk** if each action leads to one of a set of possible specific outcomes, each outcome occurring with a known probability;

3. **Uncertainty** if each action has as its consequence a set of possible specific outcomes, the probabilities of which are unknown.

The decision maker’s attitude toward risk affects the shape of his or her utility function and the choices he or she will make in the decision problem involving risk or uncertainty

**CHAPTER SIX: PRODUCTION AND COST ANALYSIS**

**Introduction**

No matter the objective of any business organization, achievement of efficiency in production or cost minimization for a given production activity appear to be one of the prime concern of the managers. As a matter of fact, the survival of a business firm in a competitive environment depends on its ability to produce at competitive costs. Firms are, therefore, mandated to either minimize costs of production or maximize output from a given quantity of inputs. In the manager’s effort to minimize production costs, the fundamental questions he or she faces are:

(f) How can production be optimized or costs minimized?

(g) What will be the beaviour of output as inputs increase?

(h) How does technology help in reducing production costs?

(i) How can the least-cost combination of inputs be achieved?

(j) Given the technology, what happens to the rate of return when more plants are added to the firm?

The theory of production attempts to provide theoretical answers to these questions, through abstract models built under hypothetical conditions. It follows that, though production theories may not provide solutions to the real life business problems, it can provide tools and techniques for the analysis of production conditions and for finding solutions to the practical business problems.

**6.1. Theory of Production**

Production theory generally deals with quantitative relationships, that is, technical and technological relationships between inputs, especially labour and capital, and between inputs and outputs.

Meaning of Production

In economics, the term "production" means a process by which a commodity or commodities are transformed into different usable commodities. In other words, production means transforming inputs (labour, machines, raw materials, etc.) into an output. The production process, however, does not necessarily involve physical conversion of raw materials into tangible goods. Some kind of production involves intangible inputs to produce intangible output. For example the productions of legal, medical, social and consulting services, musicians are all engaged in producing intangible goods.

An „input` is good or service that goes in to the process of production and “output is any good or service that comes out of production process.

In economic sense, production process may take a variety of forms other than manufacturing. For example transporting a commodity from one place to another where it can be used in production. If a dealer collects and transfers the sand from the riverbank to the construction site, he is engaged in production. A man who transports fish to the market place is considered to be producing. Their activities are all considered production. Suffice it to say that production is the creation of anything that satisfies a human want or need.

Input and Output

Input is a good or service that goes into the production process. In other words, an input constitutes the components of materials used to produce an output. An input is simply anything which the firm buys for use in its production or other processes for sale. The term "inputs" needs some more explanations. Production processes require a wide variety of inputs depending on the nature of product. But, economists have classified inputs into:

- Labour

- Capital

- Raw materials and

 - Time

All these variables are 'flow' variables, since they are measured per unit of time. An output is any good or service that comes out of production process. The outputs represent the value created out of the combination of inputs used by the producer.

**Fixed and Variable Inputs**

Inputs are classified as (1) Fixed inputs or fixed factors and (ii) variable inputs or variable factors.

Fixed and variable inputs are defined in economic sense and in technical sense. In economic sense, a fixed input is one whose supply is inelastic in the short run. Therefore, all of its users cannot buy more of it in the short-run. Conceptually all its users cannot employ more of it in the short run. If one user buys more of it, some other users will get less of it. A variable input is defined as one whose supply in the short run is elastic e.g. labour and raw materials. All of the users of such factors can employ a larger quantity in the short run.

In technical sense, a fixed input remains fixed (constant) up to certain level of output whereas a variable inputs changes with change in output.

**Production Function**

* Production function is a tool of analysis used to explain the input-output relationship. A production function describes the technological relationship between inputs and outputs in physical terms. In its general form, it tells us that production of a commodity depends on certain specific inputs. In its specific form, it presents the quantitative relationships between inputs and outputs.

A firm’s long-run production function is of the form:

Q = f(Ld, L, K, M, T, t) (3.1.1)

where Ld = land and building; L = labour; K = capital; M = materials; T = technology; and, t = time.

**Short Run and Long Run**

The short run refers to a period of time in which the supply of certain inputs (e.g. plant, building, and machines.) is fixed or is inelastic. In the short run therefore, production of commodity can be increased only through an increase in variable inputs, like labour and raw materials. It is important to note that short-run and long-run are economic jargons. They do not refer to any fixed time period. While in some industries short run may be a matter of few weeks or few months, in others (e.g. electric and power industry), it may mean three or more years. The long run refers to a period of time in which supply of all the inputs is variable. Therefore in the long run employing more of both variables and fixed inputs can be possible.

The economists use another term, i.e. very long period which refers to a period in which the technology of production is supposed to change. In a very long run, the production function also changes. The technological advancement means that a larger output can be produced with a given quantity of inputs.

**The laws of production**

In the short run, input-output relations are studied with one variable input, while other inputs are held constant .The Law of production under these assumptions are called “the Laws of variable production”. In the long run input output relations are studied assuming all the input to be variable. The long-run input output relations are studied under `Laws of Returns to Scale.

**Law of Diminishing Returns (Law of Variable Proportions)**

The Laws of returns states the relationship between the variable input and the output in the short term. By definition certain factors of production (e.g.-Land, plant, machinery etc) are available in short supply during the short run. Such factors which are available in unlimited supply even during the short periods are known as variable factor. In short-run therefore, the firms can employ a limited or fixed quantity of fixed factors and an unlimited quantity of the variable factor . In other words, firms can employ in the short run varying quantities of variable inputs against given quantity of fixed factors. This kind of change in input combination leads to variation in factor proportions. The Law which brings out the relationship between varying factor properties and output are therefore known as the Law of variable proportions..

The variation in inputs lead to a disproportionate increase in output more and more units of variable factor when applied cause an increase in output but after a point the extra output will grow less and less. The law which brings out this tendency in production is known as‟ Law of **Diminishing Returns**`

The Law of Diminishing returns levels that any attempt to increase output by increasing only one factor finally faces diminishing returns. The Law states that when some factor remains constant, more and more units of a variable factor are introduced the production may increase initially at an increasing rate; but after a point it increases only at diminishing rate. Land and capital remain fixed in the short-term whereas labour shows a variable nature.



The above table illustrates several important features of a typical production function .With one variable input.- here both Average Product (AP) and Marginal Product (MP) first rise ,reach a maximum - then decline. Average product is the product for one unit of labour. It is arrived at by dividing the Total Product (TP) by number of workers Marginal product is the additional product resulting term additional labour. It is found out by dividing the change in total product by the change in the number of workers. The total output increases at an increasing rate till the employment of the 4th worker. The rate of increase in the marginal product reveals this .Any additional labour employed beyond the 4th labour clearly faces the operation of the Law of Diminishing Returns. The maximum marginal product is 16 after which it continues to fall , ultimately becoming negative. Thus when more and more units of labour are combined with other fixed factors the total output increase first at an increasing rate then at a diminishing rate finally it becomes negative.

The graphical representation the above table is shown below



OX axis represents the units of labour and OY axis represents the unit of output. The total output (TP)curve has a steep rise till the employment of the 4th worker. This shows that the output increases at an increasing rate till the employment of the 4th labour. TP curve still goes on increasing but only at a diminishing rate. Finally TP curve shows a downward trend.

The Law of Diminishing Returns operation at three stages .At the first stage, total product increases at an increasing rate .The marginal product at this stage increases at an increasing rate resulting in greater increases in total product .The average product also increases. This stage continues up to the point where average product is equal to marginal product .the law of increasing returns is in operation at this stage

The Law of increasing Returns operates from the second stage on wards .At the second stage, the total product continues to increase but at a diminishing rate. As the marginal product at this stage starts falling, the average product also declines. The second stage comes to an end where product becomes maximum totals and marginal product becomes zero. The marginal product becomes negative in the third stage. So the total product also declines. The average product continues to decline in the third stage.

**Assumptions of Law Diminishing Returns**

The Law of Diminishing Returns is based on the following assumptions;-

Returns is based on the following assumptions;-

1. The production technology remains unchanged

2. The variable factor is homogeneous.

3. Any one factor is constant

4. The fixed factor remains constant.

**Law of Returns to scale**

In the long –run all the factor of production are variable, and an increase in output is possible by increasing all the inputs. The Law of Returns to scale explains the technological relationship between changing scale of input and output. The law of returns of scale explains how a simultaneous and proportionate Increase in all the inputs affects the total output. The increase in output may be proportionate, more than proportionate or less than proportionate. If the increase in output is proportionate to the increase in input, it is constant Returns to scale .If It is less then proportionate it is diminishing returns to scale. The increasing returns to the scale comes first ,then constant and finally diminishing returns to scale happens.

**Increasing Returns to scale**

When proportionate increase in all factor of production results in a more than proportionate increase in output and this results first stage of production which is known as increasing returns to scale. Marginal output increases at this stage. Higher degree of specialization, falling cost etc will lead higher efficiency which result increased returns in the very first stage of production.

**Constant Returns to scale**

Firms cannot maintain increasing returns to scale indefinitely after the first stage; firm enters a stage when total output tends to increase at a rate which is equal to the rate of increase in inputs. This stage comes in to operation when the economies of large scale production are neutralized by the diseconomies of large scale operation.

**Diminishing Returns to Scale**

In this stage, a proportionate increase in all the input result only less than proportionate increase in output. This is because of the diseconomies of large scale production. When the firm grows further, the problem of management arise which result inefficiency and it will affect the position of output.

**6.2 theory of cost**

**Introduction**

The term *cost* simply means cost of production. It is the expenses incurred in the production of goods. It is the sum of all money-expenses incurred by a firm in order to produce a commodity. Thus it includes all expenses from the time the raw material are bought till the finished products reach the wholesaler.

A managerial economist must have a proper understanding of the different cost concept which is essential for clear business thinking. The cost concept which is relevant to business operation and decision can be grouped on the basis of their purpose under two overlapping categories:

1. Concept used for accounting purpose

2. Concept used in economics analysis of the business

**Types of Cost (or Cost Concepts)**

There are several types of costs ( or cost concepts).Following are the important items:-

**Money Cost:** money cost means the total money expenses incurred by a business firm on the various items entered into the production of a particular product. For example, money payments made on wages and salaries to workers and managerial staff, payments for raw materials purchased, expenses on power and light insurance, transportation, advertisement; and also payments made on the purchase of machinery and equipments etc. constitute money cost of production. Money cost is also called nominal cost.

**Real Cost:** Real cost means the real cost of production of a particular product. It is the next best alternative sacrificed in order to obtain that product. .It also denotes the „efforts‟ of workers and sacrifices of owners undergone in the production of a particular product.

**Opportunity Cost:** Opportunity cost refers to the cost of foregoing or giving up an opportunity. It is the cost of the next best alternative. It implies the income of benefit foregone because a certain course of action has been taken. As Adam smith observed, if a hunter can bag a deer or a beaver in the single day, the cost of deer is a beaver and the cost of beaver is a deer. A man who marries a girl is foregoing the opportunity of marrying another girl. A film actress can either act in films or do modeling work. She cannot do both the jobs at the same time. Her acting in the film results in the loss of an opportunity of doing modeling work. Likewise, if an old building is proposed to be used for a business, where rent of the building is the opportunity cost. The opportunity cost concept was first developed by an Austrian economist, Wieser.

The opportunity cost concept plays an important role in managerial decisions. It is useful in determination of relative prices of different goods. It is also useful in fixing the price of an output factor. Above all, it helps in the best allocation of available resources.

**Sunk Cost :** Sunk costs are those which have already been incurred and which cannot be changed by any decision made now or in the future. These are past or historical costs.

**Incremental cost:** These are additional costs incurred due to a change in the level or nature of activity.

**Differential Cost :** It refers to the change in cost due to change in the level of activity or pattern of production or method of production.

**Explicit Cost:** Explicit costs are those costs, which are actually paid (or paid in cash.). They are paid out costs.

**Implicit Cost:** Implicit costs are those costs, which are not paid in cash to anyone. These are not actually incurred, but are computed for decision-making purpose. These are the costs, which the entrepreneur pays to himself. For example, rent charged on owned premises, wages of entrepreneur, interest on owned capital etc. Implicit costs are also known as imputed costs or hypothetical costs.

**Accounting cost:** Accounting costs represent all such expenditures, which are incurred by a firm on factors of production .Thus, accounting costs are explicit costs. In short, all items of expenses appearing on the debit side of trading, profit and loss account of a firm represent the accounting cost. Since all the expenses on production are in money terms, the accounting costs are money costs or nominal costs.

**Economic Cost**

Economic cost refers total of explicit cost and implicit cost. Thus it includes the payment for factors of production (that is rent, wages etc.) and the payments for the self owned factors (interest on owned capital, rent on owned premises, salary to entrepreneur etc.)

**Difference between Accounting Cost and Economic Cost**

Accounting cost means the expenses incurred by the firm on production and sale of goods or service. These are paid by the firm to the outsiders. For example, payment made for wages, raw materials, fuel, power, building etc. are the accounting costs. Accounting cost is the money paid for contractual payments. It includes payments and charges made by the enterprise to the suppliers of resources. It is the explicit cost. But economic cost includes not only explicit cost but also implicit or imputed cost. Implicit cost includes rent charged on owned premises, interest charged on owned capital, wages paid to entrepreneur etc. Implicit cost is not included in accounting cost. Accounting cost includes only explicit costs which are recorded in the books of account. Implicit cost will not be recorded in the books of account. Thus the economist’s concept of cost is more comprehensive as compared to accountant’s concept of cost.

Accounting cost is generally used for financial reporting and control. Economic costs are used for decision-making.

In short, accounting costs involve only cash payments made by the entrepreneur. On the other hand, economic costs include all these accounting costs plus the implicit cost

**Social Cost of Production(or Social Cost)**

In the production of goods, costs will be incurred not only by the owners business but also by the society. Cost incurred by a society in terms of resources used in the production of a commodity is known as social cost of production. It is the opportunity cost borne by a whole society or community. Social costs include not only the cost borne by the owners of a business(or producers) but also the cost passed on to the society. For example, production of certain commodities (chemical, rubber, petroleum, steel etc) causes environment pollution. Pollution caused while producing a commodity imposes a social cost on those residents who suffer ill health. Some industries leave wastes which the adjoining areas have to bear. A cost that is not borne by the firm but is incurred by others in the society is called external cost. Social cost includes external costs and privet cost (because firms are also apart of society). Thus, social cost is the total cost of the society on account of production of a commodity. For example, the social cost of liquor sold by a firm includes the cost incurred by the firm (private cost) and the cost like expenditure of additional police force to deal with the drunken people and such other incidental expenses for the society. Take another example. When people go for picnic in the park and throw wrappers, then they impose a real cost on the residents of that area who have to clean up the park. This is social cost. Thus social cost includes real cost which is the cost borne by the society, directly or indirectly due to the production of goods. In short social costs are those costs, which are incurred by the society in producing commodities and services. It is the sum of private costs of production and economic damage upon society.

**Private Cost of Production (Private Costs)**

Private costs are the costs incurred by a firm in production a commodity or service. All the actual costs incurred by a firm or producers are private costs. Private costs include both explicit cost and implicit cost. Private costs have to be borne by only those persons or firms who make decision. These do not include the effect of the produced commodity on the society.

**Difference between Private Cost and Social Cost**

Private costs are the costs incurred by a firm while producing a commodity or service. But social costs are those costs, which are incurred by the society in producing commodities or services. Social costs include private costs and external costs. Private costs include both explicit and implicit costs. Private costs do not include external costs.

The concept of social cost enables to understand the social implication of the utilization of scarce resources among the different sections of the society. The economic optimum is the yardstick in matters of private cost, but social optimum is the governing factor in the case of social cost.

**Fixed and Variable Cost:-**

**Fixed Cost:** Fixed costs are those costs which do not vary with the volume of production. These costs remain fixed or constant up to a certain level of production. Even if the production is zero, a firm will have to incur fixed costs. Examples are rent, interest, depreciation, insurance, salaries etc. The fixed costs are also called supplementary costs, capacity costs or period costs or overhead costs.

Average fixed cost (fixed cost per unit) changes with a change in the quantity of production. If the volume of production increases, average fixed cost will decrease. If the quantities of production decrease, average fixed cost will increase. Thus, there is an inverse relationship between fixed costs and quantity of production.

Average fixed cost is obtained by dividing total fixed cost by total output. Total fixed cost curve and average fixed cost curve are shown below:



From the above graph it is clear that the total fixed cost curve is horizontal line. On the other hand the average fixed cost curve slopes from left to right. This implies that as the output increases, the average fixed cost falls.

**Variable Cost:**

Variable costs are those costs, which change with the quantity of production. When the output increases, variable cost also increases. When the output decreases, the variable cost also decreases. Thus, there is a direct relationship between variable cost and volume of production.

Variable costs are also known as prime costs or direct costs. Examples are materials, wages, power, stores etc. Prime or variable cost consist of direct material cost, direct labour cost and other direct expenses

**Business cost and full cost**

Business costs include all the expenses which are incurred to carry out a business. It includes all the payments and contractual obligations made by the firm together with the book cost of depreciation on plant and equipment. These cost concepts are used for calculating business profits and losses and for filing returns for income- tax and also for other legal purposes

The concept of full costs includes business costs, opportunity costs and normal profits. The opportunity cost includes the expected earnings from the second best use of the resources, or the market rate of interest on the total money capital and also the value of the entrepreneurs own services which are not charged for in the current business. Normal profit is a necessary minimum earning in addition to the opportunity cost, which a firm must get to remain in its present occupation.

**Total, Average and Marginal Costs:**

**Total Cost** represents the value of the total resource requirement for the production of goods and service. It refers to the total outlay of money expenditure on resources used to produce a given level of output.

Algebraically,

TC = FC + VC.

- **Average Cost refers** to per unit cost of a product. It is gotten by dividing TC by total output Q, i.e.



Marginal cost is the additional cost to total cost incurred as a result of producing an extra unit of a particular product.



**Production Cost**

This concept is concerned with the relationship between cost and output. This relationship is important in business decisions especially when profit levels and optimum levels are envisaged. This relationship is expressed through the cost function i.e.

 TC = F (Q), i.e. Total cost (TC) is a function of output.

When this is interpreted, it means that the total amount to be incurred as cost of production depends on the quantity of that good that is produced. You should note that production cost is divided into two time periods - the short-run and the long -run.

**The Short-Run Cost**

This is a period of production not long enough to allow all factors of production to be varied. In other words it is that period of production in which some factors of production are fixed while others vary. Hence;

TC = TFC + TVC

No matter the level of output, TFC (total fixed cost) remains the same e.g., the cost of machines, building, etc.

By now we should already know that:

 

The law that governs cost of production in the short-run is the law of variable proportions, commonly called the law of diminishing returns to scale. This law states that "as more and more variable factors of production are added to the fixed factors of production out-put will be increased but at a rate that is decreasing"

This implies that to produce the same output a number of times, cost of production will be increasing as more variable factors will be needed each subsequent time due to the operation of diminishing returns.

It should be noted that for all the aggregated costs, the averages could be gotten except for the MC. Dividing that particular cost by the quantity, can give us this



The following is the nature of cost curves in the short run.



 Aggregate costs

While TC and TVC are inversely S-shaped TFC is a horizontal straight line (Fixed) in the short-run.

 



AFC is an asymptomatically sloped, while MC, AC and AVC are all U- shaped owing to the law of diminishing returns to scale.

It should be noted that AVC reaches its minimum point before AC and the MC cuts across them, when each of them is at its minimum point i.e. e and e1, respectively.

The optimum output in the short -run is that one which can be produced when MC = AC i.e. at point e, on the figure above. At this point the average cost is at its minimum, implying the least cost combination.

**Long Run Cost Analysis**

The long run is that period of production in which all factors of production are variable. This implies that all input in the long run are elastic. The firms can therefore increase their scale of production by hiring a larger quantity of all inputs. Hence TC in the Long run is given by:

TC = VC or TC = TVC

An understanding of the long-run analysis will be enhanced when you understand that the long run comprises of a series of short run production plants. This implies that the long run cost curve is made up of so many short run costs curves.

The long -run cost curves of the traditional approach looks thus:

 



The long run AC (LAC) is called a planning curve or an enveloped curve. The optimum point of production is at q where the LMC = LAC. The law that governs cost curves in the Long run is the law of return to scale. When the revenue of the firm is considered, the firm will break even (make economic profit) when TR = TC i.e. no loss, no profit.

**6.3. Economies and Diseconomies of scale**

It can be shown that Long-run average cost decreases with the expansion of production scale up to a certain optimum level, and then begins to rise. This behaviour of the longrun average cost is cost by the economies and diseconomies of scale. Economies of scale give rise to cost savings, while diseconomies of scale lead to cost increases. Economies and diseconomies of scale determine also the *returns to scale* in production. Increasing returns to scale operates until economies of scale are greater than the diseconomies of scale. When economies of scale and diseconomies of scale are in balance, returns to scale are constant. In the discussions that follow, we examine the various kinds of economies and diseconomies of scale.

**6.3.1. Economies of Scale**

The factors which cause the operation of the laws of returns the scale are grouped under economies and diseconomies of scale. Increasing returns to scale operates because of economies of scale and decreasing returns to scale operates because of diseconomies of scale where economies and diseconomies arise simultaneously. Increasing returns to scale operates when economies of scale are greater than the diseconomies of scale and returns to scale decreases when diseconomies .overweight the economies of scale. Similarly when economies and diseconomies are in balance, returns to scale become constant.

When a firm increases all the factor of production it enjoys the same advantages of economies of production. Economies of scale are of two different categories:

(i) Internal or Real economies; and,

(ii) External or Pecuniary Economies

i. ***Internal Economies***. Internal or ‘real economies’ arise from the expansion of the plant size of the firm and are internalized. This implies that internal economies are exclusively available to the expanding firm. Internal economies are often classified under the categories:

(a) Economies in production;

(b) Economies in marketing;

(c) Managerial economies; and,

(d) Economies in transport and storage.

***Economies in Production***. Economies in production arise from two basic sources: (a)

technological advantages; and, (b) advantages of division of labour and specialization.

***Economies in Marketing****.* Economies in marketing arise from large-scale purchase of raw materials and other material inputs, as well as large-scale selling of the firm’s own products. Economies in marketing the firm’s own product are associated with: (a) economies in advertisement cost;

(i) Economies in large-scale distribution through wholesalers; and (c) other large scale economies.

***Managerial Economies***. These arise from (a) specialization in management; and, (b) mechanization of managerial functions.

***Economies in Transport and Storage costs***arise from full utilization of transport and storage facilities.

ii. ***External or Pecuniary Economies of Scale.*** These kind of economies of scale accrue

to the expanding firms from the advantages arising outside the firm, from the input market, for example. Pecuniary economies accrue to the large-size firms in the form of discounts and concessions on: (i) large-scale purchase of raw materials; (ii) large-scale acquisition of external finance; (iii) massive advertisement campaigns; (iv) large- scale hiring of means of transport and warehouse, and the like.

**6.3.2. Diseconomies of Scale**

Diseconomies of scale represent disadvantages that arise due to the expansion of scale of production, leading to a rise in production cost. This may be *internal* or *external.*

1. ***Internal Diseconomies of Scale.***

Economies of scale has some limit, which is reached when the advantages of division of labour and managerial staff have been fully exploited; excess plant capacity; excess warehouse capacity; excess transport and communication capacity, and the like.

***(ii) External Diseconomies of Scale.***

These are the disadvantages that originate outside the firm: in the input markets, and due to natural constraints, especially in agriculture and extractive industries. With the expansion of the industry, for example, the discounts and concessions that are available on bulk purchases of inputs, as well as concessions on finance will eventually come to an end. Increasing demand for inputs also put pressure on the input markets leading to increase in input prices that will further lead to rises in production costs.

**6.4.3 Economies of scope**

Economies of scope are defined as the reduction of a firms’ per unit cost by producing two or more goods jointly rather than separately. The scope economies can be measured with the following formula:



Here, C (Q1, Q2) denotes the firm’s cost of jointly producing the goods in the respective quantities, C(Q1) denotes the cost of producing good 1 alone and C(Q2) for good 2. For instance, suppose producing the goods separately means incurring costs of Rs 12 million and Rs 8 million respectively. The total cost of producing the goods in the same quantities is Rs 17 million. It follows that SC = (12 + 8 – 17) / (12 + 8) = .15. Joint production implies 15 per cent cost savings in comparison to separate production. Many firms produce a variety of goods. Computer firms such as IBM and Digital Equipment Corporation produce a wide variety of computers from mainframe to personal computers.

UNIT SEVEN: PRICING **STRATEGIES AND PRACTICES**

Formulating price policies and setting the price are the most important aspects of managerial decision making. Price in fact, is the source of revenue which the firm seeks to maximize. Again, it is the most important device a firm can use to expand the market. If the price is set too high, a seller may price himself out of the market. If it is too low, his income may not cover costs, or at best, fall short of what it could be. In other words, if the Company prices too much, it will make fewer sales. If it charges too little, it will sacrifice profits. So the price must be fixed judiciously.

 **Meaning of price**. Price is the money value of the goods and services. In other words, it is the exchange value of a product or service in terms of money. To the seller, price is a source of revenue. To the buyer, price is the sacrifice of purchasing power.

**Factors governing prices and pricing decision**.

Price is very important to both the buyer and the seller. In this connection, it may be noted that in economic theory, two parties should be generally emphasized ie. Buyers and sellers. In practice, however, as pointed out by Oxenfeldt, certain other parties are also involved in the pricing process, i.e. rival seller, potential rivals, middlemen & government. All these parties also exercise their influence in price determination.

Factors governing prices may be divided into external factors and internal factors.

**Internal Factors:**

These are the factors which are within the control of the organization. Various internal factors are as follows.

1. **Cost:** The price must cover the cost of production including materials, labour, overhead, administrative and selling expenses and a reasonable profit.

2. **Objectives:** While fixing the price, the firm‟s objectives are to be taken into consideration. Objectives may be maximum sales, targeted rate of return, stability in prices, increase market share, meeting or preventing competition, projecting image etc.

3. **Organizational factors:** Internal arrangement of the organization. Organizational mechanism is to be taken into consideration while deciding the price.

4. **Marketing Mix:** Other element of marketing mix, product, place, promotion, pace and politics are influencing factors for pricing. Since these are interconnected, change in one element will influence the other.

5. **Product differentiation:** One of the objectives of product differentiation is to charge higher prices.

6. **Product life cycle:** At various stages in the Product Life Cycle, various strategic pricing decisions are to be adopted, eg. In the introduction stage. Usually firm charges lower price and in growth stage charges maximum price.

7. **Characteristics of product:** Nature of product, durability, availability of substitute etc. will also influence the pricing.

**External Factors.**

These factors are beyond the control of organization. The following are the main external factors.

1. **Demand:** If the demand for a product is Inelastic it is better to fix a higher price and if demand is elastic, lower price may be fixed.

2. **Competition:** Number of substitutes available in the market and the extent of competition and the price of competition etc. are to be considered while fixing a firm price.

3. **Distribution channels:** Conflicting interest of manufacturers and middleman is one of the of the important factor that affect the pricing decision. Manufacturer would desire that middleman should sell the product at a minimum mark up.

4. **General economic conditions**: During inflation a firm forced to fix a higher price and in deflation forced to reduce the price.

5. **Government Policy**: While taking pricing decision, a firm has to take into consideration the taxation policy, trade policies etc. of the Government.

6. **Reaction of consumers:** If a firm fixes the price of its product unreasonably high, the consumer may boycott the product

**Pricing Policies.**

Price must not be too high or too low. Price setting is a complex problem. The pricing decision is critical not only in the beginning but it must be reviewed and reformulated from time to time. Price policies provide the guidelines within which pricing strategy is formulated and implemented. It represents the general frame work within which pricing decision are taken. Price policies are those management guidelines that control the day to day pricing decision as a means of meeting the objectives of the firm such as maximization of profit, maximization of sales, targeted rate of return, survival, stability of prices, meeting or preventing competition etc.

**Steps** in formulating pricing policies:

1. Selecting the target market or market segment on which marketer would concentrate more.

2. Studying the consumer behavior and collecting information relating to target market selected.

3. Studying the prices, promotion strategies etc.of the competitors and their impact on the market segment.

4. Assigning a role to price in the marketing mix.

5. Collecting the cost of manufacturing the product at different levels of demand.

6. Fixing suitable (strategic) price after determining the price objectives and according to a selected method of pricing.

**Objectives of pricing policy.**

Pricing decisions are usually considered a part of the general strategy for achieving a broadly defined goal. Before determining the price itself, the management should decide the objectives. While setting the price, the firm may aim at one or more of the following objectives.

1. **Profit maximization**: Since the primary motive of business is to earn maximum profit, pricing always aim at maximization of profit through maximization of sales.

2. **Market share:** For maximizing market share a firm may lower its price in relation to the competitors‟ product.

3. **Target return in investment**: The firm should fix the price for the product in such a way that it will satisfy expected returns for the investment.

4. **Meet or prevent competition:** In order to discourage competition a firm may adopt a low price policy.

5. **Price stabilization:** Another objective of pricing is to stabilize the product prices over a considerable period of time.

6. **Resource mobilization**: Company may fix their prices in such a way that sufficient resources are made available for the firms expansion, developmental investment etc.

7. **Speed up cash collection:** Some firms try to set a price which will enable rapid cash recovery as they may be financially tight or may regard future is too uncertain to justify patient cash recovery.

8. **Survival and growth:** An important objective of pricing is survival and achieving the expected rate of growth. Profit is less important than survival.

9. **Prestige and goodwill:** Pricing also aims at maintaining the prestige and enhancing the goodwill of the firm.

**10. Achieving product** –**quality leadership**: Some Companies aim at establishing product quality leader through premium price**.**

**Methods of pricing.**

1. Cost Plus pricing.

2. Target pricing.

3. Going rate pricing.

4. Customary pricing.

5. Follow up pricing.

6. Differential pricing.

7. Marginal cost pricing.

8. Barometric pricing.

1. **Cost plus pricing:** This is the most common method used for price. Under this method, the price is fixed to cover all costs and a predetermined percentage of profit.ie, the price is computed by adding a certain percentage to the cost of the product per unit. This method is also known as margin pricing or average cost pricing or full cost pricing or mark up pricing. The business firm under oligopoly and monopolistic market are following this pricing policy.

**2. Target pricing**: This is variant of full cost pricing. Under this method, the cost is added with the predetermined target rate of return on capital invested. In this case the company estimates future sales, future cost and calculates a targeted rate of return on capital invested. This is also called as rate of return pricing.

**3. Marginal cost pricing**: Under the marginal cost pricing, the price is determined on the basis of marginal cost or variable cost. In this method, fixed costs are totally excluded.

4. **Differential pricing:** Under this method, the same product is sold at different prices to different customers, in different places, and at different periods. This method is called discriminatory pricing or price discrimination. Examples, Cinema theater, telephone bills etc..

**5. Going rate pricing**: under this method, prices are maintained at par with the average level of prices in the industry. I.e., under this method a firm charges the prices according to what competitors are charging. Firm accepting the price prevailing in the industry in order to avoid price war. This method is also called acceptance pricing or parity pricing.

**6. Customary pricing:** in the case of some commodities the prices get fixed because they have prevailed over along period of time. Examples, the price of cup of tea or coffee. In short the prices are fixed by custom. The price will change only when the cost changes significantly. It is also called conventional pricing.

**7. Follow up pricing**: this is the most popular price policy. Under this, a firm determines the price policy according to the price policies of competitors. If the competitors reduce the price of the product, the firm also reduces the price of its product. If the competitors increase the price, the firm also follow the same.

**8. Barometric pricing**: this is the method of leadership pricing. In this type of price leadership, there is no leader firm. But one firm among the oligopolistic firms announces a price change first. This is followed by other firms in the industry. The barometric price leader need not be a dominant firm with the lowest cost or even the largest firm in the industry but they responds to changes in business environments rapidly. On the basis of a formal or informal tacit agreement, the firms in the industry accept a firm as price leader who may act firstly upon the environmental or market changes.

**Pricing of a new product. (Methods and strategy)**

In pricing a new product, generally two types of strategies are suggested. They are;

**1. Skimming price strategy**

This is done with a basic idea of gaining a premium from those buyers who always ready to pay a much higher price than others. Accordingly a product is priced at a very high level due to incurring large promotional expenses in the early stages. Thus skimming price refers to the high initial price charged when a new product is introduced in the market. Reasons for charging this price are;

A. When the demand of new product is relatively inelastic.

B. When there is no close substitutes

C. Elasticity of demand is not known.

D. When the buyers are not able to compare the value and utility.

E. To attract the high income customers.

F. To recover early the R&D and promotional expenses.

G. When the product has distinctive qualities, luxuries etc..

**2. Penetration price strategy**

This is the practice of charging a low price right from the beginning to stimulate the growth of the market and to capture large share of it. Since the price is lower, the product quickly penetrates the market, and consumers with low income are able to purchase it. Reasons for adopting this policy are:

A. Product has high price elasticity in the initial stage.

B. The product is accepted by large number of customers.

C. Economies of large scale production available to firm.

D. Potential market for the product is large.

E. Cost of production is low.

F. To introduce product into market.

G. To discourage new competitors.

H. Most of the prospective consumers are in low income class.

**Kinds of pricing (pricing strategies)**

Pricing policy means a policy determined for normal conditions of the market. Pricing strategy is a policy determined to face a specific situation and is of temporary nature. Simply pricing policies provide guidelines to carry out pricing strategy. Following are the important pricing strategies.

1. **Psychological pricing**: Here manufacturers fix their prices of a product in the manner that it may create an impression in the mind of consumers that the prices are low. E.g. Prices of Bata shoe as Rs.99.99. This is also called odd pricing.

2. **Mark up pricing.** This method of pricing is followed by whole salers and retailers. When the goods are received, the retailers add a certain percentage of the whole saler‟s price.

3. **Administered pricing**: Here the pricing is done on the basis of managerial decisions and not on the basis of cost, demand, competition etc.

4. **Other pricing strategies**: Geographical pricing, base point pricing, zone pricing, dual pricing, product line pricing etc. are some other pricing strategies.

**Role of Cost in Pricing**

Most of the wholesale and retail organizations add some percentage of profit or mark up total cost per unit to arrive at selling price. According to Hall and Hitch, business firms under the conditions of oligopoly and monopolistic competitive market do not determine price and output with the help of the principle MC=MR. they determine price and output on the basis of full average cost of production. Cost of production consists of fixed and variable costs. In the short run the firm may not cover the fixed cost but it must cover at least variable cost. In long run all costs must be covered. if the entire cost is not recovered, the firm will incur losses, and the firm must stop their production. Thus costs provide the basis for pricing. If the cost increase price also increases. Cost represents a resistance point for lowering of price, i.e., below which pricing should not be done. Cost also determines the profit margin at various level of output.

**Role of Demand factor in pricing**

In the case of pricing of a product, demand plays a significant role. In some cases demand occupies a vital role than cost. The demand is the factor which determines the sales and profit. We know as per law of demand, demand and price have inverse relationship. To increase the demand, the firm has to reduce the price. Similarly to decrease the demand the firm has to increase the price. the elasticity of demand is to be considered in determining the price of the product. If the demand for the product is elastic, the firm can fix lower price. If the demand is inelastic, the firm can fix a higher price**.**

**Consumer Psychology and Pricing**

While fixing the price of product, the management should give importance to consumer psychology. Actually demand of the product is based upon the behavior of consumers. Some consumer may buy a product of high quality even though the products are highly priced. Consumers think that highly priced products are of high quality. If the price of product is less, consumer will think that such product is of low quality. If the price is too high, the consumer may boycott the product and they will go for substitute product of low price. If the price is too low the consumers think that the goods are of inferior quality. They will not buy it. The important elements that influence the consumer psychology are; price of the product, after sales service, advertisement and sales promotion, personal income, fashions. So consumer are many types, they follow different approaches to firms product. So in case of price determination, the consumer psychology must given due weight age.

 **Managerial economics Individual Assignment mark 10%**

**Instruction: you should explain in detail and you write at least 6 pages, the submission date is only until may 30/10/07 E.C and your hand writing should be readable and neat**

**1.** Define sunk Cost ?

**2.** Distinguish between Accounting cost and economic cost?

**3.** Define fixed cost ?

**4.** What is explicit Cost ?

**5.** What are Social costs ?

**6.** What is Marginal revenue

**7.** Distinguish between marginal cost and incremental cost ?

**8.** Distinguish between long run cost and short run cost ?

**9.** State the relationship between TC, AC and MC ?

**10.** Distinguish between marginal revenue and incremental revenue ?

11. Mention various method of pricing?

12. What are the objectives of pricing policy?

13. What is the role of cost and demand factors in price determination?

14. Explain the pricing strategies of new products?

15. What is the role of consumer psychology in pricing?

**16.** Discuss how Ethiopian Airlines might use the marginal analysis concept to decide on adding a new flight to its schedule. Identify the costs that should and should not be considered in this analysis.

**3.** The demand for Unilever Ethiopia PLC products is related to the state of the economy. If the economy is expanding next year (an above-normal growth in GNP), the company expects sales to be $90 million. If there is a recession next year (a decline in GNP), sales are expected to be $75 million. If next year is normal (a moderate growth in GNP), sales are expected to be $85 million. Unilever’s economists have estimated the chances that the economy will be either expanding, normal, or in a recession next year at 0.2, 0.5, and 0.3, respectively.

**a.** Compute expected annual sales.

**b.** Compute the standard deviation of annual sales.

**c.** Compute the coefficient of variation of annual sales.

