BHM 638:
MANAGERIAL ECONOMICS

NATIONAL OPEN UNIVERSITY OF NIGERIA

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COURSE GUIDE

NATIONAL OPEN UNIVERSITY OF NIGERIA

For long, business managers have been borrowing aspects of economics to enable them take good and rational decisions. The success of an organization or business depends to a large extend on managerial decisions. How sound the decisions are, is based on how knowledgeable the managers are. This does not in any way suggest that all good managers have sound knowledge of Economics. There are some managers who are capable of taking right decision owing to their practical experience in the job. Others are able to do so because of the knowledge they acquired in school. All in all, academic knowledge is not a waste as it provides reasons for decisions taken.

Managerial economics is that course that blends business decisions with economics realities. It brings out the economics tools that could be used to enhance managerial decision-taking. Business flourishes most when managers are capable of taking good decisions. Their ability to take good decision can be enhance be enhanced by the knowledge they have of managerial economics.

This course guide briefly explains to you what the course is all about. The course material you will be using, and how you are expected to cover the course. It gives the advice on the amount of time you are required to spend on each unit of the course, to enable you complete the course successfully and in good time. The course also provides you some quidance on Tutor Marked Assignment, which will be made available in the assignment file. There will be regular tutorial classes that are linked to the course. You are advised to attend the sessions.

WHAT YOU WILL LEARN IN THIS COURSE

During this course, you will be learning definition of economics concepts, their implications and their application to business. As a promising manager, you are expected to grasp this concept and then try to apply them to your activities. All these is to make you a distinguished manager.

COURSE AIM AND OBJECTIVES

This course is aimed at:

i   Giving you an understanding of the concepts involve in managerial economics.
ii   Making you to be able to define and explain the concepts.
iii   Enabling you understand the applicability of economic theories in the firms decision making processes.
iv   Making you appreciate the role of economic theories in analyzing and solving the practical problems facing modern firms, especially as it concerns investment decision.

v   Enabling you to understand the existing relationship between applied Economics and Business Management

When all the above aims are considered, we can conclude that the major aim of the course is to expose you to various tools, techniques and logic of solving business and economic problems of the firm.

WORKING THROUGH THIS COURSE

For you successfully complete this course, you are required to read the study units, reference books and other resources that are related to the unit. Each unit of the course contains self assessment and Tutor Marked Assignment. The self-assessments are to enhance your understanding of the course, and are not to be submitted.

The Tutor Marked Assignment (TMA) is to be done immediately every unit is completed and sent to the course facilitators for assessment.

The medium to be used and the time to submit the TMA will be specified to you later. This course is a 3-credit course. As such you are expected to spend a minimum of three hours every week studying the course. You are expected to complete the entire course outlined within a period of 18-25 weeks.

COURSE EVALUATION

As stated before, every unit of this course has an assignment attached to it. You are required to keep an assignment file. After every unit the assignment should be done. At the end of the course, the evaluation shall be as follows:

Assignments	-	40%
Examination	-	60%
		100%

 Out of all the assignment you will do, each one shall be marked and converted to 4%. At the end of the best 10 shall be selected so as to make up to 40%. The examination at the end of the course shall cover all aspect of the course.

COURSE UNITS

In this course, Economy theory, techniques, logic and analysis that could be helpful to you as a manager shall be considered under different topics. Based on this, the following units have been designed for the course.

Units   Title

24   Demand and supply of capital

25   Capital budgeting and investment decisions.

These units must be treated sequentially; as a logical link exists in the arrangement. Every previous unit lays a foundation for subsequent ones. A maximum period of one week is required for every unit.

REFERENCE MATERIAL AND OTHER RESOURCES

As was earlier mentioned, materials relevant to the course include, not only the ones below, but also others that you can lay your hands on. But for now, the following references are recommended:

1   Lipsey, R. G. and Crystal, K.A (1997): An introduction to positive economics, Oxford, Oxford press.

2   Lipsey R.G et al (1987): Economics. London Haper and Ron Publishers

3   Dwiredi D.N (1998): Managerial Economics. New Delhi, Vikas Publishing house PVT, Limited.

4   Koutsiyannis A. (1979): Micro-economics, London

PRESENTATION SHEDULE

Specific dates for particular activities, such as submission of assignment, tutorial schedules and examination dates shall be made available to you on a later date. This will enable you plan your activities in the same line. The method of submitting your assignment and receiving other course materials shall be agreed upon on a later date. You should endeavour not to be falling behind the schedule whenever it is given.

CONCLUSION

By the time you exhaust this course, you will find it useful not only in solving business problems, but also your day-to day problems.

BHM 638: MANEGERIAL ECONOMICS

COURSE DEVELOPMENT

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NATIONAL OPEN UNIVERSITY OF NIGERIA

Module 1

UNIT 1

AN OVERVIEW OF MANAGERIAL ECONOMICS

1.0   INTRODUCTION

Economics as a discipline has proved to be a life wire in the survival of modern firms. To accomplish their assigned task, managers need to apply economic tools of analysis to their duties and responsibilities. With knowledge of economic principles, business managers can perform their functions more efficiently than those without it. The managers are always trying to maximize the gains from their business activities (especially the private firms). To realize this goal, managers should know how to practicalize economic theory, so as to arrive at the maximum level of optimality and to avoid unnecessary mismanagement of the organization's resources. Hence, managerial economics has developed to bridge the gap between Economic theory and business practices.

2.0   OBJECTIVES

This unit forms the introductory aspect of the course. It provides the basis upon which other subsequent units will be understood. If fully comprehended, you should be able to:

7   Define managerial economics

8   Define its scope and aspects it covers

-       Understand the applicability of economic theory in firm's decision-making processes.

-       Appreciate the role of economic theory in analyzing and solving the practical problems facing modern firms and

-       Apply it to your business activities as well as your daily activities

3.0   THE SCOPE OF THE COURSE

The application of economic tools of analysis has gained a wider recognition and holds a central position in the modern day decision making process, especially in the modern business organizations. With the introduction of managerial economics, business firms would not find it difficult to develop appropriate and lasting solution to complex business problems.

For this, it has become highly necessary for the decision makers and entrepreneurs at least to have the basic knowledge of the relevant economic tools of analysis, so as to facilitate a faster as well as to develop a more coherent base for business decisions. In this view, managerial economics or applied economics has been developed and made to serve as a devise for assimilating and guiding the application of the relevant pieces of economic theories and tools in the contemporary business environment.

The course managerial economics is of a dynamic scope, as it deals with the society, which in itself is dynamic, which leads to the outlook of management. The decision variables keep on changing, necessitating a change in the subject matter of managerial economics.

It is equally worthy to note that the course covers the aspects of economic theory related to business environment. Business environment is not only being affected by individual decision-making processes but equally, the environment within which the firms operate affect life.

3.1   DEFINITION OF MANAGERIAL ECONOMICS

Managerial Economics is an area of Economics which deals with the application of Economic theories, tools and logic in the analysis of business problem and decision making process of the firm, which affects its internal and external (environmental) areas. It is that guide which gives the manager the base for good decision-making.

3.2   THE SCOPE OF MANAGERIAL ECONOMICS

Assume that you get back home today and a friend tries to find out from you what managerial Economics is all about what will you tell him? Definitely I know you will attempt a lot of explanations. The answer to this question can be found in the definition above and the demarcation of the scope, which we are considering here.

Economics is divided into two broad categories- Microeconomics and Macroeconomics. Both categories of theories are applicable to business analysis and decision making process of the firm. Directly or indirectly, managerial economics comprises therefore of these two areas of Economics. You should note that the aspects of micro and macroeconomics that constitutes managerial economics, depends on the purpose of analysis.

As a student of Managerial Economics, you should endeavour to understand all these economic concepts, theories and tools of analysis, which can be applied to the analysis of the business environment. For the sake of simplicity, only aspects that are related to microeconomics and that have an impact on the entire business environment shall be considered in this course. The aspects of macroeconomics shall be considered at a later stage of this programme. Under this scope, - Microeconomics (managerial economics) areas of business issues in which economic theory can be directly applied may be broadly divided into two:

- Operational or internal issues and

- Environmental or external issues.

3.2.1   MICROECONOMICS APPLIED TO OPERATIONAL ISSUES

Operational problems are of internal nature. They include all those problems which arise within the business organization and fall within the preview and control of the management. Some of these problems are: -

- Choice of the commodity i.e. what to produce,
- Choice of size the firm i.e. how to produce
- Choice of technology i.e. choosing factor combination
- Choice of price i.e. how to price the commodity
- How to promote sales
- How to face price competition
- How to manage inventory i.e. stock of both finished goods and raw materials.

These problems are always the main concern of Business Managers. Microeconomics deals with these questions and others confronted by managers of the business enterprises. The microeconomic theories, which deal with most of these questions, are summarized below.

> **The theory of Demand:** Demand theory explains the behaviour of the consumer. It answers questions such as: How does the consumer decide whether or not to buy a commodity? How do they decide on the quantity of the commodity to be purchased? When do they stop consuming a commodity? How do the consumers behave when price of the commodity, their income and taste and fashion etc changes? At what level of demand does changing price become inconsequential in terms of total revenue? The knowledge of demand theory can therefore be helpful in the choice of commodities for production.

> **Theory of Production:** Production theory also called theory of the firm, explains the relationship between input and output. It also explains under what condition costs increase or decrease? How total input increases when units of one factor (input) are increased, when all other factors are held constant? When all factors are simultaneously increased? To what extent can one factor be substituted for another? How is the optimum size of output achieved? This theory will help you in determining the size of the firm, size of the total output and the factor proportion i.e. the amount of capital and labour to be employed.

> **Theory of Exchange or Price Theory:** The price theory explains how prices are determined under different market conditions, when price discrimination is desirable when the price is feasible, profitable and expanding sales in a competitive market. Price theory thus can be helpful in determining pricing policy of the firm. Price and production theories together help in determining optimum size of the firm.

> **Profit Theory:** Profit making is the most common and major objective of business firms. But making a satisfactory profit is not always guaranteed because a firm has to carry out its activities under condition of uncertainly in respect to: demand for the product, input prices in the factor market, nature and degree of competition in the product market, price behaviour under changing conditions in the product markets, just mention a few.

An element of risk is always there even if most efficient techniques are used for predicting the future and even if business activities are meticulously planned. The firms are therefore supposed to safeguard their interest and avert the possibilities of risk or minimize it. Profit theory guides in the

measurement and management of profit, in making allowances for risk premium in calculating the pure return or capital and also in future profit planning.

➢ **Capital and Investment Theory:** Capital like all other inputs is a scarce and an expensive factor of production. Capital is the foundation of the business. Its efficient allocation and management is one of the most important tasks of the manager. Major issues related to capital and investment theory are:

- Choice of investment project
- Assessing the efficiency and
- Most efficient allocation of capital, just to mention a few.

Knowledge of capital theory can contribute greatly in the investment decisions, choice of inputs, maintaining capital intact and capital budgeting etc.

These are just a summary of a few items among many others that we shall be dealing with in this course.

4.0   CONCLUSION

Economic theories have wide application to business decision making. Some of the major theories, which can wisely be applied to business analysis, have been mentioned above. But you should always have in mind that economic theories, models and tools of analysis do not offer ready-made answers to the practical problems of individual firm. They provide only logic and methods that could be used to find answers, and not the answers. It depends on the manager's own understanding, experience, intelligence and training on how to use the tools of economic analysis to finding correct answers to the practical problems of the business.

For the purpose of this course, the scope of managerial economics is limited to a number of items that you will understand these aspects and be able to apply them to your activities.

5.0   SUMMARY

From all what has been discussed above, I can say that you now know what you should be expecting to see in subsequent units of the course. You should therefore condition your mind towards getting the best out of the units and putting the knowledge gained into practice.

6.0 TUTOR MARKED ASSIGNMENT

"Managerial Economics bridges the gap between theory and business practices". Shed some light on the above statements.

7.0 REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive Economics, Oxford, oxford press.

Lipsey R.G et al (1987) economic London, Harper and Row Publisher.

Dwivedi D.N (1987) Managerial Economics. Vikas publishing house PVT Limited, New Delhi.

Koutsiyannis A. (1979) Microeconomics 2nd Edition London Macmillan

THE MAJOR OBJECTIVE OF BUSINESS FIRMS.

1.0   INTRODUCTION

Business enterprises are formed with specific objectives in mind. These objectives differ depending upon the intention of the owners of the firm. In this unit of the work, we will pay particular attention to the objectives of business firms. The problems of these objectives will also be discussed in this unit. Suppose you are running a poultry farm and somebody ask you the objective of your business venture. What will you tell him? You may not be wrong if you say your objective is to make profit. The real answers to the above question will come out clearly when we understand this unit and the next one.

2.0   OBJECTIVES OF THE UNIT

At the end of this unit, you should be able to know the following:

-        What a business firm is all about
-        The basic objectives of business firms
-        The meaning and theories of profit
-        The problems associated with measurement of profit
-        How business firms maximize profits and
-        What level of profit is considered reasonable?

An understanding of all these will help you a lot in business decision taking.

3.0   MAIN OBJECTIVE OF FIRM

3.1   DEFINITION OF BUSINESS FIRMS:

A firm in economics is the smallest unit of a production outfit. A business firm therefore is any production entity that carries out activities for money e.g. poultry farm, bakery, shoe industry, tannery, an accounting firm etc

3.2   PROFIT AS A BUSINESS OBJECTIVE FIRM

Profit has been upheld as the major objective of business firms. Profit means different things to different people. Businessmen, accountants, tax collectors, workers and economists see it to mean different things. In a general sense, profit is regarded as income accruing to the equity holders, in the same sense as wages accrue to the labor, rent accrue to the owners of the rentable assets, and interest accrues to the money lenders. To the layman, profit means all income that flow to the investors. To the accountant, profit means the excess of revenue over all paid out cost including both manufacturing and over head expenses. It is the same as net profit. To the economist profit means a return over and above the opportunity cost i.e. the income which a businessman might expect from the second best alternative use of his resources. You can see the notion different people have about profit. It therefore depends on who is defining it. Let us look at it now more closely.

8   Accounting profit Vs Economic profit.

These two concepts of profit are the most important in business decisions. As such, an understanding of the difference between them is important.
From the accounting point of view, profit is surplus of revenue over and above all payment on cost. This can be calculated as:

Accounting profit = TR – (W+R+I+M).
Where TR = Total Revenue

W = wages and salaries, = rent, I = interest and M= Cost of materials. It should ,be noted that when calculating accounting profit, only explicit costs are considered i.e. Actual expenditure.

On the other hand, economic profit takes into account the implicit and imputed costs. This implies that economic cost takes into consideration the opportunity costs of factors of production. Opportunity cost is defined as the income forgone, which a businessman could expect from the second best alternative use of his resources. E.g. when an entrepreneur uses his labour in his own business, he forgoes the income, which he might have earned by working in another firm. This also applies to all productive resources and are called opportunity cost.

Economic profit or pure profit as it is also called, could therefore be defined as the residual left after all contractual costs have been met, including the transfer costs of management, insurable risks, depreciation and payments to shareholders sufficient to maintain investment at its current level. The formula for calculating it is:
Pure profit (economic profit) = Total Rev. - (Explicit + implicit cost).

The value that can be derived from the above formulae can be negative or positive. In a nutshell, the major difference between accounting profit and pure profit lies in the fact that while pure profit takes into consideration the opportunity cost of factors of production employed, account profit does not. By the time we treat the concept of cost, you will appreciate this aspect better.

3.2.1 SOURCES AND THEORIES OF PROFIT.

Economists do not agree on the sources of profit. As result of these disagreements, a number of theories are advanced to explain the sources of profit. We shall briefly consider a few of these theories here. You are required to pay particular attention to this for proper understanding. The following are advanced as sources of profit:

a). Profit as reward for Dynamic Entrepreneurship
According to this theory, profits are found not in a static economy, but in a dynamic economy. In a static economy, (i.e economy with little or no changes) there are no changes in economic indices, in such a case, firms make only normal profit i.e the wages of management). But in a dynamic economy there are constant changes in all economic indicators. Managers take advantage of these changes and promote their businesses, expand their sales and reduce their costs. A manager who takes successful advantage of the changing conditions in a dynamic economy makes pure profit.
Pure profits exist only in the short-run, because in the long run, there is a rise in output, which causes a decline in product prices. This leads to the

disappearance of pure profit. Managers with foresight continue to take advantage of these changes and make profit.

b) Profit as Reward for Risk-Bearing

This approach is also known as Hawley's Risk Theory of Profit. According to this approach, profit is simply the price paid by society for assuming business risks. As such, businessmen would not assume risk without expecting adequate compensation in excess of actual value. They would always look for a return in excess of the wages of management for bearing risk. Risk gives rise to trouble, anxiety and disabilities of various kinds and the entrepreneur bears all these. This gives him a claim to reward for taking these pains in excess of actuarial value of risk. According to this theory, profits consist of two parts:

- One part represents compensation for actuarial or average loss incidental to the various classes of risks necessarily assumed by the entrepreneurial adventures, and

- The remaining part represents an inducement to suffer the consequences of being exposed to risk in their entrepreneurial adventures.

Hence, profits arise from factor ownership only so long as ownership involves risk. This implies that an entrepreneur has to assume risk to qualify for profit. Accordingly, if an entrepreneur avoids risks by insuring against it, he ceases to be an entrepreneur and would not receive any profit, because profits arise out of uninsured risks.

c)   Profit as reward for innovations

This theory is also called Schumpeter's Innovation Theory of profit: According to this theory, the payment of interest and profit, trade cycles and many others were only incidental to a distinct process of economic development. As such, this theory is embedded in Schumpeter's theory of economic development. According to this approach, a stationary economy, which is the starting point, is characterized by equilibrium in all the spheres, implying there is no profit. Profit can only be made by introducing innovations in manufacturing techniques and methods of supplying the goods. Innovations could take the form of:

- Introduction of new commodity,
- Introduction of a new method of production
- The opening of a new market

-        Finding new sources of raw materials and
-        organising the industry in an innovative manner

This may all give rise to profit, which over time will be competed away as early discussed. Where profits arise due to such factors as patent, trusts, cartel, etc, it would be in the nature of monopoly profit and not entrepreneurial profits.

3.2.2 PROBLEMS OF MEASURING PROFIT

The first problem of measuring profit arises from its definition, and the costs to be included. The problem that arises from the definition is solved by specifying the purpose for measuring profit. Accounting concept of profit is used when the purpose is to produce an interim profit figure for:

-        Shareholders to inform them of progress of the firm,

-        Financiers and creditors who are interested in firm's progress,

-        Managers to assess their own performance and

-        For computation of tax-liability.

Data to measure the profit for this purpose can be obtained from firm's books of account.

Accounting profit may exaggerate actual profits, if it is based on arbitrary allocation of revenue and costs to a given accounting period.
If on the other hand, the objective is to measure true profit, the concept of economic profit should be used. This can be achieved by viewing profit in terms of maximum amount that can be distributed in dividends, since the true profitability of any investment can be determined only when the ownership of that business has been terminated. This makes the concept of economic profit to be of little practical use. This notwithstanding, it serves as a guide to income measurement even from businessmen's point of view.

From the above discussion, it is clear that for all practical purposes, profits are measured on the bases of the accounting concept. This method too is not free from problems. The main problem with this method, is deciding the items that should be included in the cost. These problems include:

- Measurement of depreciation, which method
  to be used,
- Treatment of capital gains and loses and
- Method of valuation, i.e, current or historical costs

These problems arise because:

Economists' view on these items differs from that of accountants and
- There is more than one accepted method of treating these items.

3.3 PROFIT MAXIMISATION AS THE MAJOR BUSINESS OBJECTIVE

Economists have built price and production theories holding profit maximization as an important assumption. Conventional economic theory assumes profit maximization as the sole objective of business enterprises. The advantage of this assumption is its predictive power. It helps predict the behaviour of business firms in the real world and the behaviour of price and output under different market conditions.
To maximize profit under this approach, some conditions must be fulfilled. These conditions are:

- The necessary condition: which requires that Marginal Revenue (MR) must be equal to Marginal Cost (MC), i.e, MR=MC. This is Known as the first order condition of profit maximization

- The secondary condition also called the second order condition, requires that MR=MC at a point where MR is decreasing and MC rising.

When these two conditions are fulfilled, it makes it the sufficient condition These could be expressed as follows:
$$\pi = TR - TC \text{ --------------------------------- 3.1}$$

Where π = total profit, TR = Total Revenue and TC= Total Cost. If Total Revenue (TR) and Total Cost (TC) functions are given, such that
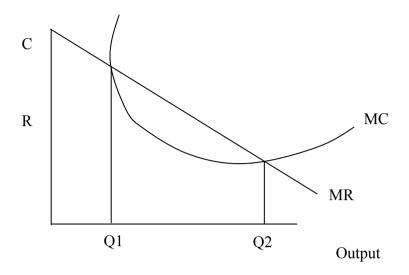
TR = F (Q) and

TC = F(Q)

Where Q = quantity produced and sold, the profit function is of the firm thus:
$$\pi = F (Q) - F (Q)$$

This could be represented graphically as follows:

Q_2 represents the sufficient condition since MR = MC at a point where MR is decreasing and MC is increasing which is contrary to Q1.

The first order condition of maximising a function is that its first derivative be equal to zero. This also olds true for the first order condition of profit maximization, i.e. the first derivative of the profit function must be equal to zero.

$$\frac{d\pi}{dQ} = \frac{dTR}{dQ} - \frac{dTC}{dQ} = O$$

$$\frac{dTR}{AQ} = \frac{dTC}{AQ}$$

ΔTR is the slope of the total Revenue curve which ΔQ is the same as Marginal Revenue (MR).

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

Witch is the slope of total cost curve is the same as marginal cost (MC). Thus, we can state the first -order condition for profit maximization as MR =MC.

This is the necessary condition, whose non-fulfillment results in the nonoccurrence of an event. The second order condition requires that

its second derivative be negative. The implication of this that the total profit curve has turned downward after having reached the peak. The second derivative of the total profit function is:

$$\frac{d^2\pi}{dQ^2} = \frac{d^2TR}{dQ^2} - \frac{d^2TC}{dQ^2} = O$$

This implies that $\frac{d^2TR}{dQ^2} > \frac{d^2TC}{dQ^2}$

Slope of MC, it can be expressed as:
Slope of MR > slope of MC

The above equation meets the second order condition for profit maximisation.

4.0   CONCLUSION

From what has been discussed so far, one can conclude that business enterprises have profit maximisation as their prime objectives, and profit maximisation plays a significant role in business decision. For profit to be maximized, the conditions of MR = MC and a rising slope of MC at the point where MR = MC provide the adequate condition for profit maximization.

5.0   SUMMARY

It has been observed from the foregoing discussion on this unit that business firms engage in production activities for the purpose of profit malting. Profit is given different explanation by different disciplines e.g. while accounting profits is surplus of revenue over and above all paid on cost economic profit is the residual left after all contractual costs have been met. Profit is maximised at a point where MR = MC.

6.0   TUTOR MARKED ASSIGNMENT

1.   Explain how business firms maximise profit?

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

Lipsey R.G et al (1987) economic London, Harper and Row Publisher. -

Dwivedi D.N (1987) Managerial Economics. Vikas publishing house PVT Limited, New Delhi.

Koutsiyannis A. (1979) Microeconomics 2nd Edition London Macmillan

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UNIT 3

OTHER OBJECTIVES OF THE BUSINESS FIRMS

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1.0   INTRODUCTION

The formation of Business organisations is not necessarily or exclusively for the purpose of making profit. Just like individuals have a variety of objectives or goals, firms too are equally set-up to achieve other objectives different from profit. This unit is trying to analyse such objectives as they are being practiced or exercised in the business organisations. So you should expect to see other objectives of firms other than profit.

2.0   OBJECTIVES OF THE UNIT

The main objectives of the unit are to analyse the non-profit objectives of business firms. To successfully achieve this you are expected to be able:

- To appreciate the existence of Non-profit goal targets set-up by firms to achieve.

- To be able to understand these non-profit goals.

- To understand why the aim of modern firms is aimed at not attaining abnormal profits.

When you must have fully understood this unit then it will be clear to you why some business firms are not profit oriented.

3.0   OTHER OBJECTIVES OF THE FIRMS.

The conventional theory of profit does not distinguish between owners' and manager's interests. The recent theories of the firm, consider owners and managers as separate entities in large corporations. The separation between managers and owners gives the managers room to use their discretion in setting the goals for the firms they manage. Objectives of business firms, in such a situation will not be profit maximisation as we have already seen. Some of these non-profit objectives are:

3.1   SALES REVENUE MAXIMISATION

This is seen as an alternative to profit maximisation objective. The reason for this objective is the dichotomy between ownership and management. This division, gives the managers an opportunity to set goals other than profit maximization - which most owner - businessmen pursue. Given such an opportunity, managers will choose to maximize their own utility function by maximizing sales revenue. This objective is not incompatible with profit maximization, especially in the long-run, as sales maximisation yields only normal profits in the long-run which is the maximum under perfect competition. Sales maximization objective is different in the short run only, for in the long run, the level of profit remains the same no matter the objective.

3.2   MAXIMISATION OF FIRM'S GROWTH RATE

Some managers may have their objectives being maximization of firms growth rate. This objective also arises as a result of the separation of management from ownership. Here the managers have balancing the growth rate of the firm as their most important item on their utility function. This objective tallies with the owners' objective of output

maximization. The achievement of this owners' objective depends on the maximization of the growth rate of the limns. You can still see that this objective is not incompatible with that of profit maximisation, as maximisation of growth rate would also mean profit maximisation in the long run.

3.3   THE OBJECTIVE OF LONG-RUN SURVIVAL AND MARKET SHARE GOALS

An alternative to profit maximisation is that of long-run survival and market share goals. Most firms have this as their long-run objective. Firms may have the intention of maximizing their profit in the long run. Their objective is therefore to maintain their market share until the long-run comes. This profit of course is not certain. As such they may not achieve their goals. This technique in the short-run is used to chase out competitors and when there are no longer competitors prices can be increased to make profit.

3.4   ENTRY-PREVENTION AND RISK-AVOIDANCE OBJECTIVE

Some firms have as the priority objective, to prevent entry of new firms into the industry. The reasons for preventing entry lie in any of the following motives:

-       Profit maximisation in the long run
-       Securing a constant market share and
-       Avoidance of risk caused by the unpredictable behaviour of the new firms.

Firms that are operating limit pricing carryout this type of objective. It can therefore be said that, the motive behind entry prevention is to maximize profit through securing a constant market share.

3.5   REASONABLE PROFIT TARGET

As discussed above, the objectives of firms differ. No matter the firm, its survival depends on the profit it can make. This suggests that all Business firms are profit oriented. What matters is the level of profit targeted. This implies that in the objective function of all firms, profit is there. While some firms will have standard profit as their level of profit, some will have target profit and others reasonable profit. Among all of them, the most popular is that of reasonable profit.

3.6   WHY MODERN CORPORATION AIM AT REASONABLE 'PROFIT' OTHER THAN MAXIMUM PROFIT.

Most firms do go for reasonable profits for a number of reasons. Salient among the reasons are:

a)   Preventing entry of competitors; when there are many firms competing in the market, profits are competed away such that only pure-profits exist. When firms maintain a reasonable level of profit, other competitors are discouraged because of the low prices prevailing in the market. As such using this type of profit keeps competitors away.

b)   Projecting a good public image; when firms charge reasonable prices, they do not attract public criticisms. Such they may wish to be reaping only reasonable profit so as not to call for public attention.

c)   Reasonable profit, restrain trade union demands and industrial actions. When high profits (abnormal profits are made, workers fill they own a part of the profit and as such demand for higher wages. But where the profits are reasonable these actions are reduced.

d)   Maintaining customer patronage: Customers' goodwill towards a firm is important in maintaining and promoting demand for its product to capture the goodwill of the consumers, quality and fair prices are essential. Firms can therefore sacrifice short-run profit in order to capture the customers and make long-run profit. This is done by charging reasonable prices in the short-run.

3.7   TYPES OF PROFIT STANDARDS

Profit standards can take any of the following forms:

-   Percentage return on investment
-   Percentage of sales
-   Aggregate money terms

Among these, the most commonly used one is the total net profit of the enterprise (aggregate money terms). Where competitors' cost curves are similar, the percentage return on investment is the most appropriate means of discouraging potential competitors.

4.0   CONCLUSION

From all what we have been saying, we can conclude that, though a business firm may be formed with other objectives in mind, profit maximization is an important objective that cannot be undermined. The level of profit that a firm pursues is what differentiates the objectives of such firms from that of other firms. Most firms, as it is seen go for reasonable profit.

In this unit, we have examined the various non-profit objectives of business firms. Among these objectives are profit maximization, sales Revenue maximization, maximization of firm growth rate, long-run survival and market share, and entry prevention and risk-avoidance objective. The problems that militate against measurement of profit have also been considered. All of these have been to enable you understand the reasons why business firms are established and enable you to realized that the goals of the business firms are not only profit maximization but that there are other non-profit goals.

5.0   SUMMARY OF THE UNIT

In this unit, we have examined the various non-profit objectives of business firms. Among these objectives are profit, sales Revenue maximization, maximization of firm growth rate, long-run survival and market share, and entry prevention and risk -avoidance objective. the problems that militate agains measurement of profit have also been considered. All of these have been to enable us understand the reasons why business firm are established and enable us to realized that the goals of the business firms is not only profit maximization but also there are other non-profit goals.

6.0   TUTOR MARKED ASSIGNMENT

l.   Why do modern firms seek a reasonable profit rather than a maximum profit

7.0   REFERENCES AND OTHER RESOURCE

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

Lipsey R.G et al (1987) economic, London, Harper and Row Publisher.

Dwivedi D.N (1987) Managerial Economics. Vikas publishing house PVT Limited, New Delhi.

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UNIT 4

</div>

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UTILITY THEORY

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1.0   INTRODUCTION

The way an individual behaves in respect of his purchases is not always uniform. As such his behaviour is of concern to business managers as well as other decision makers. The behaviour of the consumer helps in determining the demand for a product. As a result of this, a sound knowledge on the behaviour of the consumer, is necessary to business managers for good decisions to be taken. In this unit we are going to examine the consumer behaviour, which is the bedrock of the Business Firms' Decision making process. Theories developed to explain consumer behaviour shall also be examine in the subsequent units.

2.0   OBJECTIVES OF THE UNIT.

This unit is designed to fulfill the following objectives.

(a)   Equip you with a background on the behaviour of consumers.
(b)   Expose you to concepts such as quality, Utility, and price, which may be of help to you in you managerial decision making, and

(c)   Keep managers abreast on how the consumer takes his decision before buying a given good.

3.0   CONCEPTS ASSOCIATED TO UTILITY.

3.1   UTILITY DEFINED

In considering the demand, an understanding of the theory of utility is important. This is so because utility form the backbone of the theory of demand.

Utility mean the satisfaction a consumer derives as a result of consuming a particular commodity. People pay for goods and services because of the ability of such goods and services to satisfy their want. As such, a consumer will not pay for a good unless it satisfied his want.

Utility is a subjective concept, since it differs from one individual to another. For example, to a thirsty man, a sachet of pure water will mean a lot to him.

And he will value it. But to a saturated man a sachet of the same pure water or more will mean nothing to him

3.2   CONCEPT OF UTILITY

The concepts associated with utility includes:

3.2.1 TOTAL UTILITY

This may be defined as the total amount of satisfaction a consumer derives after consuming various units of a commodity. Utility is measurable and additive in units called utils. For example, if a consumer consumes 3 units of a commodity (x), his total utility for that particular good will be given by $TU_X = f(U_1 + U_2, U_3)$

3.2.2 MARGINAL UTILITY:

This refers to that utility (Satisfaction) derived from consuming an additional unit of a commodity. Algebraically it is given the formulae:

$$MU = \frac{\Delta TU}{AQ} = \quad OR$$

$$MU = TU_2 - TU_1$$

i.e. MU is given by the first partial derivative of TU with respect to

quantity. Or $\underline{dTU,}$
                 dQ

Δ Signifies change.

Where MU is the marginal utility.
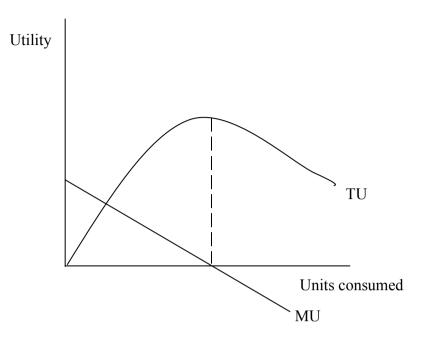 TU_2 = Present state of Total Utility and

The Law Of Diminishing Marginal Utility

This law states that as the quantity consumed of a commodity increases,
the utility derived form each additional unit decreases, given that, the
consumption of all other S commodities remaining constant. In more
simple terms, we can state the law to mean that as we consume more and
more of a commodity, marginal utility decreases while total utility
increase until a point when further consumption of that commodity leads
to dissatisfaction. This law can be illustrated using the following table:

No. of units consumed	TU Total Utility	MU Marginal Utility
1	5	-
2	9	4
3	12	3
4	12	0
5	9	-3

The first column in the table shows the units of a commodity consumed,
the second column shows the total utility of the good. The third column
shows Marginal utility, which decreases continuously as more and more
units of the commodity are consumed.

The above table can be represented graphically:

The curve above shows that when TU is at its maximum point, MU is zero. When TU starts falling. MU is negative.

3.3   MEASURABILITY OF UTILITY.

From the definition of utility we have already considered above, it is clear that utility is a feeling of satisfaction, pleasure or happiness. There is a problem related to the measurability of utility. The classical economists believed that utility is like height, weight, length, temperature and pressure, which can be quantitatively measured. This resulted in the cardinalist utility concept. On the other hand, modern economists are of the view that utility is not quantitatively measurable. They hold that it is only possible to rank utility ordinally. This implies that according to this school of thought it is only possible for somebody to say that he prefers one commodity to another than to ascertain the amount of satisfaction derived form it.

4.0   CONCLUSION

From all what we have done in this unit, the concept of marginal utility has been revealed as a very important concept that helps in determining the pattern of behaviour of consumers when prices change. It is evident that it is the value individuals give to commodities that determine their utility. Consequently, utility determines prices. An understanding of this relationship is quite crucial to managerial decisions.

Whether a commodity is useful or not to a person depends on whether he or she feels a need for that commodity. A commodity must not be useful to all individuals before it possess utility. Most societies and moralists condemn for example, cigarettes and alcohol, but they possesses utility, since they are capable of satisfying the need of smokers and drinkers. This implies that utility is ethically neutral since it may be satisfying a socially immoral need.

5.0   SUMMARY

In this unit of the work, we have explained utility and related concepts. Two theories that explain consumer behaviour have also been considered in detail. All these have been done with the aim of deriving the demand curve. It is evident that demand has its roots from the concept of utility.

6.0   TUTOR MARKED ASSIGNMENT

1.   Explain the following concepts with the help of example
    i.   Utility
    ii.   Total Utility
    ii.   Marginal Utility

2   Complete the table below.

UNIT	TU	MU
1	40	-
2	50	-
3	-	7
4	-	0
5	54	-

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An ntroduction o positive economics, Oxford, oxford press.

Lipsey R.G et al (1987) economic London, Harper and Row Publisher.

Dwivedi D.N (1987) Managerial Economics. Vikas publishing house PVT Limited, New Delhi.

Koutsiyannis A. (1979) Microeconomics 2nd Edition London Macmillan

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UNIT 5

CARDINAL UTILITY

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3.2	Equilibrium Of A Consumer
3.3	Derivation Of Demand
4.0	Conclusion
5.0	Summary
6.0	Tutor Marked Assignment
7.0	References and other resources

1.0   INTRODUCTION

The analysis of consumer behaviour is an attempt to explain how a consumer will react to changes in market conditions, given that the income he has for spending is fixed. The fundamental concern of this concept is clearly brought out by the cardinal and ordinal views which we have earlier mentioned.

This approach is important for managerial decision especially as it relate to sales and production.

In the discussion of this approach, what should be of keen interest are: the assumptions, tools of analysis, equilibrium position of that consumer and flaws of the approach. When you go home, try to find out why some people clinch to particular goods rather than others.

2.0   OBJECTIVES

At the end of this unit, you are expected to be able to answer questions relating to utility from the standpoint of the cardinal approach. You should be able to state the assumptions, understand the equilibrium position of the approach and derive the demand curve.

3.0   ANALYSIS OF THE CARDINALIST APPROACH

The classical and neoclassical economists developed this approach. This approach upholds that utility is measurable and so it is additive.

3.1   ASSUMPTIONS OF THE APPROACH

The assumptions that underlie this theory are:

-       Rationality of the consumer, which implies that a consumer is rational and he will always want to maximize his satisfaction subject to his limited income which is assumed to be fixed. Hence he will always choose a bundle of commodities that satisfies him most.

-       Fixed income i.e. to say that he has a fixed income to share between the goods and services. Hence he has to choose which good to purchase and which to sacrifice their consumption.

-       Utility is measurable; Utility can be measured in units called utils. The utility of one unit of a commodity equals the money, which a consumer is prepared to pay

-       The Law of diminishing marginal utility operates.

-       Utility is additive

-       Constant marginal utility of money:- This implies that a unit of money possess the same satisfaction to everybody whether rich or poor and that it is constant over time. Out of this analysis, the law of diminishing marginal utility is derived. We have already stated this law in the previous section.

3.2   EQUILIBRIUM OF A CONSUMER

A consumer is at equilibrium when he maximizes the level of his satisfaction, after spending all of his income.

i.e. $Y = P_1X_1 + P_2 X_2 + \ldots P_nX_n$

$\Rightarrow$ $Y - (P_1X_1 + P_2 X_2) = 0$

This position is achieved by consuming commodities in the order of their utilities. He is at equilibrium when the allocation of his expenditure is such that the last kobo he spends on each commodity yields the same utility.

For a single commodity, utility is maximized when

$MU_x = P_x$.

i.e.   Marginal Utility of good X is equal to the price of good X.

For multiple commodities, a consumer is at equilibrium when:
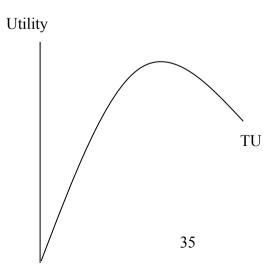
$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \frac{MU_z}{P_z} = \text{-----} = \frac{MU_n}{P_n}$$

A consumer should maintain this level of consumption to maximize satisfaction.

When $MU_x > P_x$, consumer should continue to consume more. When $Mu_x < P_x$, less should be consumed.

3.3   DERIVATION OF THE DEMAND CURVE

The demand curve of the consumer is derived from the total utility and marginal utility curve. Given that TU and MU are represented graphically as:

Utility

TU

35

Quality

Figure a: TU curve

Marginal Utility

MU

MU2

MU3

Quality

MU

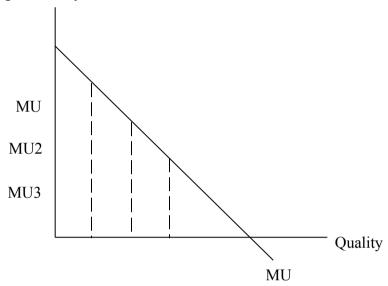Figure b: MU curve

The slope of the TU curve gives the MU curve. Given that it is utility that determines the price of a good, the utility curve in fig b is translated to mean the demand curve.

Utility

MU1

MU2

MU3

D

P1
Price

P2

P3

Quality

Δ

q₁   q₂   q₃

MU

Fig c : Derivation of the Demand curve from MU curve.
The Marginal Utility of the consumer is translated to mean the demand curve since utility determines the price a consumer is willing to pay for the good.
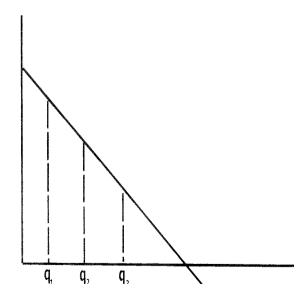
From the demand curve above, it is clear that price and quantity have a negative relationship i.e. when price is increasing quantity is falling and vice versa. This accounts for why the demand curve slopes downward from left to right. Hence, the first law of demand, which states that at higher price demanded ,while at higher price (P1), a lower quantity (q1) is demanded, while at higher price (P3) a lower quantity (q3) is demanded.

4.0   CONCLUSION

Having discussed the cardinalist theory of utility, we are quite certain that the downward sloping nature of the demand curve, is not a, mistake but according to law. Using the diminishing marginal utility (DMU) theory, and other underlying assumption this law has been proved.

5.0   SUMMARY

The cardinalist theory of consumer behaviour asserts that utility is measurable. It has a number of assumptions but that of diminishing Marginal Utility stands out as the most important. This assumption is used to derive the demand curve, which is downward sloping, and so it establishes the first law of demand.

6.0   TUTOR MARKED ASSIGNMENTS

1.   State the assumptions of the cardinalists

2.   Derive the demand curve through the law of DMU

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

Lipsey R.G et al (1987) economic London, Harper and Row Publisher.

Dwivedi D.N (1987) Managerial Economics. Vikas publishing house
          PVT Limited, New Delhi.

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UNIT 6

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ORDINAL UTILITY APPROACH

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3.4	Derivation Of The Demand Curve
4.0	Conclusion
5.0	Summary
6.0	Tutor Marked Assignment
7.0	References and Other Resources

1.0   INTRODUCTION

This approach was developed to take care of the lapses of the cardinalist approach. The base of this approach is quite scientific than the cardinalist approach. It shades more light on how the consumer behaves given his fixed income. This approach uses the law of Marginal Rate of Substitution and the indifference curves in drawing conclusions. This approach is scientific and applicable. Managers therefore need to understand some of the intricacies involved before making business decisions.

How is it possible for you to distinguish the consumption of one good from that of another good?

2.0   OBJECTIVES

At the end of this unit it is expected that you should know
the following:
-        The assumptions of this school of thought
-        The equilibrium position of the consumer
-        The derivation of the demand curve.

3.0   ANALYSIS OF THE ORDINALIST APPROACH

This approach as we already know, asserts that utility cannot be measured but can only be ranked on the bases to which the goods satisfy the consumer. For example, it is not possible to say how much utils a consumer gains when he consumes a bottle of fanta and that of coke. But it is possible for him to say that he prefers coke to fanta**.**

3.1   THE ASSUMPTIONS OF THIS APPROACH

This approach has the following assumptions underlying it;

-        Rationality: You already know what this means from our previous unit.

         It simply means the ability to take good decisions.

-        Ordinal utility: it is possible for a consumer to state his order of preference rather than the quantity of satisfaction derived from consuming a bundle of goods.

-        Consistency of choice: If a consumer prefers good x to good y, it is expected that anytime he sees the goods, he will always choose good x rather than y.

-        Transitivity: this states that if a consumer prefers good x to good y and good y to good z, then by extension, he prefers good x to good z. Hence, if he sees good x and z, he should always choose good x.

-        Non-Satiability: A consumer never exhausts his satisfaction. Hence he always prefers large quantities of all the goods.

-        Diminishing Marginal Rate of substitution (DMRS): this connotes that the rate at which a consumer is ready to substitute one commodity (x) for another (y) so as to maintain the same level of satisfaction is always diminishing.
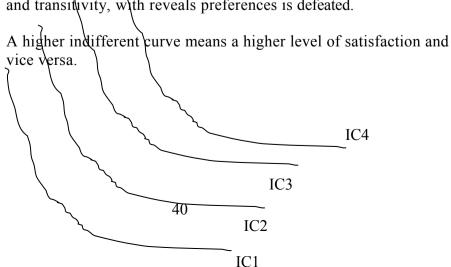
3.2   TOOLS OF ANALYSIS

The tools used in ascertaining consumer's equilibrium and in deriving the demand curve are as follows:

9   The indifference curve and
10   The budget line.

3.2.1   THE INDIFFERENCE CURVE:

An indifferent curve is a locus of points of combination of goods that leaves the consumer at the same level of satisfaction. When many! Of such curves are plotted on the same plane, as we shall soon see, it is called and indifference Map.

a. The Features Of An Indifference Curve:- are as follows

-        Indifference curves are negatively sloped i.e. they slope downward from left to right.

-        Indifference curves are convex to the origin. This convexity entails that the commodities are substitutes for one another and that the Marginal Rate of substitution moves along the indifference curve.

-         Indifference curves do not intersect. This is on the grounds that no two combination of goods yield the same satisfaction. If they intersect, the assumptions of consistency and transitivity, with reveals preferences is defeated.

-        A higher indifferent curve means a higher level of satisfaction and vice versa.

IC4

IC3

40

IC2

IC1

Going by this, a consumer on IC4 has a higher level of satisfaction than a consumer on IC3 or IC2 or ICI. This is in conformity with the assumption of non- satiety.

3.2.2   THE BUDGET LINE

The budget line below shows a consumer's budgetary constraint. Every consumer will like to consume as much as possible, but he is limited by his income. The whole of his income, as it is assumed, is used for spending on goods and services, such that

$$Y \quad = \quad P1q1 + \quad P2q2$$

Implying that $Y - P1q1 - P2q2 = 0$;

Where Y is consumer's income,

P 1 and P2 are the prices of goods x and y respectively while q 1 and q2 represent the various quantities..
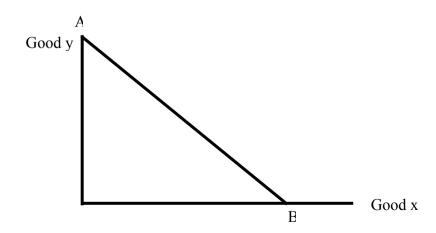
A
Good y

Good x
B

Fig 3 f A budget line.

Line A B on fig 3f shows the budget line which reveals the market opportunities available to the consumer given his income and prices of goods. The area below the curve is the feasible area.

The budget line, is subject to changes. These changes may arise out of changes in income or out of changes in prices.

A change in income will move the entire budget line outwards (in case of an increase in budget) or downward (in case of a decrease in income).
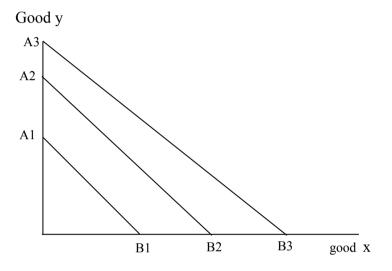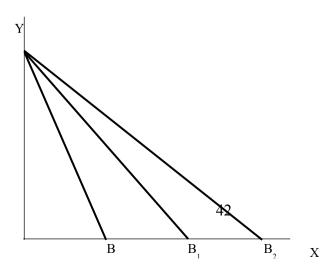
Good y

Fig. g changes in income. Effect of changes in income of the Budget line.

On the other hand, changes in prices have the same effects as changes in income, but it depends on whether the change is on a single good or on both goods.

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Changes in the price of good x. It is only the price of good x that is changing. A movement from B to B1 to B2 represents a fall in the price of good x, which is reflected by an increase in the quantity of good x that can be purchased with the fixed budget. On the other hand, a movement from B2 to B1 to B represent a rise in price of x and consequently a fall in the quantity of x that can be purchased.

3.3   The Equilibrium of the consumer.
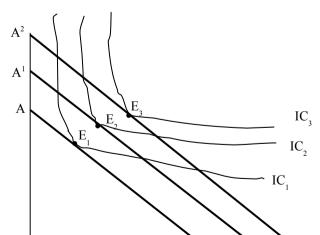
As we already know a consumer attains equilibrium where he maximizes Iris total utility, given his income and the prices of the commodities he consumes. Under this approach, a consumer maximizes his utility when his:

$$\frac{Mux}{Muy} = \frac{Px}{Py}$$

This equality should occur at the highest possible indifference curve.

Going by all what we have discussed, the equilibrium is established where the indifference curve is tangential to the budget line.

Thus Fig h shows the consumer's equilibrium .

A consumer would have been willing to be on the highest indifference curve since it implies a higher level of satisfaction. But due to his income constrain,

he can consume the quantities of good x and y that corresponds to budget line AB or below it If he lies on the indifference curve I C he will be at point E, where the 1 C, intersects the budget line.

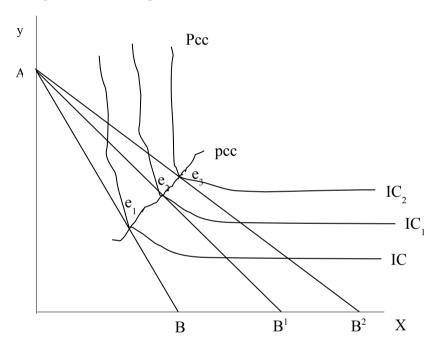Any rational consumer should be on IC3, which is tangential to A2 B2. At such he will be exhausting all of his income on the two goods. The above fig g shows how a consumer's position will be affected by changes in income. The line that links the different points of equilibriums due to changes in income is called the income consumption curve.

Changes in the price of one of the commodities will also changes the equilibrium position. See fig I below.

Given a fall in the price of good x, the equilibrium position of the consumer goes higher e.g. from e_1 to e_2 and to e_3.

The line that links the various equilibrium points due to changes in prices is called the price consumption curve (PCC). It is this PCC that is used in establishing the first law of demand.

3.4   Derivation of the Demand curve.

As we had already mentioned, the demand curve is established using the PCC. This curve gives us information concerning the consumer's income and prices. The y - axis specifies the prices, while the X - axis specifies the quantities. A

decrease in the price of y moves the equilibrium point E_1 and further to E_2. This indicates rise in consumption of x following a fall in its price. Thus,
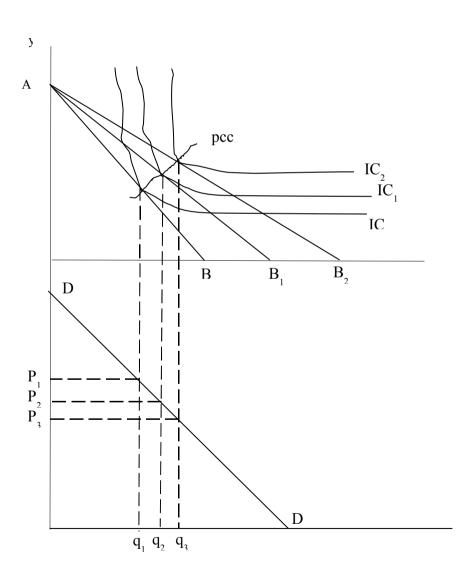
Fig J: Derivation of the DD curve.

the fall in the price of good X, leads to an increase in the amount, bought. It can be translated to mean that at a higher price, a lower quantity is demanded and at a lower price, a higher quantity is demand. Hence the ordinal approach has been used to establish the first law of demand.

4.0   CONCLUSION

The ordinalist approach derives the demand curve through a more practicable manner. Managers who also want to be more practical can follow this approach. You are therefore expected to understand all the above, so that your ability to take rood decision can be enhanced.

5.0   SUMMARY

In this unit we have succeeded in deriving the demand curve by making use of the law of marginal rate of substitution which underlies the ordinalist approach. Their equilibrium position and assumptions have equally been highlighted. Managers are to take advantage of this to achieve the business goals.

6.0   TUTOR MARKED ASSIGNMENT

a.   State and explain fully the assumptions of the Ordinalist.

b.   Also state their tools of analysis and their equilibrium position.

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to Positive Economics, Oxford, oxford press.

Lipsey R.G et al (1987) Economic, London, Harper and Row Publisher.

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UNIT 7

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ANALYSIS OF INDIVIDUAL DEMAND

1.0   INTRODUCTION

In the last three chapters, we have been examining utility and the various approaches used in analyzing utility. It has been observed that the utility forms the backbone of the concept of demand. It is time now we consider the concept of demand especially from an individual's perspective; so as to assist managers prepare themselves for better managerial decisions. Let us assume that you were walking around with a friend when some passers-bye were complaining that the price of garri had increased from N50 to N 100 per kg because of the pressure of demand on the commodity. Your friend tried to find out from you what demand actually meant. flow will you explain this concept to him?

2.0 OBJECTIVE S OF THE UNIT

The objectives of this unit include:

a)   Bringing out and explaining the concept of demand

b)   Enhancing decision making among managerial staff

c)   Explaining the reasons for shifts in Demand Curve, which affects the supply by the producer, and consequently managerial decisions.

It is expected that by the end of this unit, you must have had a full grasp of the concept of demand to prepare you for the subsequent units.

3.0   THE MEANING OF DEMAND

Demand is defined as that quantity of a commodity a person is willing to buy at a particular price and at a particular period of time. In this definition, three concepts are quite important. They are:

-        Quantity

-        Particular price and

-        Particular period of time

If any of this is lacking, then the definition is incomplete and therefore useless. The willingness and ability of a consumer to pay for the good differentiates demand from desires, and is known as effective demand, i.e. demand backed by the ability to pay. For example, if a consumer desires a car, but cannot pay for it, his demand for such a car is ineffective and consequently of no use at all. But if he desires a car, and is capable of paying for it and ready to pay the price for it, at a particular time then his demand is effective. Business managers should have an idea about the effective demand for their goods before taking major decisions concerning the sales of their products.

3.1   THE LAW OF DEMAND

Demand has several laws but we are going to look at the first fundamental law of demand. The first law of demand states that the demand for a commodity increases when its price decreases and it falls when its price rises, other things being equal. This law is based on observed facts and can still be verified with new empirical data. The law, as stated above, reveals an inverse relationship between the price and quantity demanded. The law will hold only when other things are equal. This implies that it would hold only when other things (determinants of

demand) like consumers' income, price of substitutes and complements, taste and preferences of the consumer, etc, are held fixed. This can be possible only in the short-run, for these factors change in the long run.

This law is in conformity with the one derived based on the law of diminishing marginal utility. This can be illustrated through a demand   schedule and a demand curve.

3.2   A DEMAND SCHEDULE

This is a series of prices, placed in a descending or ascending order, and the corresponding quantities, which consumers would like to buy at a particular time.

This means that a demand schedule is a list that shows the quantity of a commodity an individual will be able to buy at different prices given his fixed income. Table 7.1 below is an example of a demand schedule.

Price per loaf of bread	Quantity Demanded
30	25
25	30
20	37.5
15	50
10	75
5	150

Figure 7.1: Mr. Adamu's weekly demand schedule for Bread

From table 7.1 above, when the price of a loaf of bread is N30, with his fixed income of say N750, Mr. Adamu can buy 25 loaves of bread (i.e. 750/30 = 25). As the price of bread falls to N25 and continuously falls to N5, the quantity of bread Mr. Adamu can buy, given his fixed income (N750), increases. Hence, it shows that the higher the price, (N30) the lower the quantity demanded (25 loaves) and the lower the price (N5) the higher the quantity demanded (150 loaves). We can therefore say that the demand schedule is an alternative price-quantity combinations i.e it

shows the quantities of a commodity consumers would buy at different prices. The information could be translated into a demand curve.

3.2.1 A DEMAND CURVE

A demand curve is a diagrammatical reflection of the relationship between price and quantity demanded. Using the information in table 7.1, let us plot a demand curve for Mr. Adamu's weekly demand for bread
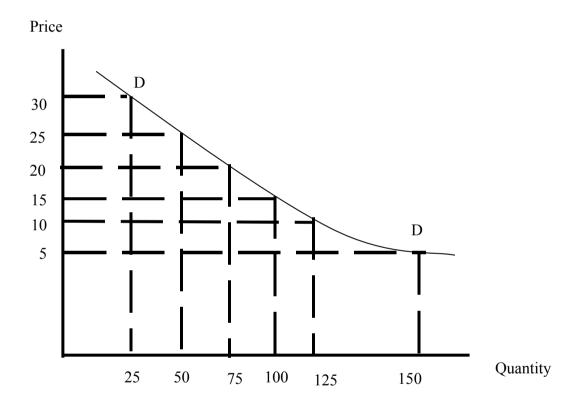
Price

Figure 7.1:   The Demand Curve

The curve above is downward sloping, which is in line with the first law of demand. It depicts that, the quantity of a commodity demanded per unit of time increases as its price falls and vice versa.

3.3   EXCEPTIONAL DEMAND CURVES

The saying that to very law there is an exception also holds true of the first law of demand. This is in the sense that not all demand curves are negatively sloped. There are certain cases where the law does not hold . These instances include:

3.3. I EXPECTATIONS OF FUTURE RISE OR FALL IN PRICE

When consumers expects that the price of a particular goods will continuously increase, they buy more of it, despite the increase in its price. They do this, to avoid the consequences of a much higher price in the future. When consumers are also anticipating a further fall in the price of a good, they tend to buy less of that commodity, postponing their purchases to a future period when prices must have fallen further.
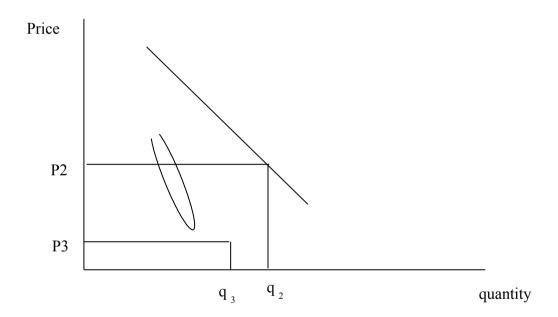

Figure 7.2:   Quantity demanded and price expectations

Figure 7.2 indicate that at a price P_2, a larger quantity q_2 is demanded. With a fall in price to P_3 instead of the quantity demanded to increase, it falls to q_3.

3.3.2 GOODS OF OSTENTATION (STATUS GOODS)

The first law of demand does not apply to commodities which are used by the rich for prestigious reason. E.g. gold, precious stones, rare paintings etc. when these goods are facing higher prices, the demand for them will increase. This is so because rich people buy such goods mainly because their prices are high.

P2

P1

Q1   Q2
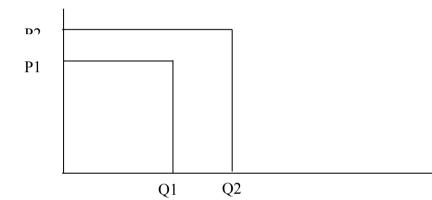
Figure 7.3:   Ostentation Demand Curve

When price is at P1, only Q l is bought. But when price increases to P2 a higher quantity Q2 is bought.

3.3.3 GIFFEN GOODS (INFERIOR GOODS)

These are usually goods consumed by the poor household as essential commodities. When the prices of such goods fall, the poor people reduce their demand for the good, so that they could augment the purchases of substitute, which are of better quality. As a result of this, less is being demanded of the giffen good. Thus, the demand for giffen goods will fall as price falls and increase as price increases. The demand curve for such goods is the same as that of inferior goods.

3.5   CHANGES IN DEMAND CURVE

When movements occur in the demand curve, this is known as changes in demand. These movements are of two kinds:

3.3.1   CHANGES IN QUANTITY DEMAND

This type of movement in the demand curve occurs along the same (existing) demand curve. It refers to the upward and downward movement of quantity demanded along the same demand curve. This is usually known as expansion or contraction of demand. Fig. 7.4 below can illustrate this.
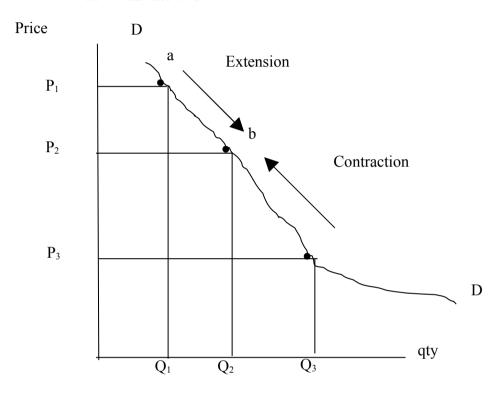
Fig 7.4 Contraction and Expansion of demand

From the fig above, when the movement is from point a to point b, the situation is known as an extension (expansion) in demand. This is in the sense that the quantity demanded has expanded from q, to q2. When the movement is from c to b, this is known as a contraction in demand. There is a movement of quantity demanded from q_3 to q_2 signifying a fall in the quantity demanded. These particular movements along the same demand curve are caused by no other factor, except the price of the commodity.

3.3.2 SHIFTS IN DEMAND

Increase or decrease in Demand: when a demand curve changes its position entirely, the change is called a shift in Demand. e.g.
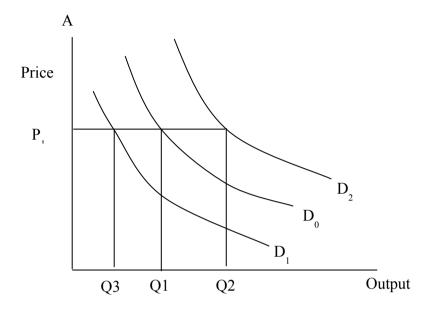
Figure 7.5:   Shift in the demand curve

A movement of the demand curve D_0 to D_2 represents an increase in demand signifying that at the same price a larger quantity of the commodity can be bought. For example, at the same price of P_1 when demand increase Q_2 is bought instead of the initial Q_1. On the other hand, a movement from D_0 to D_1, signifies a fall in demand.

Here at the same price, a small amount of a commodity will be bought. i.e. movement of quantity from Q_1 to Q_3 This downward movement in demand curve reduces the quantity a consumer can buy at each price. The increase or decrease in demand (shift in demand) is caused by a number of factors among which are:

- Change in the price of other substitute commodities

- Change in income

- Advertisement

- Changes in the prices of complementary goods
- Changes in taste and fashion.

A positive change in any of these factors in favour of the good in question will increase demand for that particular good, otherwise, its demand will fall. Decision makers should be guided by such circumstances as these changes affect their revenue. It is the shifts in demand that managers are always anticipating for. As such you should consider such changes very seriously when managerial decisions are being taken.

In a nut shell

A change in any of these factors will cause a movement of the demand curve either outward or inward.

4.0   CONCLUSION

In conclusion, demand as a concept has economic meaning and understanding. In the definition some concept such as quantity, particular price and particular period of time need to be understood economically.

Equally, we should understand that demand is dynamic in nature i.e. it can increase or decrease (Shift in demand). The factors responsible for this are:

Changes in price of other commodities, change in income, change in taste and fashion etc. Most importantly, demand as a concept has its own peculiar law.

5.0   SUMMARY

In this unit we have examined what demand is all about as well as the three important concepts, involved in the definition of demand. Also examined were the law of demand and the possible changes in demand curve. Similarly, we have examined number of factors that determines increase or decrease in demand (shift in demand).

6.0   TUTOR MARKED ASSIGNMENT

1.   a)   what is a demand schedule?

      b)   what is demand curve?

      c)   Differentiate between a change in quantity demanded and a change in demand.

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

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UNIT 8

ANALYSIS OF MARKET DEMAND

Table of Contents	

1.0   INTRODUCTION

In the previous unit, we have analyzed the individual's demand for a commodity. The market demand follows the same pattern, only that it is an aggregation of individual demands. This concept is quite important to firms. As such, business managers should be well informed of this, as a base for sound decision making. In this aspect of the work, the market demand schedule, demand curve and the types of demand will be discussed.

2.0   OBJECTIVES

At the end of this unit, you are expected to know:

- The concept of market demand
- The types of demand,.
- The determination of market demand and the
- Demand functions.

An understanding of all these will greatly influence your managerial decision making.

3.0   ANALYSIS OF MARKET DEMAND

PRICE	QUANTITY OF X DEMANDED BY			
PRICE	A	B	C	MARKET DD
5	20	3	10	3 5
4	22	8	15	45
13	25	12	23	60
2	30	20	30	80
1	35	28	39	103

As earlier discussed, demand refers to the quantity of a commodity consumers are willing to buy at a given price and at a particular period of time. Market demand is an aggregation of individual demands for a product at a given price and also at a given period of time. This implies that the total quantity that all the consumers/users of a commodity are willing to buy at a particular price and at a given time, all other things remaining equal, is called market demand for a particular product. In the same line of thinking, a market demand schedule is a summation of individuals' demand schedules.

For example:

Table 8.1:   The Market Demand Shedule

The table above shows that 3 individuals, A, B, and C are the only users of good X. a summation of the quantities each of them buy at a price gives the market demand schedule. For example at the price of N5,the market demand 35. Summing the individual demand of 20.5 and 19 for consumers A, B and C respectively gives this 35.

3.1   DERIVATION OF MARKET DEMAND

From the table 8.1 above, the individual demand curves can be plotted for A, B, and C. The market demand curve can also be plotted by making use of the last column. The market demand curve looks thus:
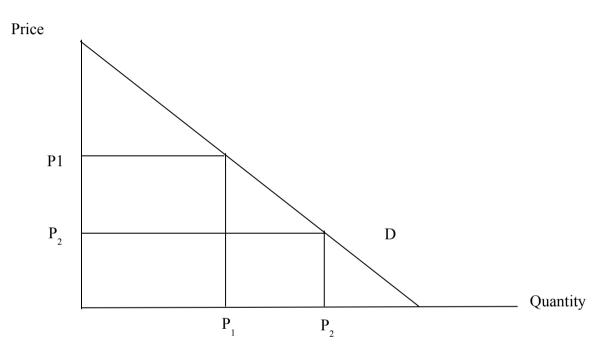
Figure 8.1 The Market Demand Curve

This demand curve also obeys the first law of demand, i.e. it slopes downward from the left to right signifying that at higher prices a smaller quantity is demanded and at lower prices a higher quantity is demanded.

3.2   TYPES OF DEMAND

There are different types of demand. The most important ones are discussed below: In the course of the discussion, ask yourself, what would happen to the demand when the price of the other good changes.

1. **Joint or Complementary Demand:** This signifies a situation in which two goods are used together such as car and petrol, bread and butter. The changes in their prices are always to the same direction. For instance, if the price of cars rises, it is expected that the price for petrol will also rise. You should therefore understand that a rise in the price of cars would lead to a fall in the demand for petrol, on the grounds that few people will buy cars and there will be fewer cars needing petrol.

2 **Composite Demand**: This is the demand for goods that are embodied in others. It will be impossible to get the good in question without having the other. For instance, if a man wants mutton, there is no way he can have it by slaughtering a ram without also having the skin of the ram. This implies that the man in buying his ram from the market, for the purpose of mutton, also bought the skin of the ram. The purchase of this skin of the ram is what is called composite demand. Their prices move in the same direction. An increase in the price of mutton leads to a fall in the demand for skin.

3. **Derived Demand:** This is the demand for goods not for their sake but f)I what they can do or produce. For instance a factory buys raw materials not because it wants the raw materials but for what the raw material can produce. As such the demand for raw materials can be called derived demand. An increase in the price of the good to be produced will lead to a fall in the demand for raw materials.

4. **Competitive Demand:** This is the demand for goods that are substitutes, i.e. goods competing with one another for consumers' scarce resources. For example the demand for butter and margarine are said to be competitive because a purchase of one will mean the other will not be bought. Also see meat and fish. The demand of goods in competitive demand moves in opposite direction with the substitute's price, using meat and fish as example, if the price of meat increases, the demand for fish will increase.

3.3   THE DETERMINANTS OF MARKET DEMAND

Market demand is affected by a number of factors. These factors help to increase or reduce market demand. These factors are:

- The price of the product itself
- The price of related goods whether substitutes or complementary goods,
- The income of the consumer

- The degree of necessity

- Nature of the good i.e. whether the good is an inferior good or a superior one (normal good).
- Consumers taste and preference
- Consumers experience
- Demonstration effect.
- Availability of credit facilities
- Population of the country and
- The manner in which the national income is distributed.

The above variables will influence a shift in the demand curve. If these variables have a positive effect, demand will increase (see increase or decrease in demand in our previous unit), otherwise it will decrease.

3.4   THE DEMAND FUNCTION

A function is defined as a symbolic statement of relationship between the dependent and the independent variables. Going by this definition, a demand function therefore states the relationship between the demand for a product and its determinants. Suppose there is only one variable (price) denoted P that determines the demand for a commodity say, x then the demand function can be expressed as:

$$Dx = F (P).$$

The above function signifies that the demand for commodity X, (Dx), is determined by the variable called price.(P) This type of demand function operates in the short run. Dx is the dependant variable while P is the independent variable. This implies that the demand for good X/depends on the changes that occur in its price.

On the other hand, if the demand for a commodity X is determined by mane factors, this type of demand function is called a multi-variant function. For example if the demand for commodity X is determined by:

-       Price of the good itself P

-       Income of the consumer Y

-       Nature of the good N and

-        Advertisement A

The demand function can be written as

Dx   =   F(P,Y,N, and A)

You should note that a demand function can either be linear or non-linear. It is linear when its changes occur by a specific constant and it is non-linear when the change is not specific. For a linear demand function, the curve to represent it is a straight line. On the other hand, the curve for a non-linear function can take any form.

4.0   CONCLUSION

The conclusions that can be drawn here are that market demand is an aggregation of individual demands. The type of demand that a product commands determines the type of decision managers can take. Managers should therefore be verse with all these aspects under demand, for it will surely improve the decision-making ability. You should therefore understand these aspects well, so that you can have an urge over your other managers who rely on past experiences.

5.0   SUMMARY

We have in this chapter reviewed the definition of demand and that of demand schedule. We have also seen how the demand is affected by a number of' factors. Types of demand have also been considered. This was followed by the examination of the demand functions. All these are of prime importance to business managers as they affect the sales volume of the firm. A good manager should understand all these, and prepare decisions that will maximize the benefits to be derived from such situations.

6.0   TUTOR MARKED ASSIGNMENT

a)   What is market demand?

b)   List and explain any 5 determinants of market demand?

C)   Explain any three types of demands you know giving at   least two each.

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

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UNIT 9

THE CONCEPT OF SUPPLY

1.0   INTRODUCTION

In the last two units, we have been concerned with aspects of demand, which makes up the demand side. It is appropriate if we now consider the supply side of goods and services by looking into some aspects of supply. From this, you should condition your mind that supply and demand are just two sides of the same coin. This is so because demand is seen from the buyers' side, while supply is from the producers' side.

In the analysis of the concept of supply, we will define the concept, state the guiding laws, and peruse market supply as well as factors affecting it. The elasticity of supply shall also be considered in this unit.

2.0   OBJECTIVES

This unit is related to the day to day activity of producers. As such you are expected to be able to understand without much difficulties. At the end this unit, you should be able to:

- •   Define the concept of supply, and the law guiding it,

- •   Differentiate supply from demand,

- • Understand how changes are caused in supply and how they manifest themselves.

- •   The elasticity of supply.

An understanding of these aspects will facilitate and guide your decision-making**.**

3.0   AN ANALYSIS OF SUPPLY

We will begin this section by looking at the definition of the concept and the law behind it. This will be followed by an illustration of other aspects of supply.

3.1   THE DEFINITION OF SUPPLY

The supply of a product is the quantity the sellers would snake available for purchase in the market over a given period of time at a prevailing price**.** Extra stocks of the products may be lying in the warehouse, but our definition refers the stock for the sale in the market. It should be noted that just like demand, the supply of product is only conceivable if related to price and measured over a given period of time. So supply must be tied to a particular period and specific price in order to be complete.

3.1.1 LAW OF SUPPLY

The law of supply states that the higher the price of a commodity the higher the quantity supplied and the lower the price of a commodity the

lower will be the quantity supplied. This law entails that supply has a positive relationship with price. This is in the sense that, supply and price move in the same direction. For instance, when price increases, quantity supplied also increases and when price falls quantity supplied also falls**.**

3.2   SUPPLY SCHEDULE AND SUPPLY CURVE

A supply schedule, refers to the list showing the amount of a commodity producers are willing to offer for sale at different prices.

Supply Schedule for rice

Price per kg (₦)	Quantity
100	50
80	40
60	30
40	20
20	10

From the schedule, at a higher price of ₦100, producers offer the highest quantity for sale. But this quantity falls as prices are falling to the extent that at the price of ₦20, only 10 bags are offered for sale. On the other hand, Supply curve shows the quantity of these same goods, services and/or resources which sellers are willing to supply at various prices. If the information above is represented graphically, the supply curve will look thus:

Price   S

                                                   Quantity

S
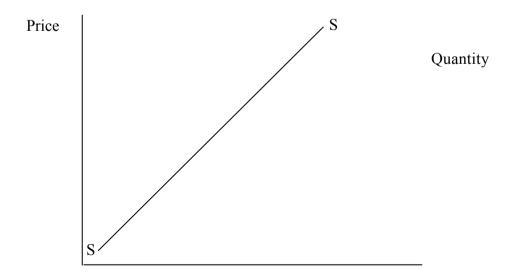
Figure 9.164   The Supply Curve

Unlike the negatively sloping demand curve, the supply curve normally has a positive slope, upwards and to the right, indicating that the sellers or producers are generally willing to supply at successively higher prices. For example, given that the price of rice is higher relative to other farm products, farmers will be more willing to increase their rice production. Additionally, the higher the price of rice, the higher the farmer's profit, hence more land and fertilizer will be devoted for rice production, thereby increasing the supply of rice.

The supply curve as we have seen from above has a positive slope i.e. it moves up from left to right. This shows that at successively higher prices producers are willing to provide more. Hence supply has a positive relationship with price.

3.3   FACTORS DETERMINING SUPPLY OF A COMMODITY

A number of factors determine how much of a good the suppliers can offer for sale in the market. These factors include:

•   Price:

    Ceteris Paribus, the higher the price of a commodity the more profitable it will be to produce, we expect therefore that the higher the price, the greater will be the quantity supplied. Reversing the process, a fall in the market price would make the product less profitable. Firms would then likely cut production and some might switch to other products or even be forced out of business.

•   Price of Other Commodities:
    Generally, an increase in the price of other commodities will make production of the commodity whose prick does not rise relatively less attractive to produce. For example rice production this season may depend on the prices of beans, groundnut and millet, where their price is higher relative to the price of rice. This makes rice production less attractive. Hence production and supply of rice will fall.

•   Price of Factors of Production:

A rise in the price of one of the factors of production causes an increase in the cost of producing a particular commodity. We should expect for example, that a rise or a fall in the price of fertilizer, labour, cost of hiring land and pesticide, to affect the supply of rice every season.

• Technology:
   Technology affects supply of commodities. The productivity per worker that has been going on in industrialized economies is attributed to their technological advancement.
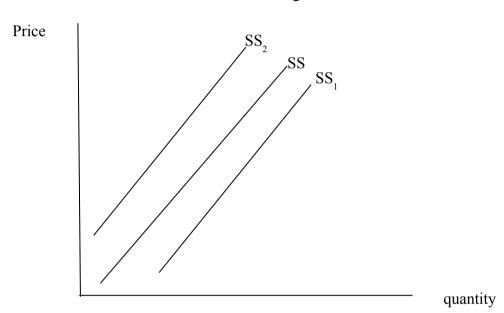
Figure 9.2:   Supply Effect of Technology Improvement

Figure 9.2 showing Improved Technologies Shift Supply Curve to the right.

The application of technology causes the supply curve to shift outward and to the right as we can see from figure 9.2 above. Here the supply curve shifts from SS to SSI. This is because with the improvement in technology producers will be prepared to supply more. These fact discussed above, can either move the supply curve to the right or the left. A movement to the right is considered an increase in supply while a movement to the left is a decrease in supply.
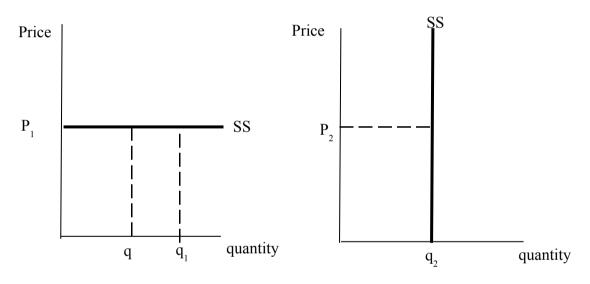
3.4   ELASTICITY OF SUPPLY

This is the responsiveness of, quantity supplied to changes in price. It seeks to expose how quantity supplied will react to changes in the price of the commodity. Price elasticity of supply is the responsiveness of quantity supplied to a change in its market price.
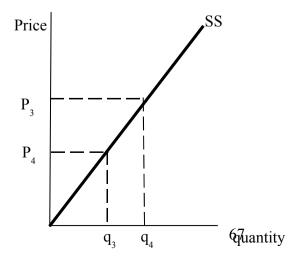
Price Elasticity of Supply = Percentage change in quantity of x supplied
                                          Percentage change in price of x

You must have noticed that the definition of price elasticity of supply is exactly the same as that of the price elasticity of demand. The only difference is that for supply, the responsiveness of the quantity supplied to a change in price is positive, while that of demand to a change in price is negative.

(a) Perfectly elastic supply   (b) Zero elasticity of supply

(c) Unitary elasticity supply

Fig. 9.3   Supply Elasticities above shows three important cases of supply elasticity.

(a)   The horizontal supply curve displaying perfectly elastic supply which indicates that at price below P1, suppliers are not willing to supply at all, but at the price of P 1they are willing to supply any quantity required.

(b)   The vertical supply curve showing perfectly inelastic supply

(c)   Unitary elastic supply curve. Every straight-line supply curve passing through the origin must have unitary elasticity. Quantity supplied must change proportionately to a change in price if the curve is to be both straight and through the origin.

3.5   FACTORS DETERMINING SUPPLY ELASTICITY

•   Where supplies have been stockpiled in anticipation of a
        change in demand and are available to the market at a
        short notice.

•   Another factor in supply elasticity is the time period under consideration. A given change in price tends to have larger effect on amount supplied as the time for suppliers to respond increases. In a brief period after a price increase, firms may be unable to increase their inputs of labour, materials and capital.
        Production, period also determines the elasticity of supply. In the short run, when factors of production cannot be fully mobilized to meet up market changes, the supply will be inelastic. Long run when all factors of production can all be mobilized to meet up changes in the market, the supply will be elastic.

4.0   CONCLUSION

In this unit, we have X-rayed supply. This has been achieved by considering various aspects of supply. From the definition of supply, it has been made clear that when defining this concept, price and time should be duly considered. A supply has been developed and interpreted, and it has helped us to derive a supply curve. The supply curve slopes upwards from left to right implying that supply curve is positively sloped. The relationship therefore established between price and the quantity supplied is a positive one. This too is in conformity with the law of supply which holds that at higher prices more is supplied and at lower prices less is supplied. Among the factors that cause a change in supply are improvement in technology and availability of raw material. At the end, the elasticity of supply has also been considered. All these have been done in order to clear your mind of any ambiguity and prepare you for better decision-making.

5.0   SUMMARY

We have successfully gone over the concept of supply. In doing this, we have analysed various aspects that are attached to the concept. It has been observed that the higher the price, the higher the quantity supplied. This accounts for why suppliers normally produce those commodities whose prices are high. Their intention in such situation is to make more profit, which can only be realized when prices are higher. Also, the quantity Supplied has been observed to depend upon price alone, while the changes in supply itself results from other changes which are different from the price changes.

6.0   TUTOR MARKED ASSIGNMENT

a)   Given that there is a change supply in supply from 15 to 20 units when price changes from N15 to N7, compute the elasticity of supply.

b)   What are the factors that affect elasticity of supply

7.0   REFERENCES AND OTHER RESOURCES

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        Economics, Oxford, oxford press.

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UNIT 10

THE CONCEPT OF ELASTICITY OF DEMAND

Table of Contents

1.0   INTRODUCTION

The concept of elasticity of demand plays a crucial role in business-decisions regarding maneuvering of prices with a view to making larger profits. For instance, when cost of production is increasing the firm would want to pass the rising cost on to the consumer by increasing the price of the goods in question. Firms may decide to change the price even without change in cost of production. But whether this action i.e raising the price following the rise in cost or otherwise will be beneficial depends on:

(a) the price elasticity of demand for the product.

(b) Price Elasticity of demand for its substitutes.

Because of this central or strategic position which elasticity of demand holds in the production and consumption process, this unit is devoted to the study of what constitute the concept of elasticity , elasticity of demand and its practical applications. You are required to devote particular attention to this unit and understand the concepts involved right at this stage. Now, what do you think is the reason given for the possibility of some producers increasing the prices of their goods and demand remaining the same, while others cannot tamper with the price of their goods? The answer to this lies in your understanding of the concept of elasticity.

2.0   OBJECTIVES OF THE UNIT

The Unit is devoted to the analysis of elasticity as a concept as it affects demand and supply of commodities. At the end of the analysis it is expected that you will be able to:

1.   Appreciate the concept of elasticity

2.   Apply the concept to practice in the course of decision-making, and,

3.   Appreciate the applicability of the concept to real life situations.

3.0   THE CONCEPT OF ELASTICITY

Elasticity of demand is a measure of the extent to which the quantity demanded of a good responds to changes in some factors that influence demand. Such f actors include price, income, and prices of other goods. The main measures therefore are price elasticity of demand, income elasticity of demand and cross elasticity demand. These measures that can be considered as types of elasticity of demand will be discussed in detail one after the other.

3.1   PRICE ELASTICITY OF DEMAND

For any purposes, it is useful to have a numerical measure of just how quickly or slowly quantity demanded rises or falls as price changes. To this end, a distinguished economist by named Alfred Marshall has been able to formulate the concept of price elasticity of demand. In the way of definition, price elasticity of demand is the ratio of the percentage change in quantity demanded to the percentage change in the price that brings about the change in the quantity demanded. It can also be defined

as the degree of responsiveness of quantity demanded to changes in price. Moreover, it can be viewed as the measure of the change in quantity resulting from a change in price.

The definition can be put in mathematical form as

$$\text{Ep}_{\text{P}} = \frac{\text{Percentage change in Quantity Demanded.}}{\text{Percentage change in price}} = \frac{\%\,\Delta \text{ in Qd}}{\%\,\Delta \text{ in P}}$$

I f the percentage changes for quantity and price are known the value of the elasticity coefficient Ep can be calculated. It is always negative because the demand curve is negatively sloped.

3.2   INTERPRETATION OF NUMERICAL VALUES OF DEMAND ELASTICITY

Price elasticity of demand may be unity, greater than unity, less than unity, zero or infinity. In other words, the numerical value of elasticity of demand can vary form zero to infinity. This can be expressed mathematically as $0 < \text{Ep} < \alpha$, the above five cases are explained with the aid of diagrams below: It should be noted that the analysis has to do with elasticity and shape of demand curves.

a)   Perfectly Inelastic Demand

Demand is said to be perfectly inelastic when quantity demanded does not react to changes in price. In this case elasticity of demand becomes zero. For example, a 20% rise in or fall in price leads to no change in the quantity demanded. For instance, if price falls from P_1 to P_2 the expectations are that quantity demanded of that particular good will rise. Unfortunately if the rise in price leaves quantity demanded unchanged, that is known as imperfect elasticity of demand.

Price ⎪D

P_1

F   Ep = 0

P_2

                                                          quantity
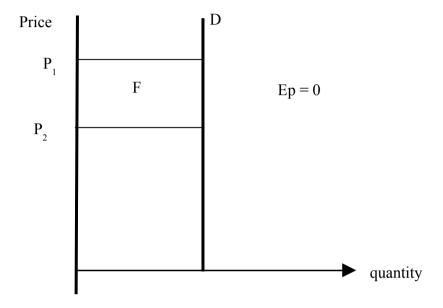
Figure10.11:   Perfectly Inelastic Demand

It should be noted that this form of price elasticity of demand is unusual. It may be expected when the price range being considered involved very low prices. For instance more salt will not be demanded by the consumer if the price is lowered and vice versa. It can also occur when the affected item is considered absolutely essential, and affordable by the consumer. An example here is medicine.

b)   **Perfectly Elastic Demand:**

Demand is elastic when at a fixed price an unlimited quantity is demanded. In other words, demand is said to be perfectly elastic when any quantity be bought at the prevailing price. Any rise in price will cause quantity demanded to fall to zero. This may be expected to occur where a substitute commodity that is just as nice in the consumer's view is available at the going or prevailing price. It also occurs in case where no one will pay more than the going price, the seller will lose Iris entire customers if he raises his price even by one kobo. The demand curve of perfectly or infinitely elastic demand as it is also called is shown below.

The demand curve is a horizontal line and is parallel to the X axis.

The slightest change in price brings quantity demanded to zero

Price

                                                    Dq

0   Quantity dd
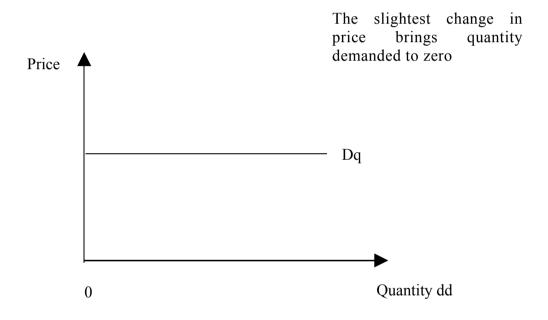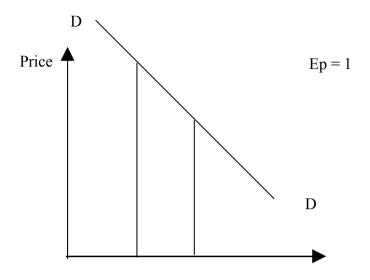
Figure 10.2:   Perfectly Elastic Demand

c)   **Unity Elastic Demand**:

Demand is said to be unit elastic when a given percentage change in price leads to a proportionately (equal percentage) change in quantity demanded. That is to say, the percentage change in quantity demanded is exactly equal to percentage change in price. For example, a 20% change in prices causes 20% change in quantity demanded.

D

Price   Ep = 1

D

Quantity Demanded

Figure 10.3:   Unitary Elastic Demand

From the diagram any change in price causes a proportionate change in quantity demand, but to the opposite direction

d)   Fairly Elastic Demand:
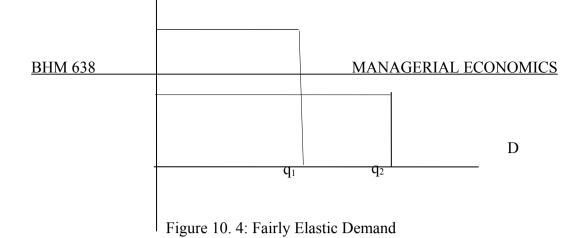
Demand is elastic when a percentage change in price induces a more than proportionate change in quantity demanded. That is to say, percentage change in price is less than percentage change in quantity demanded.

For instance if price changes by 25% but quantity demanded changes 30%, demand is said to be fairly elastic.

D

P_1

P_2

q_1 q_2

D

Figure 10. 4: Fairly Elastic Demand
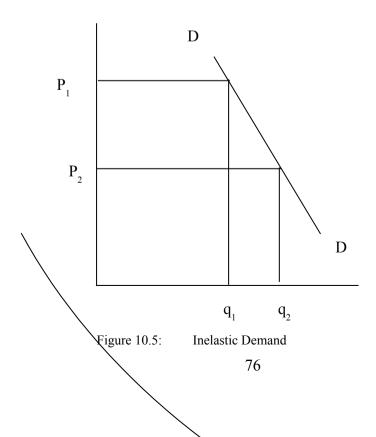
As can be seen from the figure above the demand curve tends to be flat. In other words. the flatter the demand curve the more elastic the demand. Elasticity of demand is greater than 1 i.e Ep >1

e)   **Inelastic Demand:**

Demand is inelastic when a given percentage change in price induces a less proportionate change in quantity demanded. This means that the percentages change in price greater than the percentage change in quantity demanded. The diagram below depicts inelastic demand curve.

D

P_1

P_2

D

q_1 q_2

Figure 10.5:   Inelastic Demand

It can be seen from the above figure that the inelastic demand curve tends to be steep. This implies that the steeper the demand curve the more inelastic the demand. In this case elasticity of demand is less than I ie Ep <I. From the figure above, a change from P_1 to P_2 brings about a change in quantity q_1 to q2 which is smaller. Hence demand is fairly inelastic.

3.3 RELATIONSHIP BETWEEN ELASTICITY AND TOTAL EXPENDITURE OR TOTAL REVENUE.

Money spent by purchasers of a commodity is received by the producer and is thus the gross revenue of the sellers. Economists are often interested in how total expenditure by purchasers of commodity, or total revenue of sellers of the commodity reacts when the price changes. The elasticity of demand presents useful information about the effect of a price change on the buyer's total expenditure. The relationship between price elasticity and total expenditure is analysed below.

1   When demand is elastic, a fall in price will increase total consumer expenditure and a rise in price will reduced total expenditure. It will be more profitable for the producer to reduce price than to increase it, if he intends to raise total Revenue (TR).

2   If demand is inelastic, a fall in price will reduce total expenditure and a rise in price increase total expenditure. Therefore a producer whose good has an elastic demand will increase his TR, when he increases the price of Ills goods.

3.   If demand is unit any elastic, a rise or a fall in price leaves total expenditure and Total Revenue unaffected.

In a nutshell for goods with elastic demand, a fall in its price will increase total revenue and for goods with inelastic demand a fall in its price reduces TR.

3.4 INCOME ELASTICITY OF DEMAND

Income elasticity of demand can be defined as the degree of responsiveness of quantity demanded to changes in income. In other words, it measures the response of quantity demanded when there is a change in income. It may also be defined as the ratio of percentage

change in the quantity demanded of a good X to the percentage change in income. This can be expressed mathematically as shown below.

$$Ey = \frac{\text{Percentage charge in quantity demanded of Xs}}{\text{Percentage change in income, Y}} \text{ or } \frac{\Delta Qd}{\Delta Y} \times \frac{Y}{Qd}$$

The interpretation of the values is the same as we have seen in the price elasticity of demand. The value obtained here is used in determining the type of goods in question.

3.5   CROSS ELASTICITY OF COMPLEMENTARY GOODS

This is the responsiveness of the quantity demanded of good y to changes in the price of' good x. it is measured using the formula i.e.

$$\frac{\text{Percentage change in quantity demand of good y}}{\text{Percentage change in the price of good x}}$$

$$\frac{\Delta Qy}{\Delta Px} \times \frac{Px}{Qy}$$

If two goods are complementary (Jointly demanded), a rise in the price of one leads to fall in the demand for other. For example a rise in the price of cars will lead to a fall in the demand for petrol and vice versa. Cross elasticity of complementary goods is negative because price and demand vary in the opposite direction.

3.5 .1 SOME FACTORS DETERMINING THE CROSS ELASTICITY OF DEMAND

These factors are : Availability of close substitutes, Nature of the Commodity, Level of Income, Proportion of income spent, Time Factor, Habit formation. These factors determine whether a good is elastic or inelastic. For instance if a good has close substitutes, such a good, must have an elastic demand, since a change in its price will cause substitutes to react, for example, if the price or demand for fish changes, the price and quantity demanded for meat will react.

4.0   CONCLUSION

Elasticity as a concept in managerial Economics is worth studying in a bid to determine those factors that are responsible for the change in the quantity demanded of certain commodities. In this unit we have attempted to analyse the different types of elasticity of demand as they form an important aspect of business decision-making. The types considered are the price, cross, and the income elasticity.

5.0   SUMMARY

This Unit discusses the main issues pertaining to elasticity of demand especially as it affects the decisions of the managers on how to determine prices of the commodities. Equally, elasticity in relation to the Revenue of the firm has been discussed in this unit and also a superficial explanation of income and Cross elasticity of demands has been made in this Unit. The unit focus on the price elasticity of demand, income and cross elasticity of the commodities. The relationship between elasticity and the revenue of the firm have been considered.

6.0   TUTOR MARKED ASSIGNMENT

1.   Define the concept of Elasticity?

2.   With the help of diagram explain : how a rise in the price of

        (1)   A perfectly elastic good

        (ii)   Fairly elastic good,

Affects total revenue of a firm.

7.0   REFERENCES AND OTHER RESOURCES

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UNIT 11

</div>

EQUILIBRIUM ANALYSIS OF DEMAND AND SUPPLY

1.0   INTRODUCTION

In the last three units, we have devoted considerable attention to demand and supply analysis. In the course of the analysis, we have observed that i demand analysis are concern with individual(s) purchases, while the supply analysis are concerned with the amount of a product suppliers offer to the market for sale at any given time. Having understood these aspects, the next point of contact is to unite the two. It is this unity between demand and supply that is called equilibrium analysis. In a free market system, this equilibrium is determined by the invisible forces of demand and supply (market forces). But in other situations, the government normally steps in to adjust the prices for one reason or the other. It is this government intervention in the market that is considered price control. All these shall form the backbone of our discussion in this unit.

2.0   OBJECTIVES

The objective of this unit is to see how we can bring the aspect of demand and supply together. Hence, at the end of this unit, it is expected that

- You should be able to unite demand and supply,

- Analyze different changes that may occur to the demand and supply conditions and how the equilibrium is restored.

- Know how the government intervenes in the market through price fixation.

A good knowledge of this aspects would pave the way for you to be able to take rationale and good decisions especially when it concerns production and supply of goods to the market.

3.0   EQUILIBRUIUM ANALYSIS

Economists use the term equilibrium to indicate state of balance in which there are no forces causing change in either direction. From our discussions on demand and supply we have established that as demand curve slopes downward, the supply curve slopes upward. This means that the behavior of sellers and buyers are inversely related. . As the seller supply more at a higher price, consumers on the other hand, buy more at a lower price and vice-versa. Hence there is a need for a price that is both acceptable to sellers and buyers so that whatever is supplied will be automatically the quantity demanded. The equilibrium price clears the market, in which the quantity supplied equals the quantity demanded.

Possible Price (N per kg)	Demand	Supply	Pressure on Price
500	10	50	Downward
400	20	40	Downward
300	30	30	Neutral
200	40	20	Upward
100	50	20	Upward

Table 11.1:   For Demand and Supply Schedule of Rice per Kg.

Price (N)   D

500

400   Equilibrum Point

300

200

100   Shortage

0   Quantity (Q)

          10   20   30   40   50
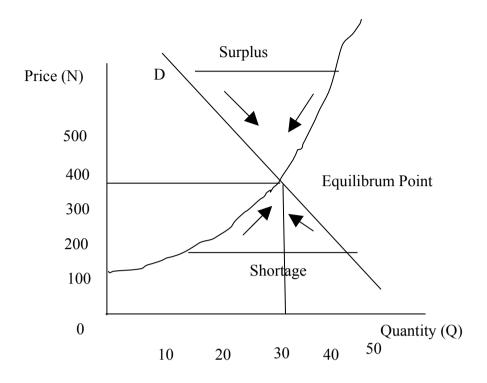
Figure 11.1:   Showing Demand & Supply Curve for Rice and the
equilibrium price

The Market equilibrium is shown by the intersection of the demand curve
DD and the supply curve SS, at a price of N300 at which 30 kgs per month
are transacted i.e. supplied and demanded. At any price above the
equilibrium, there will be a downward pressure on the price because
quantity supplied exceeds quantity demanded. While at any price, below
the equilibrium, there will be an upward pressure on the price. Here
quantity demanded exceeds quantity supplied and price forced upwards.
The buyers and sellers can trade as much as they wish, as there is no
incentive for any further price change. When there is a disequilibrium in
the market, The market forces try to re-establish the equilibrium position.
Look at the figures below.

(a) Price below Equilibrium   (b) Price above Equilibrium

P   Supply

Supply   Supply

P₁

P₂
                                          Demand   Demand

82   Q

Figure 11.2 showing Movement to Equilibrium

In panel (a) of figure 11.2, the market price is below the equilibrium price. In this case:

- The quantity demanded (QD) exceeds the quantity supplied (AS);
- Shortages develop suppliers stock runs out, and queue may form.
- Sellers raise their prices
- As prices rise to equilibrium the quantity supplied expands and the quantity demanded contracts until equilibrium is attained.

In panel (b) the market price is above equilibrium price. Here,

- The quantity supplied (QS) exceeds the quantity demanded (QD)
- Surplus develops and sellers warehouse unsold stock.
- Sellers reduce their price
- As prices fall to equilibrium the quantity demanded expands and the quantity supplied contracts until equilibrium is attained.

3.2   EFFECTS OF SHIFT IN DEMAND AND SUPPLY ON THE EQUILIBRIUM PRICE AND EQUILIBRIUM

3.0.1   SHIFTS IN DEMAND AND ITS EFFECTS ON EQUILIBRIUM

As we have seen earlier that a demand curve can shift either to the left or to the right due to non-price factors. Now let us consider what happens if the demand for product changes for any of the reasons given. Suppose that demand increased because of a basic change in peoples' income. The product is now bought in large quantities and this would occur at any price.

As we have seen earlier on our diagrams, a large quantity is always shown further to the right. Since people now buy more at any price level, each point on the demand curve moves to the right. The result is a general shift of the demand curve to the right. If demand decreased causing less to be bought at each price the demand curve as a whole would shift to the left.
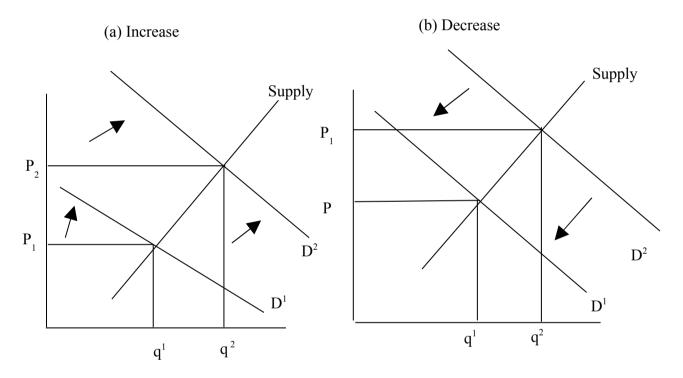

Figure 11.3:   Effects of Shift in demand Curve

The effect of an increase in demand is illustrated in the fig above. The adjustment to a new equilibrium involved the following distinct movements:

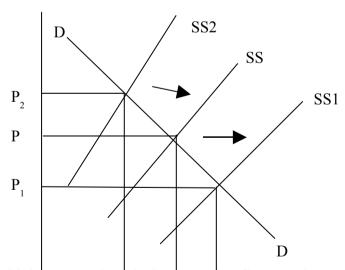1   The demand curve shifts to the right from D_1 to D_2

2   The increase in demand may cause the price to rise from P_1 to P_2 quantity demanded expands from Q_1, to, Q_2.

You should note that there is no shift in the supply curve but simply a movement along the curve as firms respond to the higher price. Thus, through the rise in price, the quantity supplied adjusts to the extra demand and equilibrium is restored.

If demand decreases, the process of adjustment is the reverse of an increase in demand. Conclusion about the market equilibrium is sometimes called the "I,aw" of demand and supply. One such law can now be stated.. an increase in demand normally causes the price to rise and the quantity supplied to expand to a new equilibrium. Conversely, a decrease in demand causes the price to fall and the quantity supplied to contract to a new equilibrium.

3.2   EFFECT OF SHIFT IN SUPPLY

A change in equilibrium may also be brought about by a shift in the supply curve. Such a shift could be caused by any of the given influences on the supply of the product. Thus, any thing that improved the efficiency or reduced the costs of production would stimulate production and so increase supply at any given price. Conversely, a rise in costs would discourage production and decrease supply at any given price.

Figure 11.4:   Effects of Shifts in Supply Curve

It should be remembered that, on the figures above an increase in quantity is shown by the movement to the right. An increase in supply would therefore shift supply curve to the right. A decrease would shift the supply curve to the left. The figure shows how equilibrium is restored in each case. The figure exposes the following:

a)   A shift in the supply curve

b)   A movement of price to the new equilibrium

c)   An adjustment of the quantity demanded to the new
        equilibrium.

Another "Law of demand and supply" can now be noted. An increase in
supply normally, causes the price to fall and the quantity demanded to
expand to new equilibrium. Conversely, a decrease in supply causes the
price to rise and the quantity demanded to contract to a new equilibrium.

3.3   PRICE CONTROL

As we have already mentioned, there are times the government steps into
the market to control prices. This could be done to protect the consumers
or the producers as the case may be. Therefore, price control refers to the
deliberate attempt by the government to adjust prices in the market rather
then give the forces of demand and supply a free hand. There are two
categories of price control. These categories are: Maximum price and
Minimum Price.

3.3.1 MAXIMUM PRICE

This is also called price ceiling. This is that price below the equilibrium
above which no producer is allowed to sell. This price is established
below the equilibrium so as to protect the consumers from producer's
exploitation. This is depicted by figure 11.5 below.
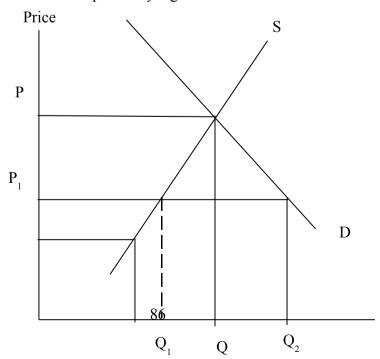
Figure 11.5:   Price Celing

In the Figure above the equilibrium price is P but the maximum price is P1 as set by the government. Above this price, no producer is allowed to sale. Here Demand exceeds supply i.e. quantity demanded is q_2 while quantity supplied is q_1. To meet up the excess demand, the government rations the few available goods to the needy consumers.

3.3.2   MINIMUM PRICE

The minimum price is also known as the floor price. This is the price above the equilibrium price established by the government, below which no producer is permitted to sale. This is a price higher than the equilibrium and is meant to protect the producers from low prices. This type of prices are common in situations where government seeks to protect producers, especially in the areas of agriculture. The figure below depicts this type of price control. The minimum price is set for P_1. At the minimum price supply exceeds demand.

To Prevent prices from falling, the government buys the excess and stock-piles.

Price

P₁

P

S

D

87

q_1 q q_1

Quantity
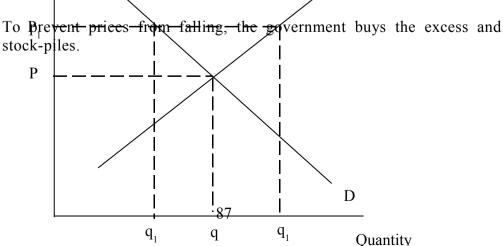
Figure 11.6:   Price Flow

4.0   CONCLUSION

From the foregoing discussion, it is evident that the equilibrium position is one in which quantity demanded is equal to the quantity supplied, i.e, Qd = Qs. When there is a disequilibria either due to excess supply or excess demand, the market forces interacts and establishes a new equilibrium. All these we have seen how they work. At times, the government in an attempt to either protect the consumers or producers may step into the market to control prices. These prices are either maximum prices in favour of consumers or minimum prices in favour of producers. We now know what happens when the least change is introduced into the market. Any change in the market conditions can be adjusted by the market forces alone or with the help of the government through price control.

5.0   SUMMARY

The analysis of the equilibrium demand and supply as shown above, are based on the background knowledge of our analysis of market demand on the one hand and market supply on the other hand. It is the unity between these two that is considered equilibrium. At equilibrium, demand must be equal to supply. How stable this equilibrium is a matter that can be considered elsewhere. When there is a disequilibrium, all is put on deck by the market forces to ensure that equilibrium is once more re-established. At other times, the government deliberately ignores the market forces and moves in to determine its own prices. At such

government determined prices, demand could exceed supply or supply could exceed demand. How these excesses are met are also considered.

A perfect understanding of the operation of the market forces and government in the establishment of the equilibrium price is an added advantage to business managers. You are therefore urged to understand how all these forces function.

6.0   TUTOR MARKED ASSIGNMENT

a) When is a market said to be at equilibrium

b) Explain in detail how the government can intervene in the market

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

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UNIT 12

PREDICTING FUTURE DEMAND FOR A GOOD

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1.0	Introduction
2.0	Objectives
3.0	Demand Forecasting Techniques
3.1	Survey Techniques
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4.0	Conclusion
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7.0	References and Other Resources

1.0   INTRODUCTION

Forecasting demand is the process of predicting the future trend of demand for a particular commodity. It is an attempt to envisage how a good could be consumed in the future.

In the preceding units we have come to the conclusion that the basic objective of business firms is to make at least a reasonable profit. This can be achieved only through an understanding of the behaviour of consumer and the fundamental issues involve in the concept of demand. When all these have been understood, the business manager needs to make use of them and predict the future demand for his goods. The results of these predictions can then be used to plan production, purchase of raw materials, obtain finance and advertise.

The prediction of future demand for a product is quite important when large-scale production is being planned and when production involves a long gestation period. This will avoid the risk of over or under-production. Firms that do not predict the future demand for their products expose their functioning and existence to risk and uncertainty and this may hamper the realization of their objectives. This highlights the importance of this unit to business managers. With this background, assume that you are running a business firm now producing chicken. How will you know whether your chicken will be bought in the future or not? I know that you will use your own means of looking into the future of the demand for your products. But the most reliable ways are exposed to you in this unit.

In this unit a few methods used for forecasting demand are considered. It should be noted that, among the numerous techniques of demand prediction, the one to be used depends largely on the data available and on the choice of the manager.

2.0   OBJECTIVES OF THE UNIT

At the end of this unit, it is expected that you should be able to:

-        Understand what demand forcasting is all about,

-        Understand some demand forecasting techniques,

-       Highlight why future demand predictions are essential

-       Forecast future demand. for the products of a firm using at least two approaches.

3.0   DEMAND FORECASTING TECHNIQUES

Though there are multiplicities of techniques used in forecasting future demand, these techniques are basically grouped into two classes:

a)   Survey method, comprising of complete Enumeration and sample survey, enduse method, Expert opinion and market studies and experiments.

b)   Statistical methods, comprising Trend prediction, Barometric method and Econometric methods.

3.1   SURVEY METHOD

These methods are used mostly for short -run forecast of demand. In this method, information on consumers' future purchase plans and intentions are collected by conducting surveys.

This information can be generated through:

Survey of potential consumers or through opinion polling of experts like market experts and sales representatives and from market studies and experiments. When the survey method is on the consumers (that is on the first technique), direct interview of the potential consumers can be done.

The consumers are asked what quantity of the product they would be willing to buy at different prices over a given period. This method may over almost all the potential consumers or selected groups of consumers from different parts of the area of consumer concentration (Areas where the potential consumer of a good are located). When only a few selected representative consumers are interviewed, it is known as sample survey method. What we are saying here is that, the sample survey method, selects a number of consumers. of a good out of the total consumers of that particular good and their views on their future demand are taken. "These views are then generalized and used to predict the future demand for the product.

3.1.1   THE COMPLETE ENUMERATION METHOD

As we have already mentioned above, in this method almost all-potential users of the product are interviewed. The quantities indicated by the consumers are added together to obtain the probable demand for the product. i.e.

$$Dp = d_1 + d_2 + d_3 + ... + d_4 + ...dn$$

This implies that the expected demand for a product D_p is given by summing up individual demand represented by d_1, d_2, d_3 and d_4 to dn.
This method proves difficult where the consumers of the product are widely spread. You will agree with me that if the consumer of a particular product covers only a state in Nigeria, getting the views of every consumer will not be an easy task. As such this method is limited in use especially for non-customized goods.

3.1.2   SAMPLE SURVEY METHOD

When this method is employed, only a few potential consumers and users are selected from the relevant market through sampling. Direct interview or questionnaires could be used. The future demand, when responses are received, could be estimated through:

$$D_P \quad = \quad \frac{H_R}{Hs} (H.A_D)$$

D_p is the demand forecast.
H is the number of household from the relevant market
H_S is the sampled household
    H_R is the number of household with a demand for the product
    A_D is average expected consumption by the reporting households.

This method is simpler and less costly in terms of money and time but it has the limitation of the impossibility of getting a representative sample. It is difficult to choose a few individuals such that their views could be used to draw generalization on the whole society.

3.2   STATISTICAL METHODS

This method utilizes time-series and cross-section data for estimating long-term demand. This method is rated better because of its ability to minimize subjectivity, estimates are relatively more reliable, and it involves a less cost and is scientific. This method comprises of the following techniques:
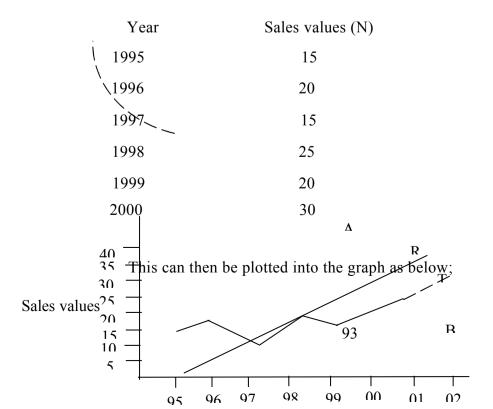
-        The Trend projection technique

-        Econometric technique and

-        Barometric technique.

3.2.1   THE TREND PROJECTION

Methods This method is concerned with the study of movements of variables through time. The use of this method requires time-series data over a long period of time. The assumption that underlies this method is that the factors responsible for the past trends in the variable to be projected will continue to be the same in the future and in the same magnitude and direction.

Here the trend method is applied on sales. Existing firms can use their sales value, while new firms can obtain data from older firms of the same industry. Three methods could be used under this approach. They are: Graphical method (here, annual data on its sales are plotted on a graph against the years. Sales on the vertical axis and the years on the horizontal axis. A line is, drawn through the plotted points and a free hand line is also drawn, so that the total distance between the line and the point is minimum. The line that was drawn to show the trend should be extended to exceed the years into the projected years. When this is done, a forecast of an approximate sales volume can be achieved. For example, let us assume the following sales value for a firm from 1995 to 2000.

Year	Sales values (N)
1995	15
1996	20
1997	15
1998	25
1999	20
2000	30

This can then be plotted into the graph as below;

The line T shows the actual trend of sales, while the line R shows the circular trend. These two lines can be extended to exceed 2000 to 2004, and by so doing the values of sales for 2004 can be predicted. For instance, if we project R in the same way, we could say that the sales values for 2003 would be 35 units.

This method is limited on the grounds that an optimist may over project it while a conservative may project a falling line indicating a fall in sales for the projected years. Say line B.

3.2.2. ECONOMETRIC METHODS

This is another technique used still under the statistical methods. This method combines statistical tools with economic theories to estimate economic variable and to forecast economic events.

This method could be of a model of simultaneous equations. Single - equation regression can successfully explain the relationship between variables and perform demand forecasting for most commodities. Models of simultaneous equations are used in situations where complex relationship exists between economic variables.

In regression models, when forecasting the demand for a product, the demand function for the product is used. The quantity to be forecasted in the function is the dependent variable while the variables that affect or

determine the demand are the independent variables. In the situation where only a single variable determines the demand for a product, simple regression is used. On the other hand, where a host of variables determine the demand for a product, multiple regression analysis is used.

When you have specified the forms of the regression equations, i.e.

Qd   = $b_0 + b_1 X_1 + e$ in case of simple regression or

Q_d = $b_0 + b_1 X_1 + b_2 X_2 + e$ multiple regression / the variables

can then be estimated.

Today this estimations are made easier by computer packages such as statistical package for social scientists (SPSS) and Two- stage-least square ('TLS) methods. Once you fit in the values correctly into these packages, the results are determined. This method has the advantage of reliability and widespread usage.

4.0   CONCLUSION

We can conclude here that Demand forecasting is a vital ingredient needed by Firms to enable them face future challenges. As such, managers need to be equipped with techniques of forecasting future demands for their products. The most common approaches used are the survey techniques and econometric approach. Managers should therefore be verse with these techniques of forecasting future demand.

5.0   SUMMARY

In this unit, we have highlighted the importance of forecasting demand to business managers. Various techniques that can be used to predict future demand have been mentioned. Under the survey technique of demand forecasting, deep attention has been paid to complete enumeration method and the sample survey method. On considering the statistical methods, which are upheld to be more reliable, the graphical method of trend projection and the econometric technique have also been considered here.

6.0   TUTOR MARKED ASSIGNMENT

I .   Discuss critical 4 methods of demand forecasting that you know.

7.0   REFERENCES

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<div style="border:2px solid green;display:inline-block;padding:4px;">**UNIT 13**</div>

SOME BASIC CONCEPTS IN THE THEORY OF PRODUCTION

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1.0   INTRODUCTION

Business firms aim at achieving efficiency in their production process. The main concern of any manager is to see how he can minimize cost of producing a given level of output. In fact, the survival of a firm in a perfectly competitive environment depends on its ability to minimize its cost of production. This is because this cost of production is directly related to the profit level of the producer, which also determines his ability to compete favourably or otherwise. The theory of production tries to explain the ways and provides the tools and techniques to analyze

the production conditions and to find solution to the practical business problems.

This unit is devoted to the discussion of some basic concepts in the theory of production. It is equally worthy to note that production theory deals with input output relationship, production period, and production function.
Input-output relationship can be expressed in physical terms as well as in the monetary terms. Production theory deals with physical relationships i.e. technical and technological relations between inputs and outputs.
In this unit, a discussion is made on production and its physical relationship. i.e. an explanation of the relationship existing between the factor input and the factor output. With this background, let us assume that your firm is engaged in the production of a wide range of products. List all the inputs - output relation for a firm you know well for the past 10 months and tell us which inputs are fixed and which one can be varied. From your experience in the field I know you can do this. The theory below shades more light to what you have in mind.

2.0   OBJECTIVES OF THE UNIT

The theory of production deals with the relationship between the factor inputs and the factor output, in physical terms. The unit provides an explanation of this relationship between input and outputs in monetary terms. This unit examines the basic concept in the production theory, which will be of help in your understanding the subsequent units.
At the end of this unit, you are expected to know the following:

-       The meaning of production

-       The production function

-       Input and output

-       Fixed and variable input

-       Fixed and variable cost

3.0 CONCEPTS IN THE PRODUCTION THEORY

As stated earlier , we are going to focus our attention on a few concepts of production.

3.1   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 production of legal, medical, social and consulting services, hairdressers, musicians are all engaged in producing intangible goods.

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 any thing that satisfies a human want or need.

3.2   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 output represent the value created out of the combination of inputs used by the producer.

3.3   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 inputs** 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.

3.4   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.

3.5   PRODUCTION FUNCTION

In this unit, we will be concerned with the laws of production i.e. the relationship between inputs and output. 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.

Besides, the production function represents the technology of a firm, of an industry or of the economy as a whole.

A production function may take the form of a schedule or table, a graphed line or Curve, an algebraic equation or a mathematical model. But each of these forms of production function can be converted into the other forms.
Before we illustrate the various forms of a production let us note how a complex production function is simplified and the number of inputs in the production function, i.e. the dependent variables are reduced to manageable number, especially in theoretical analysis or models.

A real life production function is generally very complex. It includes a wide range of inputs. The economists have however classified the input as (1) land (ii) labour (iii) capital (iv) raw material (v) time and (vi) space.
All these variables enter the actual production function of a firm, the economist have however reduced the number of variables used in a production function to only two, viz, capital and labour, for the sake of convenience and simplicity in the analysis of input-output relations.
The reasons for ignoring other inputs are as following:

Land as an input, is constant for the economy as a whole and hence it does not enter into the aggregate production function. However, land is not a constant variable of an individual firm or industry. In the case of an individual firm, land is lumped together with "capital." In case of raw materials it has been observed that this input bears a constant relation to output at all levels of production. For example, cloth bears a constant relation to the number of garments since the same number of garments can be gotten from the cloth. Similarly, for a given size of a house, the quantity of bricks, cement, steel, etc. remains constant irrespective of number of houses constructed. This consistency of input - output relation leaves the methods of production unaffected. So is the case generally, with time and space. That is why, in most production function only two inputs - labour- and capital are included.

We will illustrate the tabular and graphic form of a production when we move on to explain the laws of production. Here, let us illustrate the algebraic or mathematical form of a production function. This is the form of production function, which is most commonly used in production analysis.

To illustrate the algebraic form of production function, let us suppose a coal-mining firm employs only two inputs - capital (K) and labour (L) -

in its coal production activity. As such, the general form of its production function may be algebraically expressed as;

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

Where   Q   =   the quantity of coal produced per time unit
          K   =   capital and L = labour

The production function implies that output of coal depends on the quantity of capital, K, and labour, L, employed to produce coal. Increasing coal production will require increasing K and L. Whether the firm can increase both K and L or only L depends on the time period it takes into account for increasing production, i.e. whether the firm considers a short run or long run.

By definition, supply of capital is inelastic in the short run and elastic in the long run. In the short run, therefore, the firm can increase coal production by increasing labour only, since the supply of capital in the short run is fixed. In the long run, however, the firm can employ more of both capital and labour. Accordingly, the firm would have two types of production functions.

-       Short-run production function
-       Long-run production function

The short run production function or what may also be termed as single variable production function,' can be expressed as,

$$Q = f(L)$$

the form: In the long-term production function, both K and L are included and the function takes the form:

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

Assumptions

A production function is based on certain assumptions, which include:

-       perfect divisibility of both inputs and output

-       limited substitution of one factor for the other

-       constant technology, and

-           inelastic supply of fixed factors in the short run

If there is a change in these assumptions, the production function will have to be modified accordingly. The most important functions used in economic literature to analyse input-output relationships is Cobb-Douglas Production function.

4.0   CONCLUSION

This unit reviewed quite a number of issues, which are of important to every business organization. It is recommended that managers should understand some of these concepts as a key to decision making. An understanding of the production conceptions will therefore given you a base in your managerial decision-making.

5.0   SUMMARY

Some basic concepts of production that are considered to be of some importance to business managers have been considered above. These concepts are quite useful when decisions on techniques of production are being considered. The concepts considered cover the meaning of production, the explanation of input-output relationship, nature of variables, the different production periods and the production function.

6.0   TUTOR MARKED ASSIGNMENTS

1.   Analyse the short run and long run period of production.?

2.   What are fixed factors and variable factors of production?

7.0   REFERENCES AND OTHER RESOURCES

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UNIT 14

THE THEORY OF COST

1.0   INTRODUCTION

The last unit has been concerned with production. It has been dealing with cost in physical values. This is contrary to what is obtainable in the society as business managers take their decisions based on the money value of their goods. A consideration of factor value in monetary terms is what is called cost of production. Cost of production in plane terms can be defined as the monetary value of goods and services used in realizing a given output. When considered from technical position, the concept is given a deeper meaning. All these, we shall see in the course of our work. The concepts related to costs especially those that affect managerial decision making shall form part of this unit. These costs shall be analyzed and their implications on production drawn.

2.0   OBJECTIVES OF THE UNIT

Costs reflect on the price of a commodity and are translated into changing demand patterns. It is intended that at the end of this unit, you should be able to:

- Appreciate the concept of cost

- Understand explicit and implicit costs

- Calculate the various aspect of cost such as FC, VC, MC, AC

- Analyse short-run and long-run cost, and

- Take major decisions based on the cost concept.

3.0   COST CONCEPTS

The cost concepts that are relevant to business operation differs from those relevant to economics. Each of these groups shall be discussed below.

3.1   ACCOUNTING COST CONCEPTS

We had in an earlier unit defined opportunity cost as the next best alternative forgone. This is the same as defining it as the expected returns from the second best use of the resources forgone due to scarcity of resources. As such opportunity cost can also be called alternative cost. Tied to opportunity cost, is the concept of economic rent/profit. Economic rent/profit is excess earning over and above the employment of a factor of production in its next best alternative use. E.g. Given that Mr. X has N150, 000 to invest in either an Okada business or a tailoring shop, and he decides to invest in the Okada business because it will yield him a monthly profit of N 1,500, rather than investing in the sewing tailoring shop that will earn him only N1,000 a month as profit.

His opportunity cost is the next best-forgone alternative i.e. the tailoring shop. On the other hand, his economic rent is the excess profit gotten by investing in the Okada business and not in the Tailoring shop i.e N1,500 (to be earned from the Okada business) minus N1,000 (the earnings that would have come from investing in the Tailoring shop.

Actual cost is a contrast to opportunity cost. It is the actual cost incurred during the process of production by making payments for labour, material, plants, machinery, equipment, etc, used.

a)   BUSINESS COST AND FULL COST

Business cost includes all expenses incurred in carrying out a business. These types of cost are used for calculating business profit and losses, income tax returns and for legal purposes. This cost include all the payments and contractual obligations made by the firm together with the book cost of depreciation on plant and equipment.

Full cost, on the other hand, incorporates opportunity cost and normal profit. It refers to the minimum earning which a firm must get to remain in its present occupation.

b)   EXPLICIT AND IMPLICIT COSTS.

These are other accounting cost concepts. Explicit costs are those costs that fall under actual or business costs and are entered into the account books. This cost involves cash transaction, which are recorded. On the other hand, implicit cost also called imputed cost is the earnings expected from the second best alternative use of resources. There are costs forgone by other factors of production that goes unrecorded. E.g. If an entrepreneur is employed by another firm, he will be paid, but since he employs himself in his firm, he does not charge his pay as the explicit cost of his own business. Implicit costs are not taken into account when calculating the profit of a firm, though they form an important consideration in whether or not a factor would remain in its present occupation. These two make up economic cost.

c)   OUT-OF-POCKET AND BOOK COSTS

Out-of-pocket costs are those cash transfers made by a business, i.e. all explicit costs. On the other hand, those costs which do not involve cash payments but a provision is made for them in the account books are called book cost. This implies that book costs are payments by a firm to itself. E.g depreciation and owner's own unpaid interest.

3.2   ECONOMIC COST CONCEPTS

a)   Fixed cost and variable cost (FC and VC):

Fixed costs are the cost that do not change as output changes, i.e. it is the cost incurred as a result of using fixed factors of production. Example cost of managerial and administrative staff, depreciation of machinery, building cost, rents, etc.
Variables cost, on the other hand, is that cost incurred as a result of employing a variable factor of production. It increases with an increase in output and falls with a fall in output, example cost of raw materials, and running cost of fuel, repairs, direct labour charges etc.

b)   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 the per unit cost of a product. It is gotten by dividing TC by total output Q, i.e.

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

- **Marginal cost**: Your knowledge of marginal can be applied here. Marginal cost is that additional cost to total cost incurred as a result of producing an extra unit of a particular product.

MC

=

ΔTC

Δ
Q

This concept of MC should be understood right at this point for it has extensive implications on both business and economic analysis.

3.3   PRIVATE COSTS AND SOCIAL COST

Private cost are those cost which are actually incurred or provided for by an individual or a firm on the purchase of goods and services from

the market. These are an internalized cost incorporated in the firm's total cost of production.

On the other hand, social cost refer to the total cost to the society on account of production of a commodity. It includes both private cost and external cost. It is made up of:

-       The cost of resources for which the firm is not compelled to pay a price example rivers, lakes atmosphere public utilities etc.

-       The cost in the form of disutility created through pollution.

3.4   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-a̅un and the long -run.

3.4.1   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 out put, TFC (total fixed cost) remains the same e.g, the cost of machines, building, etc.

        By now we should already know that:

TFC   =   TC - TVC

TVC   =   TC - TFC

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

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

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

$$ATC \text{ or } AC = \frac{TC}{Q}$$

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

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

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

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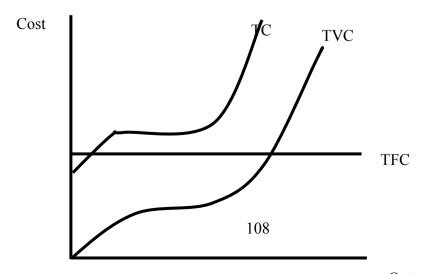
Fig. 14.1:   Aggregate costs.

While TC and TVC are inversely S-shaped TFC is a horizontal straight line (Fixed) in the short-run.
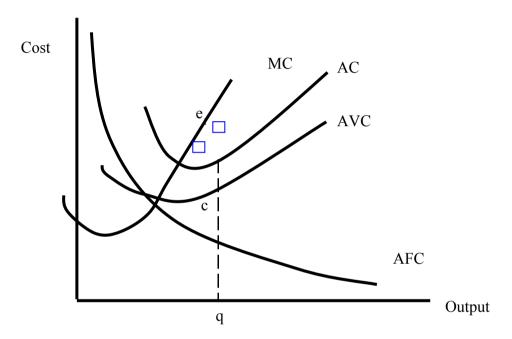
Figure 14.2:   MC, AC, AVC and AFC cost curve.

AFC is a 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 e_1, respectively.

The optimum out put 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.

3.4.2   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:

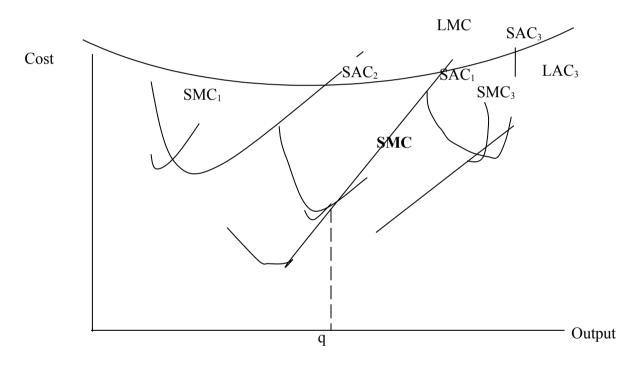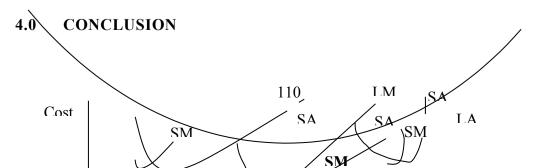Figure 14.3: Long –run Average Cost Curve

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.

4.0   CONCLUSION

Having noted the importance of cost to business managers, a selected cost structure has been presented. Emphasis has been laid on aspects which can be of practical help to these managers. The rationale for the U-shape nature of the cost curves (Averages) both in the short run and long run, and the intersecting points of MC to AC and AVC should remain fresh in your minds.

5.0   SUMMARY

This work has examined the theory of cost from the traditional perspective. Accounting cost concepts have been distinguished from economic cost concept. In doing so, different types of costs have been discussed. Furthermore, production costs under the short run and long run has been analyzed, and equilibrium cost positions established. This has been in a bid to exposing you to the theory of cost, which is a vital ingredient in business decisions that relates to output determination and profit.

6.0   TUTOR MARKED ASSIGNMENT

Why is it that the MC, AC, AVC are U-shaped in the short run and long run?
Explain and distinguish FC, VC, and TC from each other.

- a)   Marginal cost and Average cost
- b)   Business cost and full cost
- c)   Actual cost and imputed cost
- d)   Private cost and social cost
- e)   Short run and long run cost.

7.0   REFERENCES AND OTHER RESOURCES

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<div style="text-align:center">**UNIT 15**</div>

THE LAWS OF PRODUCTION

1.0   INTRODUCTION

As mentioned above, production function states the relationship between output and input. Given the production function, the relationship between additional quantities of inputs and additional output can be easily obtained. This kind of relationship yields the laws of production. The traditional theory of production studies the marginal output-input relationship under (1) short run and (ii) long run conditions. In the short run, input-output relations are held constant.

The laws of production under these assumptions are called **"The Law of Variable Proportions."** In the long run, the input-output relations are studied assuming all the inputs to be variable. The long run input output relations are studied under **"Laws of Returns to Scale."** Now, imagine that your organization doubled its workers once and the yield was encouraging. It doubled them again unfortunately the yield per person began dropping. How can you explain this to your friends? Find out what firms do in such circumstances.

2.0   OBJECTIVES OF THE UNIT

At the end of the unit, I expect that you should be able to:

-        Explain the relationship between additional quantities of inputs
         and the additional outputs.

-        Discuss the laws of variable proportions with the aid of diagrams,
         as well as the laws of return to scale;

-        Explain the importance of these laws to business firms.

By the time you are able to explain these, then you must have gone a
long way in understanding why certain things happen the way they do in
the course of production.

3.0   LAWS GOVERNING PRODUCTION

There exist a set of laws that govern production whether in the short
run or in the long run. For the sake of simplicity we are going to
assume the two time period when discussing the laws.

3.1   SHORT RUN LAWS OF PRODUCTION

These are the laws that govern production in the short run. The
important ones are what we are considering here.

3.1.1 The Laws Of Returns To Variable Proportions

Production with one Variable output:
As mentioned earlier, the laws of return state the relationship between
the variable input and the output in the short-run. By definition, some
factors of production are available in unlimited supply even during the
short period. Such factors are called variable factors. In the short-run,
therefore, the firms can employ an unlimited quantity of the variable
factor. In other words, firms can employ in the short run, varying
quantities of variable inputs against a given quantity of fixed factors.
This kind of change in input combination leads to variation in factor
proportions. The laws which bring out the relationship between varying
factor proportions and output are therefore known as **Law of Variable
Proportions**, or what is more popularly known as **Law of Diminishing
Returns.**

This law states that when more and more units of a variable input
are applied to a given quantity of fixed inputs, the total output
may initially increase at an increasing rate and then at a constant
rate but it will eventually increase at a diminishing rate. That is,

the marginal increase in the total output eventually decreases when additional units of variable factors are applied to a given quantity of fixed factors.

To illustrate the law of diminishing returns let us assume (i) that the coal mining firm (in our earlier example) has a set of mining machinery as its capital (K), fixed in the short run, and (ii) that it can employ more of mine-workers to increase its coal production. Thus, the short run production function for the firm will take the form

$$Qc = f(L)$$

Let us assume that the labour-output relationship in coal production is given by the following production function.

$$Qc = -L^3 + 15L^2 + I\ OL^1$$

Given the production function (above) we may substitute different numerical values for L. in the function and work out a series of Qc, i.e. the quantity of coal that can be produced with different number of workers. For example, if L=5, then

by substitution

$$Q_c = -5 + 15 \times 5^2 + 10 \times 5$$

$$= -125 + 375 + 50$$

$$= 300$$

A tabular array of output levels associated with different number of workers from 1 to 12, in our hypothetical coal-production examples is given in the Table below (Cols. 1 and 2). From the table, we derive the marginal product (MP_1) and the average product (AP_L) curves. The TP_L schedule demonstrates the law of diminishing returns. As the curve TP_L shows, the total output continues to increase at an increasing rate until the employment of the 5th worker, as indicated by the increasing slope of TP_I, curve (see also col.3 of the table). Beyond the 6"' worker, TP_L continues to increase (until the tenth worker) but the rate of increase in TP_L (i.e. marginal addition to TP_L) begins to fall and turns negative from 1Ith worker onwards. This shows the operation of the law of diminishing returns.

The table presents the usual three stages in the application of the laws of diminishing returns

No of workers (N)	Total product -TP_L (tones)	Marginal * Product (MP_1)	Average Product (AP_L)	Storage of production
(1)	(2)	(3)	(4)	(5)
1	24	24	24	
2	72	48	36	1
3	138	66	46	Increasing and
4	216	78	54	constant
5	300	84	60	returns
6	384	84	64	
7	462	78	66	
8	528	66	66	11
9	576	48	64	Diminishing
10	600	24	60	returns
11	594	-6	54	111
12	552	-42	46	Negative returns

*MP_L = TPn-TPn-$_1$ or MP_L = $-3L^2 + 30L + 10$, i.e. the first derivative of the production

Table 15.1:   Three stages of Production
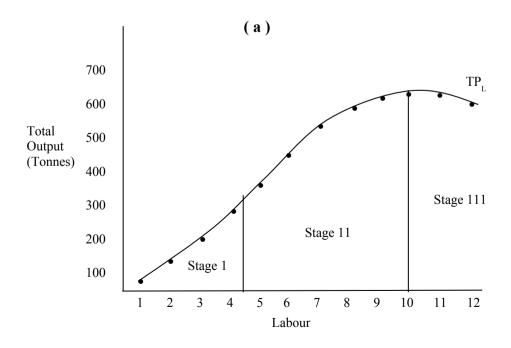
Figure 15.1: The Law of Diminishing Returns

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(B)
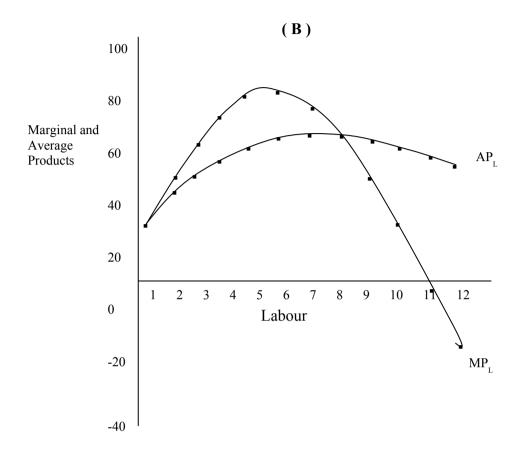
Figure 15.2: Total, Average and Marginal Products

In stage 1, TP_L increases at an increasing rate. This is indicated by the rising MP_L till the employment of the 5th worker. Given the production function the 6th worker produces as much as the 5th worker. The output from the 5th and the 6th workers represents an intermediate stage of constant returns to the variable factor - labour. In stage II, TP_L continues to increase but at a diminishing rate; i.e. MP_L begins to decline. This stage in production shows the level of output at the employment of the 10th worker. Beyond this level of output, $TP,$, begins to decline. This marks the beginning of stage III in production.

To conclude, the law of diminishing returns can be stated as follows. Given the employment of fixed factor (capital), when more and more workers are employed, the return from the additional worker may initially increase but will eventually decrease.

The reasons which underlie the application of the laws of return in Stages I and 11 may be described as follows. As shown above, the marginal productivity of workers (MP_L) increases in stage 1, whereas it decreases in stage 11, the law of diminishing returns is in application.

One of the important factors causing increasing returns to a variable factor is the indivisibility of fixed factors (capital). It results in under-utilisation of capital if labour is less than its optimum number. Let us suppose that optimum capitallabour combination is 1:6. If capital is indivisible and less than 6 workers are added, utilization of machine increases and also the productivity of additional workers leads to advantages of division of labour until optimum capital-labour combination is reached.

Once the optimum capital - labour ratio is reached, employment of additional workers will amount to substitution of capital with labour. But technically, one factor can substitute another only up to a limited extent. In other words, there is a limit to which one input can be substituted for another. That is, the elasticity of substitution between inputs is not infinite. Hence, to replace the same amount of capital, more and more workers will have to be employed because marginal productivity per worker.

Assumptions

The application of the law of diminishing returns is based on the following assumptions:

(a)   The state of technology remains unchanged

(b)   Input prices remain unchanged and

(c)   The variable factors are homogenous

The law of diminishing returns is an empirical law, observed in various production activities. This law however may not apply universally to all kinds of productive activities. In some productive activities it may operate quickly, in some its operation may be delayed; and in some others, it may not appear at all. This law has been found to operate in agricultural production more regularly than in industrial production. The reason is, in agriculture, natural factors play a predominant role whereas man-made factors play the major role in industrial production. Despite the limitations of the law, if increasing units of an input are applied to the fixed factors, the marginal returns to the variable input decrease eventually.

3.1.1 THE LAW OF DIMINISHING RETURNS AND BUSINESS DECISION

The law of diminishing returns as presented graphically has a relevance to business decisions. The graph can help in identifying the rational and irrational stages of operations. It can also provide answers to such questions as (1) how much to produce; and (ii) what number of workers (or other variable inputs) to employ to a given fixed input so that, given all other factors, output is maximum. The above exhibits the three stages of production. Stage III shows a very high labour-capital ratio. As a result, employment of additional workers proves not only unproductive but also causes a decline in the TP. Similarly, in stage 1, capital is presumably underutilized. So a firm operating in stage I is required to increase labour, and a firm operating in stage Ill is required to reduce labour, with a view to maximizing its total production. From the firm's point of' view, setting an output target in stages III and I is irrational. The only meaningful and rational stage from the firm's point of view is stage II in which the firm can find answer to the questions how many workers to employ. changes in the scale of the firm, i.e. in response to a simultaneous and proportional increase in all inputs. In other words, the law of return to scale shows that a simultaneous and proportionate increase in all the inputs affects output at all levels of production. When a firm increases all its inputs proportionately, there are three possibilities i.e. (1) total output may increase more proportionately (increasing return to scale) (ii) total output may increase proportionately (constant return to scale) or (iii) total output may instead by the law of constant returns and then diminishing return to scale. This is the path the laws follow.

3.2   LAWS OF RETURN TO SCALE

The law of return to scale explains the behaviour of output in response to changes in the scale of the firm, i.e. in response to a simultaneous and proportional increase in all inputs. In order words, the law of return to scale shows that a simultaneous and proportionate increase in all the inputs affects output at all levels of production. When a firm increases all its inputs proportionately, there are three possibilities i.e. (1) total output may increase more proportionately (increasing return to scale) (ii) total output may increase proportionately (constant return to scale) or (iii) total output may instead decrease (diminishing return to scale)

The law of increasing return to scale is followed by the law of constant returns and then diminishing return to scale. This is the path the laws follow.

3.2.1 INCREASING RETURNS TO SCALE

When a change of a proportionate magnitude in inputs lead to a more than proportionate change in output, such as situation is called increasing returns to scale. For example, if labour and capital are doubled, and output more than doubles, then it signifies increasing return to scale i.e. if input increases by 40% and output increases by 50% the situation is that of increasing returns.

Some factors may lead to increasing returns to scale. These factors include:
- Technical and managerial indivisibility: Some equipment and managerial skills that are used in the process of production cannot be divided into smaller sizes. For example, the engine of a machine cannot be reduced or divided into smaller parts. As such, the engine must be used as complete as it is. Also, it is not possible to employ half a person as a manager. Because of these difficulties, the minimum quantity required for production may be surpassed and hence, Output will increase. Such indivisible inputs may have the productivity increased faster than those of other inputs.

- Dimensional relations: dimensional relations may affect Increasing return to scale. As such, when the labour and capital are doubled, the capital is more than doubled.

- Higher degree of specialization: Another factor that may cause increasing returns to scale is a higher degree of specialization of labour and capital which can only be achieved through an increase in the scale of production. When specialized labour suitable to a job and the required machines are put into use, productivity per unit of input increases. The cumulative effect may lead to increasing returns to scale. As such, it can be said that employing a specialized input leads to increased production.

3.2.2 CONSTANT RETURNS TO SCALE

This signifies a situation where a proportionate change in input brings about the same proportionate change in output. This suggests that if inputs are increased by 50%, output should also increase by 50%.

Constant returns to scale arise out of the limitations of economies of scale. When expansion in the scale of production is implemented, economies of scale may arise as a result of the indivisibility already mentioned above. Greater possibility of specialization of input, the use of labour saving techniques of production, etc. may also lead to constant returns to scale. When economies of scale reaches its limit, and diminishing returns are yet to set in, return to scale becomes constant. In a situation where factors of production are perfectly indivisible, the production function is homogenous of degree one.

3.2.3 DECREASING RETURNS TO SCALE

This connotes a situation where a proportionate change in input brings about a less than proportionate change in output. For instance if capital and labour are increased by 50%, and output increases by 40%, the situation is that of decreasing returns to scale.

The causes of diminishing returns to scale are related to diseconomies of scale. The most important factor that causes diminishing returns to scale arises out of managerial diseconomies. This implies that diminishing returns in management as a result of an expanding size of the firm may lead to diminishing returns, i.e. decreasing efficiency of management. Secondly, when natural resources used for production are exhausted, diminishing returns are bound to set in.

4.0 CONCLUSION

As a firm can grow by diversification, an understanding of the economics of expansion is essential. The limits to this process arise from, (a) the firm as an administrative and planning unit, and (b) the firm as a collection of resources. The capacities inherent in both these aspects will determine for any given firm the profitable limits to the rate and direction of diversification.

5.0 SUMMARY

There are two laws of production as examined in the unit. The law of variable proportion, which is operating in a short-run period and law of

return to scale, which is operating in the long run. These laws are relevant to business decision as it can be possible for business firm to decide on the rational stages of operation. Economies and diseconomies of scales were also discussed in the unit.

6.0   TUTOR MARKED ASSIGNMENT

1.   What is the difference between the two concepts of

(a) Increasing and

(b) Diminishing returns

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive economics, Oxford, oxford press.

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UNIT 16

ECONOMIES OF SCALE

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1.0	Introduction
2.0	Objectives
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1.0   INTRODUCTION

The factors which cause the operation of the law of returns to scale are grouped into economies and diseconomies of scale. Increasing returns to scale are the result of economies of scale and decreasing returns to scale results from the diseconomies of scale. Where economies and diseconomies arise simultaneously, return to scale may increase or decrease depending on whether economies or diseconomies are greater. Return to scale increase when economies of scale are greater than the diseconomies of scale and returns to scale decrease when diseconomies outweigh the economies of scale. When the diseconomies are in balance, return to scale become constant.

Most small firms you see around are all trying to grow large. In your opinion, what is there in growing large? Try to find out the reason behind this.

2.0   OBJECTIVES

This unit has the objectives of enabling you get acquainted with a number of issues pertaining to economics of scale. At the end, you are expected:
1   To understand the advantages of division of labour and specialization as well as technological advantages (economies in product).

2   To understand ways of increasing the output without a necessary increase in input e.g. economies in working, economies in transport and lower advertising rate charged by the advertising firms from large scale advertising, lower wage rates if a large-scale firm monopolizes employees of certain kind of specialized labour.

3.0   DIFFERENT ECONOMIES OF SCALE

The factors which cause the operation of the laws of of returns to scale are grouped under economies and diseconomies of scale. Increasing returns to scale are the results of economies of scale and decreasing returns to scale result from the diseconomies of scale. Where economies and diseconomies arise simultaneously, returns to scale may increase or decrease depending on whether economies or diseconomies are greater. Returns to scale increase when economies of a scale are greater than the diseconomies of scale, and returns to scale decrease when diseconomies of scale is greater than economies of scale. When economies and diseconomies are in balance, returns to scale become constant. In this unit, we will briefly discuss the various kinds of economies of scale.

Internal economies are those advantages that arise from the expansion of the firm itself. They are those benefits that are from within the firm. When a firm increases its size of production, it enjoys certain benefits. They are some benefits that come from within the firm. Such benefits include:

A.   **Economies in Production**. Generally, economies of scale is a result of the economies in production, which arise from:

(1)Technological advantages, and

(11)   Advantage of division of labour and specialization.

Large-scale production provides opportunity to avail the advantages of technological advances. The modern technology is so highly advanced and composite that the accomplishment of the whole process of production of a commodity can be conceived in one composite unit of production plants.   For example, production of cloth in a textile mill may comprise such plants as (i) Spinning; (ii) Weaving (iii) Packing, etc. A composite dairy scheme may consist of plants like (1) Chilling; (ii) Milk-processing; and (iii) Bottling.As such when the scale of production

is small, the firm may not find it economical to have a composite plant. But a large-scale firm enjoys the economies of scale in terms of a larger output.

As we have already seen above, increasing returns to scale and decreasing returns to scale are associated to economies of scale and diseconomies of scale respectively. When economies of scale outweigh diseconomies of scale, increasing returns to scale is experienced. On the other hand, when diseconomies of scale exceed economies of scale, the end result is a diminishing returns to scale. The implication of this is that when the two are balanced, constant returns to scale is experienced. Economies of scale are classified into two:

2   Internal economies of scale; and

3   External economies of scale.

3.1   INTERNAL ECONOMIES OF SCALE

Internal economies of scale are those advantages from within, that a firm will enjoy as a result of an expansion in its size. When firms grow large, they tend to enjoy some benefits that small firms cannot enjoy. These benefits arises out of the following:

*   **Technical Economies;**
    Greater size gives more opportunity for division of labour. It also enables firms to spend more on research and technical progress.

    Large firms can sometimes afford to buy machines and equipment that are too expensive for smaller firms. Even if a machine is available in different sizes, a larger one is usually cheaper to operate, in relation to output, in the same way as a bus can carry passengers more cheaply than a taxi.

    Size can contribute to technical efficiency in a variety of ways. By carrying Out all process of manufacturing in one large factory, it is often possible to save time and reduce costs.

*   **Managerial Economies**

    Large firms employ the most professional managers. They are able to attract more qualified staff and can use specialists to manage particular departments. Able managers are likely to be attracted

not only by higher salaries but also the prestige and power of responsible positions in large organization.

The employment of specialist managers in charge of functions such as sales or accounts brings the advantage of division f labour. Small firm may not have enough work to justify separate departments for each of these functions so that managers and staff have to undertake a wider range of activities, losing the advantage of specialization.

- **Commercial Economies**

  Larger firms are often able to buy materials at lower prices and also have advantages in selling their finished products. It is practically evident that most goods bought in large quantities or large size frequently turns out to be cheaper. Large firms are likely to pay less for their materials or components because suppliers naturally want to attract and keep important customers.
  A large firm obtains similar advantages when it comes to selling its finished products. In transport, for example, haulage contractors are willing to allow more favourable terms for bulk deliveries and full load of their lorries. We can also see how sales can be increased through the employment of specialist managers and staff to promote exports, advertising and so on.

- **Financing Economies;**

  The advantages of being large include greater ability to raise money by borrowing and also withstanding the risk of business. Firms commonly borrow money for short-term period to meet expenses such as purchase of raw materials. Such temporary loans are usually obtainable from banks. From the banks' point of view, a large firm is better known and more credit worthy than small firm. Its reputation enables it to borrow easily and being considered reliable, it may be charged a lower rate of interest. Also big firms are generally public companies. They can also borrow by selling shares to the public. A large firm usually has greater resources to meet business risks. It may also be in a position to reduce some of the uncertainties of business. For example, it might expand or diversify a range of its products, so as not to be dependent on the sale of a single product. It may further reduce its reliance on other firms by producing` its own materials or components.

32   EXTERNAL ECONOMIES

This type of economies refers to those advantages a firm may enjoy from without as a result of growing large. It results from the simultaneous growth or interaction of a number of firms in the same or related industries. External economies are available to all firms in the industry no matter what. Their size can obtain economies as a result of developments affecting the whole industry of which they l0rm part. For instance a new invention may be available for all the firms in the industry rather than just one firm. Such economies are described as external. This is the result of Research and Development, which is facilitated by the growth of subsidiary and auxiliary firms. External economies of scale are achieved when the growth of an industry brings advantages to all firms in it. This is likely to happen because expansion usually stimulates Research and Development of ideas which tend to spread among economies of concentration.

3.3   DISECONOMIES OF SCALE

It is possible, as we have seen, for firms to grow large. Increasing size can bring drawbacks as well as advantages. Drawbacks that reduce efficiency and increase the cost per units are called diseconomies of scale. Firms that are faced with disadvantages are said to be witnessing diseconomies of scale.

As an organization becomes large, however, managerial functions become increasingly difficult to perform effectively. In a large organization, there is likely to be several departments so that more time and effort have to be devoted to communication and consultation. This may bring delay in decision-making. In areas where consumers taste change rapidly, a small firm, which can make quick decision, may have an advantage over a large firm. Diseconomies of scale arise through problems of management and human relationship in large and complicated organization.

The problems of huge business organizations is probably similar in nature. You can imagine the difficulties of arranging and supervising the work of a very large number of people; decisions are more difficult and takes longer time if more people have to be consulted. In large firms, managers become more remote from the workers, so that grievances and misunderstanding often develop into disputes and perhaps lead to strikes. Relation with customers may also go sour when compared to small firms where, for example, the owner or manager is personally available to attend to complaints.

3.4   HOW FIRMS BECOME LARGE

Firms become large either by growing or by joining with other firms. Integration is the process of joining together. This is done by agreement between firms to combine or merge.

Alternatively it can be as a result of take-over bid; when one firm gains control over another by buying its shares. Integration is normally classified into three Kinds-horizontal, vertical and lateral.

Horizontal Integration occurs when firms joining together are in the same industry and at the same stages of production. For example, the recent integration that took place between Chrysler motors and Mercedez Benz. This means that same product is to be made by one large combined firm; it should thus be possible to obtain the advantage of large-scale production.

Vertical Integration is an amalgamation of firms in the same industry but at different stages of production. For example a publishing company, a paper manufacturer and bookshop are all concerned with the supply of books at different stages. 11' they join together, this is considered vertical integration. This type of integration can also be divided into forward and backward. Thus a publishing company that acquires a bookshop is said to be integrating forward because it is getting closer to its consumers. If it buys a paper manufacturing company to produce its own raw materials the integration is backward.

Firms may integrate forward in order to expand their sales or backward to ensure the supply of their materials, instead of relying on other firms. They may be able to obtain some of the economies of large-scale production.

Lateral Integration is an amalgamation of firms in different industries. This is most likely to happen when there is no connection between the industries. For instance, when airways entered into the hotel and catering business. However, there has been a rising tendency towards integration between firms in unrelated factory space or become less dependent on sales of a particular product.

These are a few methods through which firms can grow large.

In a nutshell when a firm grows large, it encourages the growth of subsidiary industries that supply inputs. Growth of auxiliary industries results in economies of scale and this decreases the cost of production for that firm. For example, when an industry producing confectionaries increases its size, it encourages auxiliary industries supplying the raw materials for such an industry. This could be gotten at a reduced cost.

5.0   CONCLUSION

The economies of scale discussed above are based on the experience of large scale firms. These economies of scale, however, many not be necessarily available to all the large- scale firms, as some large firms witness diseconomies of f scale. On the other hand, one may find well-managed small scale firms producing, goods of a relatively lower cost, amidst poorly managed ones.

6.0   SUMMARY

In this unit we have defined what economies of scale is. In the course of our discussion, we have seen that economies of scale are of two kinds-internal and external economies. Each of them arises out of different circumstances. Internal economies are a consequence of technical, managerial, commercial and financial economies while external economies arise from the development of subsidiary /auxiliary Firms and the capabilities of research and development.

6.0   TUTOR MARKED ASSIGNMENT

1.   Define economic of scale?

2.   What are the internal advantages a firm will enjoy as a result of economies of scale.

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to
        positive economics, Oxford, oxford press.

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UNIT 17

PRICING OF FACTORS OF PRODUCTION

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1.0   INTRODUCTION

For an entrepreneur to be success in his business venture, he must know how much to give each factor of production.

This unit is aimed at addressing the ways by which factors of production are priced, i.e. how to determine what to pay as a reward for the factors of production. The first aspect of this segment of the unit treats the pricing of factors of production, taking labour as the only factor, assuming other factors are held constant. In the subsequent part of the unit, an analysis of variable inputs is made whereby issues such as Isoquant and capital-labour contribution and output relation is considered.

When you look at some organizations, there exists a maximum number of workers and capital that can be employed at any particular time. Why do you think this happens?

While you are trying to find solution to the problem, beware that an understanding of this unit will greatly assist you to answer the question. When you go home find out the maximum number of workers that can be employed in any 3 organisations of your choice and ask them the reason.

2.0   OBJECTIVES OF THE UNIT

This unit tries to expose you to understand how factor prices are determined under perfectly competitive environment and analyze some little aspect of production such as Isoquant and output-input relationship.

Hence at the end of the unit, you are expected to know the following:

- How prices of factors of production are determine

- The operational aspect of marginal Revenue theory

- The Isoquant Curve and its properties

- How these curves can be applied to management decisions

3.0   **MARGINAL REVENUE PRODUCTIVITY AND LABOUR EMPLOYMENT**

It may be recalled that an output maximizing coal mining firm would like to employ 10 workers - since at this level of employment, the output is maximum. See the previous unit. The firm can, however, employ 10 workers only if workers are available free of cost. Unfortunately, labour is not available free of cost - the firm is required to pay wages to the workers. Therefore, the question arises 'how many workers will the firm employ - 10 or less or more than 10?' This question can be answered with the help of **Equi-Marginal Principle**. The turn will employ workers until marginal revenue productivity of labour equals the marginal wage rate.

The marginal revenue productivity is the value of product resulting from the marginal unit of variable input (labour). In specific terms, marginal revenue productivity (MRP) equals marginal physical productivity (MPP) of labour multiplied by the price (P) of the product, i.e.
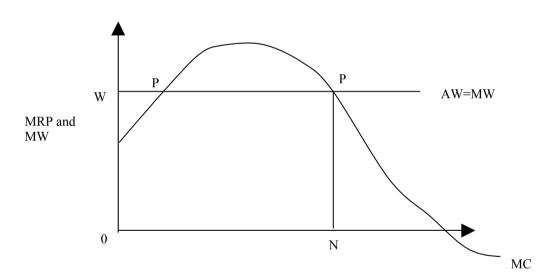
$$MRP = MPP \times P$$

For example, suppose that the price (P) of coal is given at N10 per quintal. Now, MRP of a worker can be known by multiplying its MP (as given) by N10. For example, let the MP of the 3rd worker be 66, then MRP of the 3rd worker equals 66 x 10 = N660 and of the 4th worker, 78 x 10 = 780. Likewise, if the whole column (MP) is multiplied by N10, it gives us a table showing marginal revenue productivity of workers. Let us suppose that wage rate (per time unit) is given at N660. Given the wage rate, the profit maximizing firm will employ only 8 workers because at this employment, MRP = wage rate: MRP of 8th worker 66 x 10 = N660 (wage rate). If the firm employs the 9th worker, his MRP = 48 x 10 = N480 < N660. Clearly, the firm losses N180 on the 9th worker. And, if the firm employs less than 8 workers, it will not maximize profit.

To generalize, if the whole series of MRP is graphed, it will give an MRP curve as shown in below. Similarly, the MRP curve for any input may be drawn and compared with MC or (MW) curve. Labour being the only variable input in our example, let us suppose that wage rate in the market is given at OW (in the curve below).

When wage rate is given, average wage (AW) and marginal wage (MW) are equal, i.e. AW=MW, for the whole range of employment in the short period. When AW=MW, the supply of labour and marginal cost (MC=MW) are shown by a straight horizontal line, as shown by the line AW=MW.

With the introduction of MRP Curve and AW=MW line in the figure below, a profit maximizing firm can easily find the maximum number of workers which can be optimally employed against a fixed quantity of capital. Once the maximum number of workers is determined, the optimum quantity of the product is automatically determined.

Figure 7.1 Determination of Labour Employment in the Short Run

The marginality principle of profit maximization holds that profit is maximum when MRP=MC. This is a necessary condition of profit maximization. The figure above shows that MRP and MW (=MC) are equal at point p, the point is ON. A profit-maximizing firm should therefore employ only ON workers. Given the number of workers, the total output can be known by multiplying ON with average labour productivity (AP).

We have discussed in the preceding section, the technical relationship between inputs and output assuming labour to be a variable factor, capital remaining constant. This is a short-run phenomenon. We will now

discuss the relationships between inputs and output under the condition that the inputs, capital and labour are variable factors. This is a long-run phenomenon. In the long run, supply of both the inputs is supposed to be elastic and firms can hire larger quantities of both labour and capital. With large employment of capital and labour, the scale of production increases. The technological relationship between changing scale of inputs and output is explained under the laws of return to scale. The law of return to scale can be explained through the production function and isoquant curve techniques. The most common and simple tool of analysis is isoquant curve technique. We have therefore to introduce and elaborate on this tool of analysis. The laws of return of scale will then be explained through isoquant curve technique. The discussion on the laws of returns to scale through production function follows in the next section.

3.1   ISOQUANT CURVE

The term 'isoquant' has been derived from the Greek word iso meaning 'equal' and Latin word quantus meaning 'quantity.' The 'isoquant curve' is also Known as 'Equal Product Curve' or 'Production Indifference Curve.' An isoquant curve is a locus of points representing various combinations of two inputs - capital and labour - vielding the same output. An `isoquant curve' is analogous to an 'indifference curve.' With two major differences:

(a)   An indifference curve is made of two consumer goods while an isoquant curve is constructed of two producer goods (labour and capital); and

(b)   An indifference curve measures `utility' whereas an isoquant measures output.

To illustrate the isoquant. curves, let us assume that:
-    There are only two factors of production, viz, labour (L) and capital (K) to produce a commodity X

-    The two factors can substitute each other but at a diminishing rate; and

The technology of production is given

Given these conditions, it is always possible to produce a given quantity of commodity X with various combinations of capital and labour. The factor combinations are such that the substitution of one factor for the other leaves the output unaffected.

Properties of Isoquant

The properties of an isoquant are quite similar to those of the indifferent curve.

(a)   Isoaquants have a negative slope: An isoquant has a negative slope in the economic region' or in the relevant range. The economic region is the region on the isoquant plane in which substitution between inputs is technically possible. It is also known as the profit-maximizing region. The negative slope of the input is reduced; the other input has to be increased so that the total output remains unaffected.

(b)   Isoquants are convex to the origin: Convexity of isoquants implies not only the substitution between the inputs but also that the marginal rate of technical substitution (MRTS) decreases in the economic region. The MRTS is defined as

$$MRTS = \frac{AK}{AL} = \text{the slope of the}$$

In plain words, MRTS is the rate at which the marginal units of labour can substitute marginal units of capital (moving downwards on the isoquant) without affecting the total output. The slope of the isoquant indicates this rate. The MRTS decreases because no factor is a perfect substitute for another. As such, more and more units of an input are needed to replace each successive units of another input

(c)   Isoquants cannot intersect or be tangential to each other: The intersection or tangency between two isoquants implies that a given quantity of a commodity can be produced with a smaller as well as a larger input combination. This is not attainable so long as marginal productivity of the inputs is greater than zero.

(d)   Upper Isoquant Represent Higher Level of Output: Between any two isoquants, the upper one represents higher level of output than the lower one. As such, an upper isoquant implies a greater input combination capable of producing a larger output.
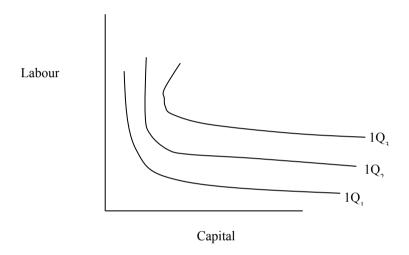
Figure 17.2:   Isoquants and Input Combination

For instance, IQ2 in the figure above, will yeild a higher level of output than IQI. On any point of IQ2, capital and labour are more than can be seen on 10 1. IQ') yeilds the highest output, since it is the highest isoquant.

Following this line of thinking, a producer should employ labour and capital that gives him the highest output at the lowest cost. At such a point, the MRP = MW. Any point outside this is inefficient.

4.0   CONCLUSION

We can therefore conclude that factors of production are being employed on the basis of their own marginal productivity i.e the addition to the total output resulting form employing one more additional factor. An Isoquant has been observed to be a representation of the combination of labour and capital that produces equal level of output.

5.0   SUMMARY

This unit has analysed the way in which prices of factor (taken labour as an example) are determined. It explains the guiding principle of employing factors in a perfectly competitive environment. In the consideration of the marginal productivity theory equally it has been seen that an Isoquant is representing a combination of labour and capital that produce equal level of output; the properties and other features of the Isoquant, were also considered.

6.0   TUTOR MARKED ASSIGNMENT

1.   State the marginal productivity theory?

2   In what ways can the marginal productivity theory assist a business manager in policy making?

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An Introduction to Positive Economics, Oxford, Oxford Press.

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UNIT 18

OPTIMAL INPUT COMBINATION

Table of Contents

1.0   INTRODUCTION

A profit-maximizing firm seeks to minimize its cost for a given output or to maximize its output for a given total cost. The logic of isoquant tells us that a given output can be produced with different input-combinations. Given the input prices, however, only one of the input combinations conforms to the least-cost criteria. Conscious of the numerous inputs most firms require to carry out production there is a problem ascertaining the equilibrium input combination. To make this a bit less cumbersome, all inputs have been reduced to just 4 i.e. the four main factors of production comprising- Land, labour, capital and entrepreneur.

To determine the optimal input combination of firms, the above four factors of production have been further reduced to two (labour and Capital) on the grounds that the others are fixed over time. Hence the optimal input combination is determined by adjusting the quantities of labour and capital a firm can acquire, given its limited funds for spending and the motive of profit. In this unit, we are going to show how a firm can find the least cost combination. What do you think about firms' combination of factors of production? Has it ever occurred to you that Firms have a formulae or standard they use in combining their inputs? Whatever the answer is when you get back to town, select a few firms and find out how they combine their factors of production so as to realize the highest output at the least cost.

2.0   OBJECTIVES

As you are already aware, this unit seeks to analyse the best combination of input for firms. Based on this, it is expected that you should try to understand the following:

- How to improve the efficiency in production

- The basic inputs used in production

- That all input- combinations are subjected to Isocost, (Limited Resources) which is also known as Isoline, budget line or budget constraints.

- How firms reach the best and the least cost combination, and,

- The determination of the best combination of a firms input.

3.0   ANALYSIS OF OPTIMUM INPUT

In analysing the optimal input combination of firms, the knowledge gained in our study of the production function is put into practice here.

We know fully well that there are different inputs used in the process of production such that the realization of any output is a function of the input used. To illustrate this, let us assume that any output is a function of the basic four Factors of production such that.

$$Q = F (S L, KY,)$$

Where Q is the output, S, land, L, Labour, k, capital and Y, entrepreneur. Following the fact that land and entrepreneurship are constant not only in the short-run but also in long run, only labour and capital are being used as variable factors.

Going by this, it is therefore clear that it is the combination of labour (I.) and capital (K) that determines output. To use these two factors of production to realize the optimal input combination, what should be at the back of your mind is the fact that firms like individuals are constrained by limited resources commonly reduced to income. Hence to determine the optimal input combination, the tools of analyses is the Isocost, which locates the cost constraint, factors of production-labour and capital, and lsoquants i.e. production possibilities.

3.1   TOOLS OF ANALYSIS

As stated above, the tools of analysis are:

-       The inputs
-       The Isocost

-        The Isoquant

3.1.1   THE INPUTS

As we have already discussed, all the factors of production which are used for producing any output are basically four in number i.e. Land, labour, capital and entrepreneur. i.e. $Q = f$ (S, L, K and Y).
But land and entrepreneur are constant overtime. This implies that they do not change frequently as output changes. As a result of this only labour and capital are the variable factors. As such production of any output depends upon the combination of labour and capital. One fundamental assumption here is the fact that labour and capital are assumed to be perfect substitutes. This suggests that either labour or capital can be substituted for one another to a large extent. This assumption implies that there is a possibility of producing an output with only one factor of production. When we will consider the isocost in the section below, the assumption will be explained further.

3.1.2   RESOURCES CONSTRAINTS

A firm has a limited amount of funds to spend on the production of an output. This resource constraint when translated into monetary terms, would mean that the amount of income which firms have for spending is limited. It is this limitation of income that pushes the producer to choose the amount of labour and capital he can employ in production. If the income were not limited, cost of production would not have been a problem to business firms.

The budget constraint (cost constraints) can be depicted in a diagram below. This diagram is quite similar to the one on the budget line that was explained under the ordinal utility theory approach.
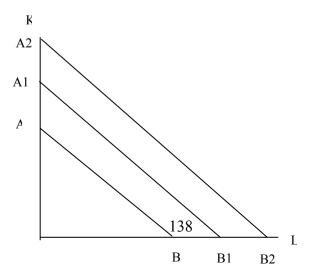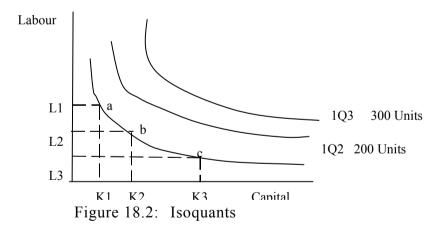

Figure 18.1: Isocost Lines

From the diagram above, three Isocost lines are depicted. These Isocost line show the cost of production a Firm can incur. Isocost AB is the lowest cost of producing a good using both labour and capital. Isocost A2 B2 is the highest cost of production the firm can witness. Going by the motive of firms to make profits, a rational producer will always go for the cheapest possible cost i.e minimize cost or maximize output. Hence they would always prefer Isocost AB. ']'his cost is determined by the prices of the price of labour and capital. Where labour is cheap, more labour than capital should be employed, and vice versa.

3.1.3 ISOQUANTS

Isoduants have been defined earlier as the line that links different points of production that yields the same output. A profit-maximizing firm seeks to minimize the cost of producing a given output or maximizes its output for a given total cost. Given the different prices of inputs, only one of the input combinations conforms to the least cost criteria.

Figure 18.2: Isoquants

No matter where he producer is on a particular Isoquant, his output is basically the same. Take for instance points a, b, and c on the diagram are basically the same. At any of these points on Isoquant Q1, the same output say 100 units of good x are produced. Hence, the producer can use any of the techniques to achieve his 100 units of x. Technique 'a' is labour intensive L1 of labour and K1 of capital, technique 'c' is capital-intensive K3 of capital and only L3 of Labour. His choice of technique depends upon the price (wages and interest) of labour and capital

respectively. This aspect falls under the production function, which we have already discussed extensively.

It should be noted that producers will always seek to be on Isoquant I Q3 which represent a higher output than on Isoquant IQl which represents a lowc‑c Output (IC 100 units).

3.2   LEAST COST COMBINATION

The least cost combination is arrived at by making use of the knowledge of Isocost and Isoquants above. For the least cost combination to be achieved, two conditions must be met. They are:

a)   The first order condition which demands that the marginal Rate of Exchange (MRE) between K and L must be equal to the ratio of their marginal physical product, i.e.

$$\frac{\Delta K}{\Delta L} = \frac{MPk}{MPL}$$
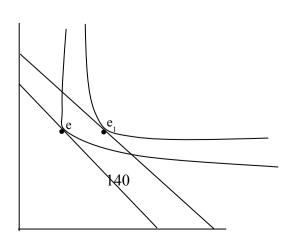
$\dfrac{\Delta K}{\Delta L}$ represents the MRE

While $\dfrac{MPL}{MPk}$ represents the ratio of their marginal physical products

This could be extended to mean that the marginal physical product of L and K must equal the ratio of their prices, i.e.

$$\frac{MPL}{MPk} = \frac{PL}{Pk}$$

When this is depicted on the curve it shows that the Isoquant must be tangential to the Isocost for that point the optimal output is achieved.

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Figure 18.3:   Least cost combination

b) The second order condition requires that the first order condition be fulfilled at the highest possible isoquant. As such, the least cost combination will be at point e. on 1 Q2. At this point, cost is minimized and output maximized.

When the above two conditions are fulfilled, then the optimal input combination has been determined.

4.0   CONCLUSION

After a thorough explanation on the optimal input combination, we can now discover that the least cost optimal input combination requires that the MP ratios of inputs should be equal to their price ratios. The examination of the optimal input combination, reveals that the technical combination of labour and capital required for production depends upon their relative prices. This combination can be arrived at only after an examination of isoquants and Isocosts. For the optimal combination to be determined, two conditions must be fulfilled. These conditions are:

-       tangency of Isoquant to Isocost and

-       on this tangency should be on the highest possible Isoquant.

Where these two conditions are met, the optimal input combination is also met.

5.0   SUMMARY

In this unit of the work, we have examined very carefully what optimal input combination depicts. In an analysis of this, the tools required for the examination and determination of the optimum have also been highlighted (Isoquants and Isocost). These two tools have been combined and the optimal input combination determined. It is hoped that you will put this knowledge into practice in order to determine your own optimal production combinations.

6.0   TUROR MARKED ASSIGNMENT

1.   What are the conditions necessary for the determination of the optimal input combination?
2.   Draw a diagram of an optimal combination and explain it.

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An Introduction to Positive Economics, Oxford, Oxford Press.

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UNIT 19

PRICING STRATEGIES AND RACTICES

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1.0   INTRODUCTION

The pricing policy and pricing method depend on the objective the firm sets for itself. There is a good deal of controversy between the marginalists and empiricists on the objectives of the business firms. Marginalists hold the view that, given the curve, price is determined in

imperfect markets where MR =MC. However, in a complex business world, business firms follow a variety of pricing rules and methods, depending on the conditions they are facing. In this unit, we will discuss some important pricing strategies and pricing practices. You know that some goods are close substitutes and sometimes they sale almost for the same price. At other times they sale for different prices. What in your opinion is the cause or all these?
The answer to this will be revealed in the course of our discussion.

2.0   OBJECTIVES

In this unit of the work different pricing techniques are discussed. At the end of the unit it is expected that the students should be able to know the various pricing strategies being used by business firms. And also how this strategies are used in pricing commodities.

3.0   PRICING STRATEGIES

The following are the pricing strategies used by business firms. 3.1

3.1   COST-PLUS PRICING OR MARK -UP PRICING

Cost -plus or mark-up pricing is also known as plus " Average Cost Pricing" or "Full Cost Pricing". The cost plus pricing is the most common method of pricing a product by manufacturing firms. The general practice under this method is to add a "Fair" percentage of profit margin to the average variable cost (AVC). The price is set as:

$$P = Avc + Avc (m)$$

Where m is the mark - up percentage. AVc (m) = gross profit margin (GPM). The mark-up percentage (m) is fixed as to cover average fixed cost (AFC) and a Net Profit margin (NPM). Thus:

$$AVC (m) = AFC + NPM$$

The procedure of arriving at AVC and Price fixation may be summarised as follows:
The first step in price fixation is to estimate the average variable cost. For this, the firm has to ascertain the volume of its output for a given period of time, usually one accounting or fiscal year. To ascertain the output, the firm uses figures for its "planned" or "budgeted" output or

takes into account its normal level of production. If the firm is in a position to compute its optimum level of output or the capacity output, the same is used as standard output in computing the average cost.

The next step is to compute the total variable cost (TVC) of the `standard output'. The TVC includes direct cost i.e. cost of labour, raw materials and other variable inputs. These costs added together give the total variable cost. The 'Average variable cost' (AVC) is then obtained by dividing the total variable cost (TVC) by the 'level of output' (q), i.e.

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

After AVC is obtained, a 'mark-up' of some percentage of AVC is added to it for profit and the price is fixed. While determining the mark-up, firms should take into account the market situation and the competition in the market.

The mark-up pricing method appears to be a 'rule of thumb', which does not seem to conform to the marginalist rule of pricing. However, mark-up pricing is not incompatible with the marginalist rule of pricing. It appears quite similar to the marginalist rule of pricing. We had earlier noted that profit is maximum at the level of output where MC = MR. We have also noted that the mark-up pricing method is given by:

P = AVC + AVC (m)

P = AVC (1+ M)

Hence mark-up pricing ultimately converges to the marginalist rule of pricing and both methods lead to the profit maximization objective.

3.1.1 LIMITATIONS OF MARK-UP OR COST-PLUS PRICING RULE

The cost -plus pricing has certain limitation which should be borne in when using this method for price fixation.
First, cost-plus pricing assumes that firm's resources are optimally allocated and the standard cost of production is comparable with the average cost of production in the industry. In reality, however, it may not be so and cost estimates based on these assumptions may be over estimated or an under estimate. Under these conditions pricing may not be commensurate with the objective of the firm.

Secondly, in cost plus pricing, generally, historical cost rather than current cost data are used. This may lead to under-pricing under increasing cost conditions and to over pricing under decreasing cost conditions, which may against the firm's objective.

Thirdly, if variable cost fluctuate frequently and significantly, cost-plus pricing may not be an appropriate method of pricing.

Finally, it is alleged that cost-plus pricing ignores the demand side of the market and is solely based on supply conditions. This is however not true because firms determine the mark-up on the basis of what the market can bear and it does take into account the elasticity aspect of the demand for the product, as shown earlier.

3.2   MULTIPLE PRODUCT PRICING

The price theory or micro economic model of price determination is based on the assumption that a firm produces single, homogeneous product. In actual practice, however, production of a single homogeneous product by a firm is an exception rather than a rule. Almost all firms have more than one product in their line of production: even the most specialized firms produce a commodity in multiple models, style, sizes, each so much differentiated from the other, that each model or size of the product may be considered as a different product. For example, the various models of the refrigerators, TV sets, radio and car models produced by the same company may be treated as different products for at least pricing purpose. The various models are so differentiated that consumers view them as different products and in some cases, as perfect substitute for the other.

 It is therefore not surprising that each model or product has different AR and MR curves and that one product of the firm competes against the other product. the pricing under these conditions are known as **Multi Product Pricing** or **Product-Line Pricing**. The major problem in pricing multiple products is that each product has a separate demand curve. But, since all of them are produced under one organisation by interchangeable production facilities, that is, while revenue curves, AR and MR, are separate, cost curves, AC and MC, are inseparable. Therefore, the marginal rule of pricing cannot be applied straightway to fix the price of each product separately. The solution is similar to one employed to illustrate third degree price discrimination. As a

discriminating monopoly tries to maximize its revenue in all its markets, so does a multi-product firm from each of its product.

3.3   PRICING IN RELATION TO ESTABLISHED PRODUCTS

It is difficult for a completely new product to be introduced into the market. Most often these new products always have substitutes. As a result of this, new products always face the problem of pricing because of strong competition from substitute products, already in the market. If you are to price a new product in relation to its well established substitutes, there are three types of pricing strategies could be used. They are:

-       Pricing below the on going Price: To price a product below the prevailing market price of substitutes two condition are assumed:

a)   When the firm wants to expand its product-mix so as to utilize its unused capacity in the face of competition. This approach gives the product ~on~ Opportunity to gain popularity and establish itself. This strategy may not work if existing brands have earned a strong brand loyalty of the consumers.

b)   Pricing at market price: when a good is being sold in a competiative environment, the most reasonable pricing appealing pricing strategy is that of pricing at the market price. This is in the sense that at such a market price the product can be sold in any quantity. This strategy is good in a perfect i competitive market in which the producer is a price taker.above the existing market -price: This is a good approach when the
seller has the wish to assuiri"rrg a prestigious position among his rivals. This

c)   Pricing above the existing market-price: This is good approach when the seller has the wish to assume a prestigious position among the rivals. This works better for ostentatious goods. Consumers of the good may wish to distinguish themselves by buying goods that are expensive and above the reach of the common man. Producers of custom made cars and ready-made goods normally use this strategy.

3.4   PEAK LOAD PRICING

This pricing strategy is used for commodities whose consumption have peaks and dumps. For example, telephone, electricity and airline services.

As a result of this, there are periods when the commodity is mostly used. Such a period is called peak -load time. On the other hand, there are time when the commodities are least utilized. Such periods are called 'off-peak' time. A fundamental characteristic of such goods is the fact that such commodities cannot be stored. As a result of this, production is suppose to be increased during peak periods and reduced during the 'off peak' seasons.

To achieve this, there is a need for double pricing system. A higher price for the peak-load period and a lower price is charged during the off-peak period. The peak load pricing has the following advantages:

- It results in efficient distribution of the consumption the commodity.

- It helps prevent loss on the part of firms, by ensuring regular supply of the commodity. The disadvantages of these strategy include:

- Those firms that operate mostly during the day are forced to be paying higher prices for using the commodity during peak periods.

- Also, adequately billing of the commodity is a problem.

4.0   CONCLUSION

Having examined the detail or the partial analysis on the pricing strategy one can rightly conclude that there are many or various ways in which products are being priced by Business organizations. The choice or strength depends upon their goals.

5.0   SUMMARY

The unit has examined the pricing strategies and practices employed by Business organizations, among which we have the popular cost-plus pricing or mark-up pricing. Its associated limitations and weaknesses hare been discussed. Equally the multiple product pricing system has been giving an attention in the unit.

6.0   TUTOR MARKED ASSIGNMENT

1 a.   List 4 types of pricing strategies firms can use
  b.   Explain the mark-up pricing strategies and highlight its limitation.

7.0   REFERENCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive
        economics, Oxford, oxford press.

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UNIT 20

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LIFE CYCLE OF A PRODUCT

1.0   INTRODUCTION

In this unit, we shall examine the life cycle of a product. That is, the various stages a product follows before reaching the final stage where it could be removed completely from the market. Attempt is made also to show the relevance of each stage, in business decision-making process. Pricing policies along the cycle of a product would also be considered in this unit, summary and conclusion would follow. Can you remember that there are some products you saw or bought some years ago, which you have not been seeing again? What do you think is the explanation that can

be given to this situation? Before taking you too far, you should understand that such products that have disappeared in the market have exhausted their life cycle.

2.0   OBJECTIVES OF THE UNIT

The objectives of this unit are that you should at the end of the unit be able to:

-        Explain the various stages of a product life cycle;

-        Discuss how a new product should be priced;

-        Explain the role of a product life cycle to business firms, and,
         = P f

-        Be able to put some of the pricing strategies learnt into practice.

By the time you are able to explain all the above you will have an edge in business decision making.

3.0   THE LIFE CYCLE OF A PRODUCT

The life cycle of a product is made up of 5 stages. These stages are the various channels through which a product passes before it finally disappears from the market. The stages of the product include: introduction, growth, maturity, saturation and decline. These stages are discussed below;

The introduction is the period taken to introduce the product to the consumers. The total sales during this period is limited to the quantity put on the market for test with considerable advertisement. The sales during this period remain almost constant.

Growth is the stage after a successful trial, during which the product gains popularity among the consumers and sales increase at an increasing rate as a result of cumulative effect of advertisement over the initial stage.

Maturity is the stage in which sales continue to increase but at a lower rate and the total sales eventually becomes constant.

During the saturation period the total sales are at the peak. There is neither increase nor decrease in the sales volume. After the saturation stage comes the stage of decline in which the total sales registers a declining trend for such reasons as:

a)   Increase in the availability of substitutes,

b)   Loss of distinctiveness of the product.

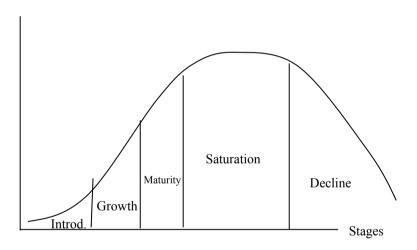This could be represented graphically thus:

Figure 20.1:   Stages of a Product Life Cycle

The pricing strategy varies from stage to stage over the life-cycle of product, depending on the market conditions. From the pricing strategy point of view, growth and maturity stages may be treated like wise. We have first discussed the pricing of a product and then in the maturity and decline stages.

3.1 PRICING A NEW PRODUCT

New products may be either simply another brand name added to the existing ones or new ones altogether for which there exists many substitutes.

Secondly, economies of large-scale production are available to the firm. Otherwise, increase in production would result in increase in cost which might reduce the competitiveness of the price.

Thirdly, the potential market or the product is fairly large and has a good deal of future prospects.

Fourthly, the product should have a high cross-elasticity in relation to rival products for the lower initial price to be effective.

Finally, the product, by nature, should be such that can be easily accepted and adopted by the consumers.

The choice of a strategic price policy depends on

1)   The rate of market growth
2)   The rate of erosion of distinctiveness; and
3)   The cost-structure of the producers.

If the rate of the market growth is slow for such reasons as lack of information, consumers hesitation, etc, penetration price policy would be unsuitable. If the pioneer product were likely to lose its distinctiveness at a faster rate, skimming price policy would be unsuitable. The period of distinctiveness -is fairly long if cost-structure shows an increasing return overtime, penetration price policy would be more suitable, Since it enables the producer to reduce his cost and prevents potential competitors from entering the market in the short-run. In pricing a new product without close substitutes, however, problems arise because for lack of information, there is some degree of uncertainty. We will here confine our discussion to the pricing strategy of a new product.

In pricing a new product, two kinds of pricing strategies are suggested, vi z,

-       Skimming price policy and

-       Penetration price policy

The skimming price policy is intended to skim the realm of the market, i.e. consumers' surplus by setting a high initial price three or four times the ex-factory price, and a subsequent lowering of prices in series of reductions. The initial high price would generally be accompanied by heavy sales promotion expenditures.

This policy succeeds for the following reason.

Firstly, in the initial stage of the introduction of a product, demand is relatively inelastic because of consumers' desire for distinctiveness by the consumption of a new product.

Secondly, cross-elasticity is usually very low for lack of a very close substitute. Thirdly, step-by-step price-cuts help skimming consumers' surplus available at the lower segment of demand curve.
Fourth, initial advertisement elasticity is considerably high.

Fifthly, high initial prices are helpful in recouping the development costs. The post-skimming strategy includes the decisions regarding the time and size of price reduction. The appropriate occasion for price reduction is the time of saturation of the top-level demand or when a strong competition is apprehended. As regards the rate of price reduction, when the product is on its way to losing its distinctiveness, the price-cut should be appropriately larger. But, if the product has retained its exclusiveness, a series of small price reduction would be more appropriate.

Penetration price policy. In contrast to skimming price policy, the penetration price policy involves a reverse strategy. This pricing is adopted generally in case of new products for which substitutes are available. This policy requires fixing a lower initial price designed to penetrate the market as quickly as possible and is intended to maximize the profit in the long run. Therefore, the firms pursuing the penetration price policy set a low price of the product in the initial stage. As the product catches the market, price is gradually raised up. The success of

penetration price policy requires that the short run demand for the product has elasticity greater than unity, which helps in capturing the market of lower price.

3.1.1   PRICING IN MATURITY PERIOD

Maturing period is the second stage in the life -cycle of a product. It is a stage between growth period and decline period. Sometimes maturing period is bracketed with saturation period. Maturity period may also be defined as the period of decline in growth rate of sales (Not the total sales) and the period of Zero growth rate. The concept of maturity period is useful to the extent it gives out signals for taking precaution in regard to pricing policy. However, the concept itself does not provide guidelines for the pricing policy. "Joel Dean" suggests that, "First Step for the manufacturer whose specialty is about to slip into the commodity category is to reduce price as soon as the symptom of deterioration appears. But he warned that this does not mean that the manufacturer should declare open price in the industry." He should rather move in the direction of "Product improvement and market segmentation".

3.1.2   PRICING A PRODUCT IN DECLINE

The product in decline is one that enters the post - maturity stage. In this stage, the total sale of the product starts declining. The first step is obviously to reduce the price. The product should be reformulated and remodeled to suit the consumers' preferences. It is a common practice in book trade. When the sale of hard-bound edition reaches saturation, paper- back editions are brought to the market. This facility is however limited to only a few commodities. As a final step in the strategy, the advertisement expenditure should be reduced drastically or withdrawn completely. The firm should rely on the residual market. This however requires a strong will of the producer. For in case of the former, market provides adequate information regarding cost, demand, and availability of market, e.t.c. Pricing in this case depends on the nature of the market.

3.2   PRICING IN RELATION TO ESTABLISHED PRODUCTS

The cases of altogether new products being introduced to the market are not very frequent. Most producers enter the market with the new brand of commodity for which a number of substitutes are available. For example, the soft drink like coke and gold spot, were quite popular in the market when new brand of soft drinks like coke and +old spot, were quite popular in the market when new brand of soft drinks like Limca, seven-up, double seven, Mirinda, Pepsi, teem, Brama, etc, were introduced in the market overtime. Many other brands of scooters appeared in the market despite the popularity of Vespa. Bajaj and Lambretta. A new entrant to the market faces the problem of pricing his product because of strong competition with established products. This problem of pricing of a new brand is known as pricing in relation to the established products. In pricing a product in relation

of its well established substitutes, generally three types of pricing strategies are adopted, viz,

Pricing below the on-going price

Pricing at the prevailing market price and

Pricing above the existing market price. Let us now see which of these strategies are adopted under what conditions

Pricing below the market price: Pricing below the prevailing market price of the Substitutes is generally preferred under two conditions: First, if a firm want to expand its product- mix with a view to utilizing its unused capacity in face of tough competition with the established brands, the strategy of pricing below the market price is generally adopted. This strategy gives the new brand an opportunity to gain popularity and establish itself. For this, however, a high cross elasticity of demand between the substitute brands is necessary. This strategy may however not work if existing brands have gained a strong brand loyalty from consumers. This strategy is similar to the penetrating pricing. Secondly, this technique has been found to be more successful in case of innovative products. When the innovative product gains popularity, the price may be gradually raised to the level of market price.

Pricing At Market Price: Pricing the same with the market price of the existing brands is considered to be the most reasonable pricing strategy for a product which is being sold in a strongly competitive market. In such a market, setting price below the market price is not of much avail because the product can be sold in any quantity at the existing market rate. This strategy is adopted also when the seller is not a "price leader" and is rather a "price-taker" in an Oligopolisitic market.

Pricing Above The Existing Market Price:

This strategy is adopted when a seller intends to achieve a prestigious position among the sellers in the locality. This is a more common practice in case of products considered to be a commodity of conspicuous consumption or prestige goods.

Consumers of such goods prefer shopping in a gorgeous shop of a posh locality of the city. This is known as `Veblen Effect'. Sellers of such goods rely on their customers' high propensity to consume a prestigious commodity. After the seller achieves the distinction of selling high quality goods, though at a high price, they may sell even the ordinary

goods at a price much higher than the market price. This practice is common among the sellers of ready-made garments.

Besides, a firm may set a high price for its product if it pursues the skimming price strategy. This pricing strategy is relevant in relation to established products when the firm can be sure of brand loyalty of the consumers, and the commodity must have a low cross elasticity in respect of competing goods.

4.0   CONCLUSION

The knowledge of the life cycle of a product is very vital to business enterprises, as these firms can use this to design policies that could improve the sales of their products. Therefore, you should study this unit carefully so as to be able to charge reasonable prices for the products of your firm.

5.0   SUMMARY

Sales of a product do increase in one turn and decrease in another. This is as a result of cumulative effect of advertisement, increase in availability of substitutes and loss of distinctiveness of the product. Pricing of a product in the various stages of the cycle is also considered in the unit.

6.0   TUTOR MARKED ASSIGNMENT

1.   Explain the life cycle of a product.

7.0   REFERENCES

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          economics, Oxford, oxford press.

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UNIT 21

PRICING UNDER PERFECT COMPETITION

1.0   INTRODUCTION

The market in which a firm operates is quite crucial in deciding the achievement
of the Firm's objective. Under market structure, the perfectly competitive market structure stands out unique as a theoretical base for competition. In this unit, we are going to consider what this market stands for by looking at its assumptions and its output and profit levels. Managers with knowledge on this, stand a better chance of making better business decisions.

When one hears the concept "perfect competition", the expectation is that, the rivalry in the market is quite intense, but practically it is not so. What do you need to convince a person on this? When you will go through this unit carefully, you will understand the situation better.

2.0   OBJECTIVES

The objectives of this unit are to ensure that you are equipped with knowledge on parallel markets. The intention here is to expose you to market realities. Hence it is expected that at the end you show know:

      a)   The realities about perfect competition as a theoretical market, and,

b)   When profit and output are maximized under this market.

3.0   CHARACTERISTICS (ASSUMPTIONS) OF PERFECT COMPETITION

The term perfect competition denotes a market structure in which there is the absence of rivalry among individual firms. Firms do not compete among themselves since they cannot influence market activities. A perfect competitive market is one which has the following characteristics:

1.   **Large number of buyers and sellers:** Under perfect competition, the number of sellers and buyers is very large. The number of buyers and sellers is so large that the share of each seller in total supply and the share of each buyer in total demand are so small that no single seller can influence the market price by changing his supply, nor can a single buyer influence price by changing his demand. With such large number of buyers and sellers, individual quantities in the marke 'are quite insignificant.

2.   **Homogeneity of products**: products supplied by all firms are approximately homogeneous: Homogeneity of product means that products supplied by various firms are so identical in appearance and use, that buyers do not differentiate between them nor do they prefer the product of one firm to that of another. Product of each firm is regarded as a perfect substitute of the product of other firms. Hence, no firm can gain any competitive advantage over other firms. Nor do the firms have preference for particular buyers. All the buyers are treated the same. Buyer for example of wheat and vegetables produced by all the farmers in today's world can fit into this situation. Other things given, they are therefore treated as homogeneous.

3.   **Price Takers**: since there are a large number of buyers and sellers in the market, and this individual buyer or seller has the power of influencing the market price, firms in such a market are seen as price takers. They are therefore to do exchange at a market determined price of quit the market. The price in the market. The forces of demand and supply establish the price in the market. The products in the market are perfectly homogenous. This implies that the products are identical to one another. This makes it impossible for anyone to have preference for a particular firm's product. Consumers and producers are to trade at that price or quit the market

4. **Perfect mobility of factors of production**: For a market to be perfectly competitive there should be perfect mobility of resources. It means that factors of production must be in a position to move freely into or out of an industry and from one firm to another.

5. **Free entry and free exit of firms**: There is no restriction legal or otherwise on the firm's entry into or exit from the industry. Hence when profits are available in the market, firms are free to join and free to quit the market when profits have been competed away. This also suggests that there is no government intervention in any form.

6. **Perfect knowledge**: There is perfect dissemination of the information about the market condition. Both buyers and sellers are fully aware of the nature of the product, its availability, suitability, and of the price prevailing in the market. This information is available free of charge.

7. **Absence of collusion or artificial restraint**: There is no sellers Union or other kind of collusion between the sellers like cartels or guilds, nor is there any kind of collusion between the buyers, like consumers' association or consumers' forum. Each seller or buyer acts independently. The firms enjoy the freedom of independent decisions.

The perfect competition, as characterized above is considered as unrealistic phenomenon in the real business world. However, the actual market approximate to the condition of perfectly competitive model includes; the share markets, security and bonds markets, and the agricultural product market, e.g. Local vegetable markets. Although perfectly competitive markets are uncommon phenomena, perfect competition model has been the most popularly used in economic theories due to its analytical value.

Some economists make distinction between perfect competition and pure competition. The difference between the two is only a matter of degree. Perfect competition, less perfect mobility of factors, and perfect knowledge is regarded as a pure competition. In this unit, we shall used these two terms interchangeably.

3.1   PRICE DETERMINATION UNDER PERFECT COMPETITION

By definition, perfect competition is a market setting in which there are many sellers of homogeneous product. Each seller supplies a very small fraction of the total supply. No single seller is powerful enough to influence the market price not· can a single buyer influence the market price. Market price in a perfectly competitive market is determined by the market forces -market demand and supply. Market demand refers to the demand for the industry as a whole. It is the sum of the quantity demanded by each individual firm at different prices. Similarly, market supply is the sum of quantities supplied by the individual firms in the industry. The market price is therefore determined for the industry, and is given for each individual firm and for each buyer. Thus, a seller in a perfectly competitive market is a price-taker not a price maker.

In a perfectly competitive market, therefore, the main problem for a profit maximizing firm is not to determine the price of its product but to adjust its output to the market prices so that profit is at maximum.

The mode of price determination- price level and its variation -depend on the time taken by supply position to adjust itself to the changing demand conditions. Price determination is analysed under three different time periods;

-        Market period or very short run
-        Short run and
-        Long run

The short run and the long-run have already been defined as regards the market period. But the very short run refers to a time period in which quantity supplied is absolutely fixed or in other words supply response to price is nil. Price determination in three types of markets is described below.

⌘☞ **Pricing in market period:** In a market period, the total output of a product is fixed. Each firm has a stock of commodity to be sold.   The stock of good with all the firms makes the total supply.

Since the stock is fixed, the supply curve is perfectly inelastic. In the very short run, supply is fixed as shown by the supply curve SS below.
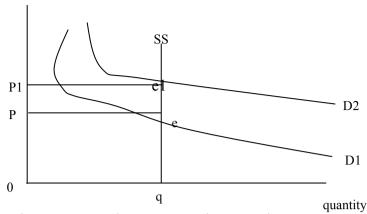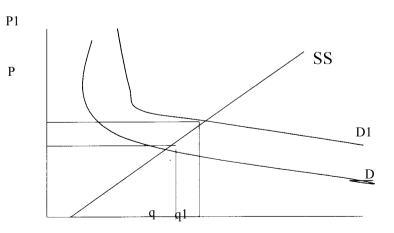
Figure 20.2: Short-run Market Supply

The quantity supplied to the market during this period is Oq. The demand curve is at D_1. Suppose due to a sudden rise in the demand for the product as a result of a rise in income. (temporal income), i.e a movement from Dl to D2, supply will not change during this period to meet up the change in demand. As such there will be a rise in price from P to P_1. The point of equilibrium will move from e to el , This C: scenario is common in the stock market, diary market and in situations of calamities-when medicines and coffins may witness a drastic change in demand.

3.1.2   PRICING AND QUANTITY DETERMINATION IN THE SHORT-RUN

The short run is by definition a period in which firms can neither change their size nor quit nor can new firms enter the industry.
This is shown by the figure sector
From the diagram it is clear that when demand changes from D to D1, the quantity supplied also increase from q to ql. This is followed by an increase in price from P to P1. This movement tallies with the second law of demand, which states that, at higher

Figure 20.3: Price and quantity Determination in he Short-Run
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prices, a higher quantity is supplied and at lower prices, a lower quantity is supplied.

In the short run, a firm in the perfectly "competitive market can make, losses, breakeven, (economic profit) or make abnormal profit. The assumptions of the perfect competitive market are brought into play at this period. The figures a, b, and c below illustrates the 3 different situation of competitive firms
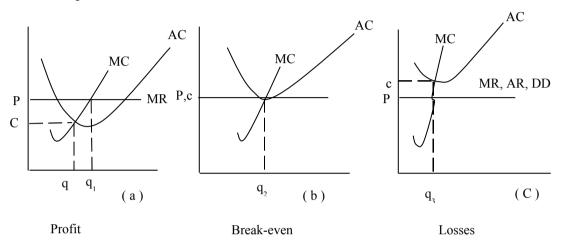

Figure 20.4: Competitive Firms In the short Run

In figure 20.4 (C), the firm experiences a loss. The price in the market is fixed (given) at P, which is the same as the AR, MR and the industry's demand curve. The cost of production c, which is given by the minimums point of AC curve, is higher than the market price. As such Ac >AR and since the firm cannot influence the market price, it is forced to incur losses. Here, at equilibrium, firms can offer for sale the quantity q3, where MC = MR. This quantity minimizes the losses the firm can incur.

In figure 20.4 (b), the firm in the short run is making economic profit. i.e. it is breaking even. Here the cost of production and the market prices are the same at P hence the firm experiences a situation of no losses, no profit. The equilibrium quantity supplied to the market is q2. At this quantity MC = MR. Also AR = AC =MC = MR=P=DD at this same quantity.

As we already mentioned, a short run firm can also make profit. This is illustrated by figure 20.4 (C). In this situation, price P is higher than the cost of production denoted by c. This is because AC is below AR. Profit

is shown on the diagram by the shaded area. At this profit level, the equilibrium output is q_1. This implies that firms in the market can produce output at the cost of C and sale it at a price P which records profit for the firm.

We should note at this point that the Price line also denotes the demand curve. This suggests that the demand curve is perfectly elastic. Hence, the slightest change in price will bring about a zero demand for the good. If price increases no matter how small, quantity demanded will fall to zero. Also note that, no individual firm is large enough to influence the market price even downward. Any attempt to do this will lead to a loss position for the firm.

It is important to note here that in the short run, a firm in the perfectly competitive market may be in a position to earn economic profit.

3.1.3 OUTPUT AND PRICE DETERMINATION IN THE LONG RUN

As we already know, the long run is that period of production which allows fundamental changes in production to occur. In this period, firms are free to join the market, just as they are free to quit.

In the long run, any change in demand causes a change in supply in the opposite direction. The figure below illustrates this very clearly.
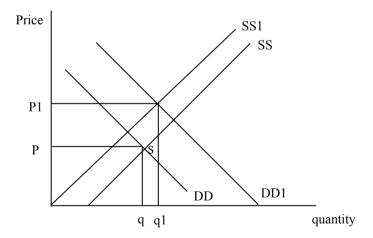

Figure 20.5: Output and Price Determination in the Long Run

When price is at P, the demand is DD, which is the same as price. The supply at this point is S. This leaves an equilibrium quantity of q. When price and demand increases the quantity moves from q to q 1.

As we clearly know, prices are given in the perfectly competitive market. This helps us to get optimum output and prices for the firm's products in the short run.

In the determination of output and prices, firms operating in the perfect competitive market can only break even make economic profit in the long run.
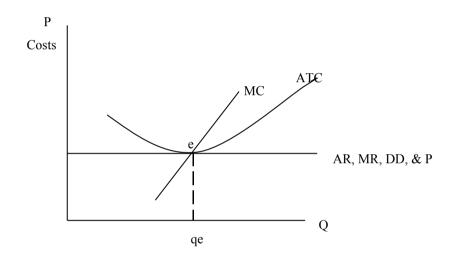
Figure 20.6:   Price and Output Determination in the long Run

In the long run, when there are profits in the market, new firms are motivated to enter the market. This increases output and depresses prices such that they can no longer be profitable. Firms that find such low prices not profitable are forced to quit the market. This results in a fall in the market output and prices are pushed upwards again. New firms and others that had left the market may join the line of production again. This will pushed down prices again and unprofitable firm may leave the market and prices may rise once more. This movement continues throughout the period. As such Firms that can stay in the business do so by covering their cost of production, i.e, breaking even.

Hence, in the long run all perfectly competitive firms must only break, even as shown by point e on the figure above.

4.0   CONCLUSION:

The conclusions reached here are that the assumptions of the perfect competitive market structure are quite elaborate and help shed light to the market. Firms in the perfectly competitively market can make profit, losses, or break even in the short run.

In the long run it is only the breakeven condition that holds. An understanding of this market may enable managers striving in competitive environment to make better decision for their firm.

5.0   SUMMARY

We have examined different aspects of the perfect competition. The assumptions of the market have been highlighted and the output and profit level indicated. It is observed that this aspect will be of importance to practical business managers.

6.0   REVIEW QUESTIONS

1. What are the assumptions of the perfectly competitive market.

7.0   REFERENCES AND OTHER RESOURCES

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UNIT 22

THE MONOPOLY

Table of Contents

1.0   INTRODUCTION

Monopoly is the extreme case of the imperfect market. It is a market under the imperfect market structure. It is often criticized by many as a source of inefficiency and exploitation. Yet its existence poses a challenge to many businesses as well as individuals. In tatting business decisions managers always attempt to appreciate the market condition in which their competitors are operating. In this unit, issues relating to the monopoly as a form of market will be considered. Such issue shall include, the meaning, reason for their existence, and their pricing condition.

2.0   OBJECTIVES

In this unit you are exposed to another form of market. As such, at the end of the unit you are expected to be able to:

- Say clearly who a monopolist is,
- Differentiate a monopoly from other market forms.
- Give reasons why monopolies exist and
- Determine the price and output conditions of a monopoly, both in the short run and long run.

3.0   ANALYSIS OF A MONOPOLY

The term pure monopoly signifies an absolute power to produce and sell products, which have no close substitutes. In other words, a monopoly market is one in which there is only one seller of a product having no close substitute. The cross elasticity of demand for a monopolized product is either zero or negative. A monopolized industry is a single firm industry. Firm and industry are identical in a monopoly setting. In a

monopolized industry, equilibrium of the monopoly firm signifies the equilibrium of the industry.

It should be noted at this point that the monopolist is faced with two crucial production decisions at any point in time. These decisions are those of output determination and price determination. The monopolist can only take one of these decisions at a time. If it chooses to determine the output of the good, it allows the forces of the market to determine the prices. On the contrary, if a monopolist chooses to determine the price, it leaves the market forces to determine the prices of the products. From all these, we can therefore define monopoly as a marl<et in which a single seller dominates the sales of a particular product that lacks close substitutes. Initially a monopoly was seen as a market situation in which there is only one supplier of a product. This has changed today as market share has been given consideration. The case of Microsoft in America in which Bill Gates was seen as a monopolist merely because he dominated the production of computer soft wares is a good example.

3.1   CAUSES AND KINDS OF MONOPOLIES

The emergence and survival of monopoly is attributed to the factors which prevent the entry of other firms into the industry. The barriers to entry are the success of monopoly power. The major sources of barriers to entry are:
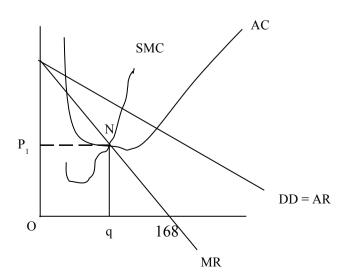
> i.   Legal restriction or barrier to entry of new firms.
>
> ii.   Sole control over the supply of scarce and key raw materials.
>
> iii. Efficiency and economics of scale.
>
> iv.   Patent right.
> v.   Market Franchise
>
> vi.   Huge capital Outlay

1.   Legal restrictions: Law in the interest of the public creates some monopolies. Most of the state monopolies in the public utility sector are evident here. e.g. Postal, telegraph and telephone services, Radio and TV Services, Generation and distribution of Electricity, Nigerian Railways. The state may create monopolies in the private sector also through license or parent.

2.   **Control over key Raw Material:** Some firms acquire monopoly power because of their traditional control over certain scarce and key raw materials, which are essential for the production of certain goods, e.g. bauxite, graphite, diamond. The monopolies of this kind emerge also because of the monopoly over certain specific knowledge or techniques of production. Firms that possess exclusive ownership of production techniques are automatically monopolies as entry is barred by lack of production knowledge.

3.   **Efficiency:** A primary and technical reason for monopolies is the economy of' scale. If a firm's long-run minimum cost of production of its most efficient scale of production almost coincides with the size of the market, then the large size firm finds it profitable in the long run to estimate competition through price-cutting. In the short-run, Once a monopoly is established, it becomes almost impossible for new firms to enter the industry and survive. Monopolies created on account of this factor are known as natural monopolies. A natural monopoly may emerge out of the technical conditions of efficiency or may be created by law on efficiency grounds.

4.   **Patent Right:** when a firm discovers a product, it is given a period of grace to be the Sole producer of the product. This is to enable it re-coup its cost of research and Development. This is what is called Patent Right. Once the Paten right covers a firm, the firm becomes a rnonopoly. As such the firm faces limited competition in the market. Drug producing firms are good examples.

5.   **Market Franchise:** Monopolies may come into existence when some particular firms dominate the market. Instances of this may occur when the firm wins government patronage. Such firms are able to whirl the market to their favour. By so doing, other firms becomes less privileged in the market. Minting and Government press are good examples of monopolies that come into existence through this means.

6.   **Huge capital Outlay:** When the capital required to set up a business firm is too large, very few individual firms will be able to raise such huge amounts. As a result of this, any firm that is able to invest in such a business, becomes a monopoly. Hence, we can say that huge amount of capital requirement repels small-scale investors, while the firm that is capable of raising such

capital for investment, assumes the monopoly status. Good examples of such firms in Nigeria Included NITEL, NEPA e.t.c.

3.2   PRICING AND OUTPUT DECISION: SHORT RUN
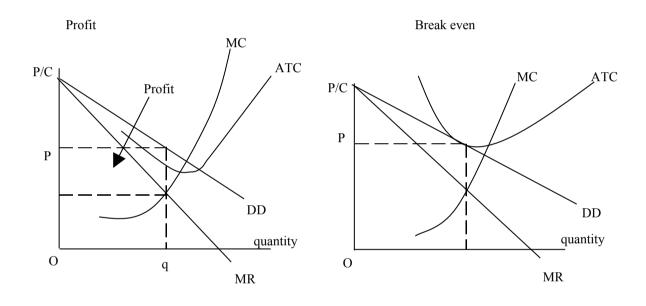
As under perfect competition, pricing and output decision under monopoly are based on revenue and cost conditions, i.e MR and MC curves in a competitive and monopoly market are generally identical but the revenue conditions differ. Revenue conditions, i.e. AR and MR curve are different under monopoly because, unlike a competitive firm, a monopoly firm faces a downward sloping demand curve. A monopolist can reduce the price and sell more and can raise the price and still retain some customers. The revenue and cost conditions faced by a monopolist firm is presented in the figure below. The AR and MR curves show the firm's average and marginal revenue curves respectively. At its short-run, average and marginal cost curves are shown by SAC and SMC curve respectively. The price and output decision rule for profit maximizing monopoly is the same as for a firm in the competitive industry. A profit maximising monopoly firm chooses a price -output combination$_s$ at which MR = SMC. Given the firm's cost and revenue curve in figure 22.1 below, its MR and SMC intersect each other at point N. An ordinate drawn from point N to X
axis determines the profit maximizing output for the firm at Oq. At this output, the firms MR=SMC. Given the demand curve AR =D, output Oq can be sold per-time Unit at only one price, i.e, Pq (=OP$_1$). Thus the determination of output simultaneously determines the price for the monopolist firm. Once price is fixed, the output and total profits are also simultaneously determined. Hence the monopolist firm is in state of equilibrium.

Figure 22.1: Price Determination Under Monopoly in the short run

The curve below shows how a monopolist can make abnormal profit in the short run. We must state at this point that in the short run, a monopolist can make profit, break even or even incur losses. The two Figures below shows such a trend:

Profit   Break even

Figure (a)   Figure (b)

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Figure (c)
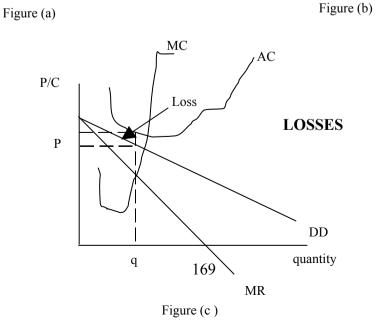
Figure 22.2: Short-run Equilibrium condition of the Monopolist

In fig a, the monopolist is malting only profit. His P > AC.

In fig b, the monopolist is making only economic profit i.e. it breaks-even only. Its AC is the same as its price. AC=P, showing that there is no profit and no loser.

In fig c, the firm is incurring losses. The AC of production in fig c is above the market price P. In this case, the firm produces at a loss. Since it cannot cover its cost of production.

3.3   PRICING AND OUTPUT DECSIONS IN THE LONG RUN

In the long run, all monopolist must make abnormal profit. This is justified by the fact that in the short run, a monopoly still testing the techniques of production can incur losses break-even or profit. But in the long-run only firms capable of making abnormal profits should stay in the market.
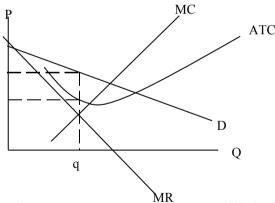
Figure 22.3: Long-Run   Equilibrium   Condition   for   the Monopolist

4.0   CONCLUSION

The monopoly like other markets operate at an optimum when MR = MC. But they are likely to make losses, profit and economic profit. Losses can be incurred only in the short run when the monopoly is adjusting his techniques of production. Curves of different types have bee used to buttress the scenario.

5.0   SUMMARY

This unit has examined the various aspects of the monopoly. It has established the reasons why monopolies exist and the optimum level of profit and output has been considered. Profit and output are maximized when MR = MC. Business managers need such information in designing the production and sales decisions.

6.0   TUTOR MARKED ASSIGNMENT

1.   Who is a monopolist?

2.   Why do monopolists exist?

7.0   REFERENCES AND OTHER RESOURCES

Lipsey R.G. and Crytal K.A. (1997) An introduction to positive
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MODULE 3

UNIT 23

DEMAND AND SUPPLY OF CAPITAL

1.0   INTRODUCTION

Capital is an essential input in production. As a factor of production, the demand and supply of capital forms an integral part in the determination of the techniques of production. The demand and supply of capital is therefore. An important aspect of capital budgeting of firm. The supply of capital at an agreeable cost influences the amount of capital that is demanded by a firm. From our analysis, the reverse of the story is also true. i.e. the demand for capital is determined by the supply of capital. In this unit, we are going to look at how the demand for capital is determined, sources of capital to business firms, and the cost of capital. Now imagine that you have conceived a good project in mind which you want to execute. The cost is quite enormous, and the profits to be realized quite promising. How do you think you can raise such huge amounts of money. In this unit some of the sources of capital available to business firm, is to be discussed. This may shed some light on how you can raise the required capital.

2.0   OBJECTIVES

At the end of the this study unit, you would be expected to be verse with- how the demand for capital is determined,

-        what constitute the supply of capital,

-        sources of capital available to entrepreneurs and

-        the measurement of the cost of capital.

Your ability to understand this will facilitate your decision-making capabilities in the aspect of investment decisions.

3.0   CAPITAL DEMAND AND SUPPLY

The analysis of the demand for and supply of capital will be well apprehended when we break it down into individual aspects. Hence, we will look at the demand on it own and then this will be followed by an analysis of the sources of capital and cost of capital.

3.1   THE DEMAND FOR CAPITAL

The demand for capital is a derived demands in the sense that capital is demanded because what capital produces, is in demand. That is, demand for capital arises from the demand for goods and services that capital can produce. The demand for capital depends, therefore, on its productivity. Besides, capital being scarce commodity is available at a cost. The demand for capital depends, therefore, also on its cost. It is demanded so long as its productivity is greater than its cost.

Briefly, the term demanded for capital refers to the amount which a firm would like to invest, given the cost of capital and the return on investment.

1

It is important to note here that 'cost of capital' is measured in money value. For comparability sake, therefore, productivity of capital is also measured in money value. The money value of capital productivity is obtained by multiplying the physical productivity of capita (PP) (i.e, actual quantity produced) by the price of product. This can be called revenue productivity (RP) of capital. It can be defined as;

RP   =   PPXP

Where RP   =   revenue productivity of capital;
PP   =   physical productivity of capital; and
P   =   price of the product.

More importantly, what matters in the demand for capital is its marginal revenue productivity, (MRP), not the revenue productivity (RP). In fact, the demand for capital is derived from the marginal revenue productivity (MRP) of capital. The MRP is defined as marginal physical productivity (MYP) multiplied by the price (P) of product. That is, MRP = MPP X P. Also, the marginal physical productivity of capital (MPP) is subject to diminishing returns. Therefore, MRP (=MPRP) curve slopes downward to the right.
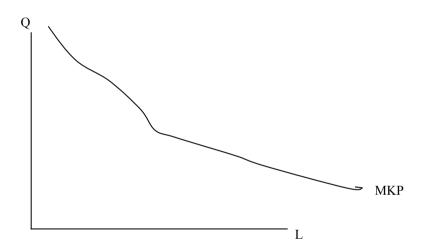
Figure23.1: Marginal Revenue productivity Curve

The level of firms' investment is determined by the MRP and MC (marginal cost of capital). A Profit maximizing firm determines its total investment where MRP of capitals equal the marginal cost of capital (MC), i.e, where MRP = MC.

To illustrate the application of this approach, let us suppose that a firm is considering 5 projects - A,B,C, D and E with varying rates of MRP. If we arrange the various projects in the descending order of their MRP and plot them on a graph, we get a step-demand curve for capital, as shown if Fig below. A smooth, normal demand curve, (DD) can be drawn through the central points (MRP bartop) of the various projects. The overall demand for capital is shown by a demand curve DD. For drawing the MC curve

let us suppose that financial market is such that certain amount of capital, say N20 can be raised at fixed cost (interest) N10 percent. Beyond this limit, cost of capital begins to rise as shown by MC curve as figure shows, demand curve DD intersects with MC at point P at appoint where MC = DD, i.e. when investment is 24 and MC is 10. the firm would accept only the first three project -A,B and C. rest of the projects yield a marginal revenue less than marginal cost and are hence unprofitable and should be rejected.
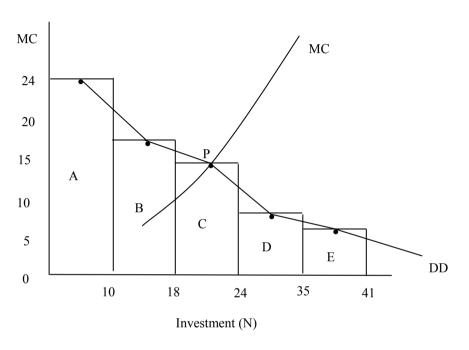
Figure 23.2: Determination of Profit-Maximizing level of Investment

Demand for Capital

capital by the firms. The project proposals submitted by the various units, big and small, are then evaluated with a view to knowing their profitability and viability. The following procedure of estimating the earnings on capital expenditures is generally used.

This determination of optimum level of investment or the demand for capital gives only a broad idea about how the level of demand for capital is determined. This part of analysis is however not sufficient to meet the requirement of capital budgeting and investment decisions. In actual practice, planning, projection, analysis of both capital and commodities is required in arriving at the appropriate investment decision. Many big firms spend considerable amount of money Oil research, innovation and

market research for the purpose. Besides, the firm collect information on capital requirements of each of the operating unites in order to assess the total need for

- Earning of each project should be estimated separately
- The two most important sources of earning, viz, cost savings and sales.
- For estimating future earning, profit projections must be based on the estimated future prices and costs.
- Not only the actual earnings but also the opportunity cost of an investment should be taken into account.
- The steam of capital earning in distant future must be appropriately discounted to know its present value, particularly in the case of long term projects.
- For assessing and comparing the earnings, average of invested capital per time unit should be used instead of initial capital outlay
- Productivity of capital should be estimated on the basis of earning over the full-time of the asset less cost of the investment
- Estimated earnings must be adjusted on account of the indirect contribution of the proposed investment to the existing production facility. This is however, a very difficult task and may involve a big margin of error.
- In a highly competitive market, abnormal profits create conditions for self destruction by inviting larger investments from the competitors. This possibility should be thoroughly examined and taken care of in estimating the future earning.
- The assessment of the friskiness of projects may involve a varying margin of error. Some systematic methods should be followed to make the necessary adjustment on account of margins of error.
- Where earning are `defused and conjectural' (e.g. earnings from expenditure on researches and employee's recreation facilities) and quantification thereof is not possible for lack of requisite data, estimating-) such earnings should be avoided till such data are available.

After each project submitted by the various integrated units is thoroughly examined on the basis of principles mentioned above, the question arises as to whether a particular project is to be accepted, rejected or postponed.

3.2   SUPPLY OF CAPITAL

Another important aspect of capital budgeting is supply of capital. Without an adequate supply of capital at an agreeable cost (rate of interest) demand for capital cannot materialize.
The sources of capital and the cost of capital will be given attention in this aspect of the unit. We will begin by examining the sources of capital

3.2.1 SOURCES OF CAPITAL

Business firms meet their demand for capital from various sources which are grouped under (i) Internal sources, and (ii) External sources.

Internal sources
i)   Internal source of capital is firm's own savings. Internal savings are normally generated in two ways: (i) by creating depreciation funds, and (ii) by ploughing back the profit or ploughing back the retained earnings. Depreciation reserves are created out of firm's earnings with a view to maintaining capital intact or for replacement of the worn-out capital. Besides, firms also raise their internal finance by retaining a part of total profit for reinvestment. Many large corporations rely mainly on their internal savings as a matter of policy. In the industrially advanced countries, the greatest proportion of corporate investment is financed out of internally acquired funds. This practice is predominant with firms seeking to:

- Display their prosperity and efficient management
- Avoid heavy cost of transactions involved in raising funds through issue of bonds and stocks, etc.
- Avoid uncertainty in raising funds from the market; and
- Enhance capital gains by increasing the market value of company's stock. Where ploughing back profit is permanent feature of investment policy, it becomes an integral part of capital budgeting.

The main managerial task in regard to raising funds from internal sources include: Forecasting the availability of internal funds; determining the depreciation reserve and plough-back profit, and deciding the amount for long-term investment.

External Sources

The external source of capital supply is capital market. The following are the ways and means of raising funds from the capital market.

a)   Sales of bonds

The firms may borrow funds directly from the capital market by selling some kind of bonds, e.g. mortgage and debenture bonds. Raising funds through the sale of bonds has certain advantages.

i)   The total interest on bonds and debentures is permissible as business cost under corporate income-tax laws; and

ii)   It increases the share of stock holders in case company is making higher profits as bondholders get only a fixed rate of interest. The second advantage is however matched by the preferential claim of debenture holders over the stock holders in case a company goes into liquidation. However, heavy financing through bonds weakens the position of a company's stock. For this reason, the conservative managerial groups avoid heavy bond-financing.

b)   Issuing new shares of common stock (or equity shares)

Another common method of raising funds from the market is to issue common stocks. The extent to which a company can raise finance by issuing new common stocks depends, among other things, on the liking or disliking of old stock holders. They may object to new issues if they apprehend loss or dilution of their power to control the company. Besides, issuing the. stocks involves heavy transaction cost fairly on account of fulfillment of legal technicalities. It has disadvantage also in regard to tax liabilities. From stock holder's point of view, small stockholders do not hold a position much superior to the bondholders.

c)   Preferred stocks

The third method of capital accumulation from the market is the sale of preferred stock. The main distinction between preferred and common stocks is that preferred stockholders get preference over common or equity stock holders in the payment of dividend. But, bondholders get preference over the preferred stock-holders.

d)   Convertible scurrilities

Direct loans, etc. the other methods of borrowing from the market are (a) direct borrowing from the financial institutions such as commercial banks, insurance companies, Industrial finance Corporations etc, and (b) issuing hybrid securities such as convertible bonds which can be traded in the market like equity shares. Under certain restrictions, this is an advantage too for the security holders. Companies borrow funds through convertible securities in case they prefer somewhat safer types of securities. A relatively recent method of capital accumulation is raising capital through public deposits.

Another source of external capital common to small firms is what is called "Adashi" or "Isusu". This is a system in which groups of firms or individuals contribute money at specific intervals and gives it one person/firm. This money could be used for business purposes.

3.2.2 COST OF CAPITAL

Capital is a scarce and a productive commodity. Since every scarce and useful commodity has a price, capital has a price too, termed as **cost of capital**. The cost of capital may be explicit or implicit. Explicit cost of capital is the interest paid on it whereas implicit cost is the expected return from the second best use of money capital.(its opportunity cost). In the strict sense of the term, implicit cost of capital is opportunity cost of money capital.

The cost of capital plays an important role in capital budgeting decisions. Since capital is available at a cost, it implies the managers should best possible use of available funds. Cost of capital can be a criterion for the selection or rejection of projects. If cost of capital is less than the return on its investment, it is an acceptable proposition.

For estimating the cost of capital, different concepts of cost are used. Various concepts of cost of capital used in capital budgeting and also the methods of computing cost of different kinds of capital are as follows:

Concept and Measures of Cost of Capitals

a)   Cost of Debt-Capital
       Debt capital refers to the funds directly borrowed from the market through public deposits, bonds and debentures. The cost of debt capital may be defined as the rate of return that must be earned on the borrowed capital to keep the earning of common stockholders unchanged. Since payment of corporate income tax affects the cost

of capital, a distinction is made between before-tax and after-tax cost of debt capital. Before-tax-cost of debt capital is the same as interest rate on the borrowed amount. It implies that if a firm borrows a certain sum and lends the same, its before tax interest earning will be equal to its interest payments.

Since interest paid on borrowed capital is deductible from the taxable income, cost of debt capital is reduced to the extent of tax saving.
After-tax-cost of debt capital = (Interest rate) x (1-tax rate). For example, if tax rate is 50 percent and interest rate is 10 percent, the after-tax-cost of capital will be:

10 (1-0.5) = 10 (0.5) = 5

= 5%

b)   Cost of Preferred Stock

Conceptually, the cost of preferred stock is similar to the cost of debt-capital. It may thus be defined as the rate of return on preferred stock that must be earned to keep the earning available to the common stockholders unchanged. The cost of preference stock or the required rate of return can be obtained by dividing the dividend per preferred stock by market price of the new preferred stock issues, i.e.

Cost of preferred Stock   =   Dividend per Share
                                                  Market price of New Issue

Dividend paid on preferred stock is not deductible from income assessable for taxation. Therefore, after-tax costs of preferred stock are the same.
c)   Cost of common stock or Equity

The cost of equity capital may be defined as the minimum rate of return on the projects financed through the sale of common stocks that can keep the market value oh issues unchanged. That is, the opportunity cost of old issues must be equal to the rate of return on them, the degree of risk remaining the same. The cost of equity capital (CEC) is estimated by the following formula.

CEC   =   Dividend per Stock
                    Market price of Stock

For example, suppose common stock of a firm has a market price of N25 per share and the current dividend is N2.50 per common stock,

suppose also that the risk premium or what is also known as expected growth rate of the firm is 5 percent. Then the cost of equity (CEC)i.e. the required minimum rate of return, can be calculated as follows

$$\frac{2.5}{25} + 0.05 = 0.1 + 0.05$$
$$= 0.15 \text{ or } 15 \text{ percent}$$

This implies that, the cost of equity is 15 percent. There is another method of estimating cost of equity capital know as the Divided Valuation Method. This method is similar to the Present Value method while cost of equity (CEC) method is similar to IRR. In simple words, CEC is the rate of discount which equalizes the discounted present value of expected dividend (D) per share over n years. The present value of share (PV)can be obtained as;

$$PV = \frac{D}{(1+ r)^n}$$

Here r is the cost of equity, i.e. r = CEC

d)   Cost of Retained Earning

Earning is simply the expected return from the re-investment of dividends. In other words, the cost of retained earnings is its opportunity cost, i.e. the income forgone by the shareholders, which might be obtained through the next alternative investment of dividend, An important modification, however, has to be made with respect to tax on dividend, because it is only the dividend minus tax that can be reinvested not the total. The cost of retained earning or its opportunity cost may thus be estimated as:

Cost of Retained Earnings = $\frac{\text{Dividend-Tax}}{\text{Price of Share}}$ x $\frac{\text{Dividend and Tax per share}}{\text{Weighted Cost of Capital}}$

We have discussed the cost of each type of capital separately. In general, however, firms acquire their finances from different sources. One reason is: firms acquire cheaper external finance with a view to preserving their internal potentials for financing future projects, especially if cost of external capital is expected to increase. Also, they might like to maintain a balance between merits and demerits of different sources of finance. They may therefore decide to have an investment pattern financed through different sources of finance. For these reasons, the firms should like to have an idea about the weighted average cost of capital from different sources. The weighted average cost of capital may be calculated

as shown in Table 23.1 below. Let us assume that the percentage distribution of the total stock of capital financed through different forms of capital is given in column 2 and the corresponding interest rates as given in column 3. Percentage share of each type of capital is its weightage (w) in the total stock of capital. As calculated in the table, the weighted (average) cost of capital comes to 7.05 percent.

Table 23.1   Weighted Average of Cost of Capital

Form of capital	Percentage share in the total capital (W)	Cost of capital (C) %	Total cost of capital = C x W
(1)	(2)	(3)	(4)
Debt capital	30	6.00	180
Preferred Stock	20	7.50	150
Equity	25	8.0	200
Stock Retained Earnings	25	7.00	170
	$\Sigma W = 100$		$\Sigma CW = 700$

$$\text{Weighted Cost of Capital} \quad = \quad \frac{\Sigma CW}{\Sigma W}$$

$$= \quad \frac{700}{100} \quad = \quad 7.0\%$$

The managers should therefore clearly define the objective of targets, find out the most suitable projects of investment relevant to the firm objectives examine the
feasibility and profitability of the project, select the projects on the basis of appropriate investment criteria, and determine their demand for capital. They should then examine the cost of variable sources of capital, accumulate the necessary funds and then finally take up the investment projects.

4.0   CONCLUS10N

From the above discussion, capital is an essential ingredient in investment decision. Its demand and supply depends upon its cost. There are a variety of sources of capital opened to business firm. A firm should therefore choose the one which is cheapest to it.

5.0   SUMMARY

This unit reviewed and analyzed the demand for capital and the supply of capital. In doing this, the sources of capital and the cost of capital have all been x-ray.

6.0   TUTOR MARKED ASSISGNMENT

What are the factors that determine the supply of capital?

7.0   REFERENCES AND OTHER RESOURCES

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MODULE 3

UNIT 24

CAPITAL BUDGETING AND INVESTMENT DECISIONS

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1.0   INTRODUCTION

In the previous chapters, we have been looking at how the market in which a firm operates affects its activities and how firms establish their prices. It is time now we consider how firms make long-term investment decisions. We. are all aware of our four factors of production. Capital is one of them. Capital can be defined as man-made devices, which assist him in production. In other words, capital means all those things created by man for production purposes. Examples of capital are buildings, tools and machines. When we say that man's wants are unlimited, it also implies that the capital man will require for production is also limited in supply. As such firms must use their limited capital in a way that they will achieve the highest output with it.

For a firm to reap the best out of its limited capital, it must make fundamental decisions in relation to the choice of project to invest in, how to be replacing worn out capital, how to be adding more capital to the already existing stock of capital and when to invest and in what quantities. Managerial decisions regarding these aspects are quite important to the survival of the firm. It is the decision of the manager in these aspects that are called capital budgeting or long-term investment decisions. In this unit, we are going to consider the ingredients of' capital budgeting, investment decisions and the Risk and uncertainty involved in investment decisions. But before we go into our discussion let me ask you, what are some of the factors you normally consider before investing in a project? If your method has not been conventional, I think the conventional method may be better for you now.

2.0   OBJECTIVES

As we are going to be considering issues relating to capital budgeting and investment decisions, I will expect that by the end of the unit, you should to be able to:

- Explain in your own way what capital budgeting is all about.

- Identify the requirements of capital budgeting,

- Decide which investment decisions can make your job as a manager.

- Know which projects are less risky and which ones are more risky.

In a nutshell, you should be able to handle this aspect of capital budgeting and investment decisions quite comfortably both theoretically and practically.

3.0   INVESTMENT DECISIONS

Now that we already know the importance of capital budgeting to the survival of a firm, let us look at the various investment decisions facing the firm. Before we do this, let us briefly consider some concepts in capital budgeting.

3.1   CONCEPTS IN CAPITAL BUDGETING

3.1.1 DEFINITION OF CAPITAL EXPENDITURE

In capital budgeting the term capital is given a specific meaning. This can be seen as expenditure on assets. Capital expenditures such as inventories and receivables which vary constantly in the short run, are not considered. This implies that capital expenditure to be considered in capital budgeting are those that involve a commitment of resources for at least one year. It should be understood right at this point that long term capital expenditures vary according to the nature and duration of the working life of a project. Items, which are normally considered in capital budgeting, include:

a)   Expenditure on new capital equipments;
b)   Creation of long-term assets by a new firm;
c)   Expenditure on expansion or diversification of assets and addition to the existing stock of capital by exiting firms; let us look at the various investment decisions facing the firm
d)   Expenditure on replacement of depreciated capital;
e)   Expenditure on advertisement which bear fruits over time; and
f)   Expenditure on research, development and innovation.

3.1.2 DECIDING PLANNING PERIOD

Capital expenditures involve higher degree of `uncertainty, forecasting, judgment' and hence a careful planning period, for capital projects vary in their gestation period. A clear vision of a plan period is necessary for the following reasons.

i.   Effective planning, execution and control;
ii.   Possible dovetailing of old plan with new ones for future, integrated development of the company;
iii.   Assessment of economies of scale and determination of plant-size, and
iv.   Financial planning and timely acquisition of necessary Finances.

3.1.3 CHOOSING A DECISION RULES

An important requirement of sound capital budgeting is the choice of criteria for accepting or rejecting a project. The criteria must be decided in advance. A particular capital project may be capable of standing the test against several criteria, or in other words, may be capable of serving several purposes. But the various criteria considered for evaluating a project may not be in conformity with each other or their fulfillment may not be the objective of the firm. It is therefore necessary that decision rules for accepting or rejecting a project must be decided in advance.

The criteria ad decision rules are normally chosen on the basis of the objective of the firm, such as profit, asset-building, a regular cash flow or maximization of short or long-term gains, etc.   .

Therefore, the first step in determining the decision rules is to:

2   Define the objective of investment

The second step is to select the criterion for evaluating the projects. the important criteria used for evaluation of projects are:
a)   discounted cash flow (present value criterion)
b)   net present worth
d)   internal rate of return, and
c)   payback period

Third step is to decide on the approach for the final selection of projects. There are two approaches for the final selection of projects; viz
(j) the accept reject approach
(ii) the ranking approach.
One of the two approaches is adopted depending on the availability of funds.

The Accept-reject approach is generally adopted when availability of funds is limited and the firm has to select one or a few from a number of mutually exclusive and alternative projects.

The ranking approach is adopted when a firm has a large amount of funds and can invest in many projects at a time. The firms under this approach rank all the projects under consideration in order of their rate of return and draw a line under the project whose cost equals its return.

3.1.4   DATA COLLECTION

Capital planning and budgeting requires the collection of adequate, necessary and relevant data on
       i)   Cost of capital projects;
       ii)   Expected rate of return;
       iii)   Availability of alternative projects;

       iv)   Period of fruition, maturity, and overall longevity of alternative projects;
       v)   Market rate of interest;
       vi)   Degree of uncertainty. It is this data that helps in the appraisal of the profit and in the determination of the viability of a project.

3.2   INVESTIMENT CRITERIA AND DECISIONS

There are a number of criteria used in evaluating the possibility of a propjet. The frequently use and most common ones are:

a) Pay-back (or Pay-out) period;
b) Net discounted present value; and
c) Internal rate of return or marginal efficiency of investment.

These criteria are equally applicable to a variety of investment decisions regarding new investments and those pertaining to replacement, scrapping, widening or depending on capital. Incidentally, from analysis point of view, there is no structural difference between decisions on new investment and those on replacement let us now briefly describe the three criteria and look into their applicability

3.2.1   PAY-BACK PERIOD METHOD

The pay-back period also called 'pay-cut' or 'pay-off period is the simplest and one of the most widely used methods of project evaluation. The pay-back period is defined as the time required to recover the total investment outlay from the gross earnings i.e. gross of capital wastage or depreciation. If a project is expected to (lenerate a constraint cash flow over its life-time, the pay-back period may be calculated as given below:

Pay-back Period   =   <u>Total Investment Outlays</u>
                                              Gross Return per period

For example, if a project costs N40,000 and yield s an annual income of N8,000

Pay-off Period   =   <u>40,000</u> = 5year
                                            8,000

In case of projects which yield cash in varying amounts, the pay-back period may be obtained through the cumulative total of annual returns until the total equals the original investment outlay. The number of figures added will give the pay-back period. For example, suppose that the total cost of a project is 11,000 which yields cash flows over 5 years as given in Col. 3 of Table 24.1 below.

Table 24.1: Calculation of pay-back Period

Year (1)	Total Fixed Outlay (2)	Annual Cash flow (3)	Cumulative Total of col (3) (4)
1st	11,000	4,500	4,500
2nd	-	3,500	8,000
3rd	-	3,000	11,000

Project	Total outlay	Annual return	Pay-back period	Rank
1	2	3	4	
A	36,000	6,000	36,000 + 6,000 = 6	3
B	24,000	8,000	24,000 + 8,000 = 3	1
C	20,000	3,000	20,000 + 5,000 = 4	2

As the table shows, the cumulative total of annual cash flows breaks even with the total outlay of the project at the end of the 3rd year. Thus, the pay-back period of the project is 3 years.

In case of projects with different investments and different annual returns, the project evaluation procedure can be described as follows. After pay-back period of each project is calculated, projects are ranked in increasing order of their pay-back period. Let us suppose that a firm has to select one out of 3 riskless projects, namely: A.B,C. the total cost of each project and their respective annual yields are given in columns (2) and (3) respectively in Table 24.2 below. The calculation of their respective pay-back periods, is given in column (4) of the table. Project B ranks 1st and project C, and A rank 2nd, 3rd respectively. The firms will invest in these projects in the same order, if it adopts the pay-back period criterion for project evaluation.

Table 24.2: Ranking of Projects

In case the projects A, B, and C yield cash flows at different rates in the subsequent years, the cumulative total method may be adopted to calculate their pay-back periods and projects ranked accordingly. After projects are ranked, they are selected in order of their ranking, depending on the availability of funds.

3.1   CAPITAL BUDGETING AND INVESTMENT DECISIONS

Merits of the Pay-back Criteria

All other things being the same, a project with shorter pay-off period is preferred to those with larger pay off period. This method of ranking project or project selections is considered to be simple, realistic and safe. Its simplicity is obvious in the calculation of the pay-off period. It is realistic in the sense that businessmen want their money back as quickly as possible and this method serves their purpose. It is safe since it avoids incalculable risk in the long-run.

Demerits of the pay-back criterion

Drawhacks. This method is a crude rule of thumb and can hardly be defended except 011 the ground of avoiding risk associated with long pay-back projects.

The second and the major drawback I 'this criterion is that it considers only a short period in which cost of project is covered. It ignores the period and the subsequent returns, after the pay-off period. This criterion, if applied, may deprive the investor of additional earning in future for example that an investor has to make a choice between two projects A and B, their costs and returns given as follows.

      i.   Project A: Total cost N20,000
              Annual returns N5,000 over four years
              Pay-back period = 4 years

      ii.   Project B: Total cost = N30,000
              Annual returns N5,000 over seven years
              Pay-back periods N5,000/5,000 = six years.

Obviously, according to pay-off period criterion, Project A will be preferred to Project B. but this will lead to foregoing an additional expected income of N6,000 i.e, the difference between the total yield from Project B (₦5,000 x 6years = ₦30 ,000) and from Project A (+ ₦5,000 x 4 years = N24,000).

The application of payback criterion can be justified only if Project B involves a high degree of uncertainty and risk. Nevertheless, this criterion can be profitably adopted if terminal year of all projects under consideration is the same.

3.3.1   NET PRESENT VALUE METHOD

a)   Definition of Present Value: The Time Value of Money

Generally, there is a time-lag between investment and its returns. When a big investment is made today, it begins to yield returns at some future date. During this time lag, the investor loses interest on the expected incomes. This implies that a naira received today is worth more than a naira received tomorrow. Or conversely a naira expected to be received one year hence is worth less than a naira today. In other words, the present value of an income expected at a future date is lower than the same amount held today. This is called the Time Value of Money.

The concept of present value can be better understood through an example. Suppose that a sum of N1000.00 held in cash today can be deposited in a bank at 10 percent rate of interest. The N1000.00 today will increase to N1100.00 one year hence, i.e.

$$\text{Amount} = 1000 + 1000\ (10/100)$$
$$= 1000 + 1000\ (O1)$$
$$= 1000 + 100$$
$$= 1100$$

It follows that ₦1100 expected after one year is worth less than ₦1100 toady. It is worth only ₦1000. This amount (₦1000) is the present value of ₦1100 to be earned after a period of one year. The present value ({PV) of ₦11000 can be obtained as follows

$$\text{PV of } ₦l1000 = \frac{1100}{(1 + 0.1)} = 1000$$

The present value of a future income may thus be defined as its value discounted at the current rate of interest. Alternatively, the present value of an amount expected at a future date, say after a year, is the sum of money which must be invested today to get that amount after one year.

In this method, the discounted rate of interest is used. It is given by:

$$\text{PV of } X_1 = \frac{X}{(1 + r)} = \frac{X_1[1]}{(1 + r)}$$

Where $1/(I + r)$ is the discount rate for one year. Given the rate of interest, (i.e, the numerical value for r), any income receivable after one year can be discounted to its present value. For example, the present value of an income of N200 expected after one year at 8 percent interest per annum (where r = 0.08), can be calculated as

$$PV = \frac{200\ [1]}{(1+ 0.08)} = 185.19$$

It means, the present value of N200 expected after one year is N185.19, if the rate of interest is 8 percent. The discount rate (d_2) for an income receivable after 2 years will be $I/(1+ r)^3$ and for an income receivable after 3 years, $d = 1/(1 + r)^3$ and so on.

The formula for discount rate for the nth-year is

$$D_n = \frac{1}{(1 + r)^n}$$

The formula for calculating present value (PV) of an amount receivable in the nth year is

$$PV = Xn \left(\frac{1}{(I + r)^n} \right)$$

$$PV = \frac{Xn}{(1 + r)^n}$$

The formula for calculating the total present value (TPV) of a stream of annual return ® over n years is given as

$$TPV = \frac{R_1}{(1+r)} + \frac{R_2}{(1+r)^2} + \frac{R_3}{(1+r)^3} + \dots + \frac{R_n}{(1=r)^n}$$
$$= \frac{Ri}{}$$
$$\Sigma\ \frac{}{(1+r)^n}$$

b)   Computation of Net Present Value

Having noted the concept of the present value and the method of calculating it, let us now see how investment decisions are taken on the basis of present value. In fact, the investment decision accepting or rejecting a project - is based on net present value. The net present vale (NPV) may be defined as the difference between the present value (PV) and the cost of investment (C), i.e.,

NPV - PV - C,

$$\Sigma \quad = \quad \Sigma \quad - \left(\frac{Cn}{(1+r} \right)$$

$$\left[\frac{Ri}{(1+r} \right]$$

$$\left(\frac{Cn}{(1+r} \right.$$

Where C is the total cost of investment, without any recurring expenditure.

If investment is a recurring expenditure, the total present cost (TPC) for n years can he calculated in the same manner as present value of an income stream, i.e,

$$TPC \quad = \quad \Sigma$$

$$TPV \quad = \quad \Sigma \frac{Rn}{(1+r)^n} - \Sigma$$

$$= \quad \Sigma \left(\right)$$

If the NPV is positive (i.e., NPV>0), the project is profitable. The firm can borrow any amount at the existing interest rate (r) and invest in it. When a choice between two projects has to be made, the one with higher NPV would be chosen.

c)   Internal Rate of Return (IRR) Criterion

the Internal Rate of Return (IRR) is also called `Marginal Efficiency of Investment (MEI), Internal Rate of Project (IRP) and Break-even Rate (BER). The IRR or MEI is defined as the rate of interest or return which renders the discounted present value of its expected future marginal yield exactly equal to the investment cost of project. In other words, IRR is the rate of return at which the discounted present value of receipts and expenditures are equal. The IRR may also be defined as follows:
IRR is the rate of return at which,

$$PV \quad = \quad \Sigma \left(\frac{Rn}{} \right) - \Sigma \left(\frac{Cn}{} \right)$$

The IRR criterion is basically the same as Keynes's Marginal Efficiency of Investment (MEI). This criterion is theoretically superior to other criteria, though it has its own shortcomings. The IRR criterion tells us that, so long as internal rate of return is greater than the market rate of interest, it is

always worthwhile to borrow and invest. However, in a perfectly competitive market firm's internal rate of return always equals the market rate of interest.

Internal Rate of Return and Present Value.

It may be inferred that IRR and NPV criteria lead to the same conclusion or yield the same decision. There are situations, however, where the two criteria give conflicting results. For example, suppose that a firm has to make a choice between project A and projects B, each having a productive line of two years. The stream of net income at the end of the year from the two projects and their respective costs are presented in Table 4.3

Table 24:3: Flow of Net Income

	Cost of Project	1st year	2nd year
Project A	100	0	140
Project B	100	130	0

Let us now calculate the NPV for both projects, assuming a 10 percent rate of return, and compare the result with IRR. Remember that NPV = PV-C

$$\text{Project A:} \quad PV_A = \frac{0}{(1.10)} + \frac{140}{(1.10)^2}$$
$$= 115.70$$

$$\text{and} \quad NPV = ₦(115.70 - 100)$$
$$= ₦15.70$$

Since NPV is positive (15.70) at the expected rate of return of 10 percent project A is acceptable . But if we raise the rate of return to 20 percent, Project A will not be acceptable because at this rate of return, NPV is negative (-2.78), as calculated below:

$$\frac{0}{(1.20)} + \frac{140}{(1.20)^n}$$

194

NPV   =

= 97.22 – 100

= 2.78

Project B:

PV   = $\frac{130}{(1+0.10)}$ + $\frac{0}{(1+0.10)}$ =   118.18

and   N PV = 118.18-100
= 18.18
Project B is acceptable at the rate of 10 percent return since NPV (=18.18) is positive. It will be acceptable even at the interest rate of 20 percent since, in that case, NPV will be 8.33.
Having calculated the NPVs for Projects A and B, let us now calculate the IRR for both projects, for comparing the decisions.

By definition, the IRR is the rate of return (r) which renders the net present value (NPV) equal to zero. By definition, r for Project A may be calculated as follows:
The value of r should be such that;

$$NPV   =   \frac{0}{1+r} + \frac{140}{(1+r)^2}   - 100 = 0$$

By solving this equation, we can obtain the value of r as follows:

$$\frac{0}{(1+r)}   +   \frac{140}{(1+r)^2} = 100$$

$$\frac{140}{(1+r)^2}   =   100$$

$$(1+r)^2 = \frac{140}{100} =   1.40$$

$$1 + r   = \sqrt{1.40} =   1.183$$
$$r   =   1.183 - 1   = 0.183$$
$$= 18.3\%$$

In case of Project B, the value of r should be such that

$$\text{NPV} = \frac{130}{1+r} + \frac{0}{(1+r)^2} = 100$$

$$\frac{130}{(1+r)} = 100$$

$$1+r = 1.30$$
$$r = 1.30 - 1$$
$$= 0.30 \text{ or } 30 \text{ percent}$$

We find that IRR of Project A is 18.3 percent and project B is 30 percent.

The information generated may now be summed as given in Table 24.4 below:

Table 24.4: Summary Table

	Project A	Project B	
R	NPV	R	NPV
0.0	40.00	0.00	30.00
10.0	15.70	10.00	18.18
18.3 IRR	0.00	20.00	8.33
20.0	-2.78	30.00 = IRR	0.00

The conflict between the two criteria may be shown by plotting the information given in Table above.

If firm consider⁻ IRR, Project B should be preferable since its IRR = r = 30 is greater than that of Project A. (with IRR=18.3). obviously, the two criteria NPV and IRR provide conflicting conclusion in regard to choice between the two projects. In actual practice, however, the firms are guided by their objectives.

3.3.2   RISK, UNCERTAINTY AND IVNESTMENT DECISION

In our discussion, we have not yet talked on this. It is time we now consider the most important risk adjustment strategies in the investment criteria. These are:

1.   RISK-ADJUSTED DISCOUNT RATE

A common, though crude, method of accounting for risk factor in capital budgeting decisions is to use   a   risk-adjusted

discount rate in the assessment of present value of future turns. In this method. The discount rate, r, calculated in this manner is treated as risk-free present value of future steam of cash flows. If risk-adjusted present value is greater than the initial investment outlays, the project is accepted or rejected otherwise.

The risk adjusted discount rate (d) is expressed

$$d = \frac{1}{1 + r + u}$$

Where u denotes the degree of risk and uncertainty.
Given this formula, risk adjusted discount rate can be calculated if values of r and u are known. For example, if r = 7 percent or 0.07 and degree of risk is 3 percent or 0.03, the risk-adjusted discount rate (d) can be obtained as follows:

$$d = \frac{1}{1 + 0.07 + 0.03}$$

$$= \frac{1}{1.1} = 0.91$$

It may be noted that the higher the risk, the higher the risk adjusted discount rate, and the lower the discounted present value.

Risk Adjusted Discount Rate Properties

The risk-adjusted discount rate approach has certain desirable properties.

•   Discount rate can be adjusted for varying degrees of risk in different years by increasing or decreasing the risk factor.

•   Also , the method of discounting is such that the higher risk factor in the remote future is accounted for automatically' since the denominator in the discounting factor (1/1+ r + u) is raised to higher powers (i.e. by the number of years considered) for example, the discounting, factor for the 100'" year will be as:

$$d = \frac{1}{(1 + r + u)^{100}}$$

This process of discounting automatically reduce the present value drastically.

Finally, the method is easy to handle in comparison with other methods. However, the basic weakness of this method is that it does not provide any instruction for estimating the risk factor, i.e the value of u. the method therefore requires to be supplemented with some other method of calculating risk factor or individual judgment and intuition of the decision maker.

2   MEAN-STANDARD DEVIATION METHOD

This method provides, perhaps, the most straightforward method of incorporating risk into discounted present value. In this method, the discounted present value of future stream of returns is calculated on the basis of their mean value, instead of actual cash flows. The use of mean brings into consideration the dispersion.

Therefore, standard deviation which is an explicit reflection of the risk becomes an important element in investment decisions.

Once the discounted present value (1^1V) of mean of the future stream of returns and the standard deviation are computed, the decision-makers are equipped with the necessary data required for investment decisions. They can now easily decide whether the expected return is worth taking the risk.

The major weakness of the method, however, is that it assumes certainty about the mean return. Also, it has no use where the expected stream of return is uniform over the Life-time of the project.

3   THE FINITE HORIZON METHOD

This method is similar to pay-back method applied under the condition of certainty. In this method, a terminal date for the life of capital is fixed. In the decision-making, only the expected return or gains prior to the terminal date are considered. The gains or benefits expected beyond the terminal date are ignored- the gains beyond the terminal date are simply treated as non-

existent. The logic behind the approach is that the development during the period under consideration might render the gains beyond terminal date of no consequence. For example, a project might go out of use, say, after 50 years of its installation, when substitutes becomes available in abundance and at a lower cost.

The demerits of this method, include the following: Adopting this method means treating two projects as equal even if one really terminated at or around the terminal date, while the other yields considerable gains for quite some time thereafter. The gains from such long-run public projects as soil conservation and term projects as it deals with the problems with imperfect foresight flood control schemes beyond the arbitrarily decided terminal point cannot be justifiably ignored. This method is therefore considered as defiant in dealing with long term projects as it deals with the problem with imperfect foresight .

4.0   CONCLUSION

The importance of capital budgeting and investment decisions cannot be over emphasized as they are of crucial significance to the survival of business firms. In this regards therefore, firms must be able to make good investment decision so as to maximize the achievement of their goals with their limited capital. For these decisions to be profitable at the end, the firms can use any of the investment techniques highlighted above, in appraising its capital projects. The choice of' technique depends upon the goals of the firm and the date available**.**

5.0   SUMMARY

In this unit, the importance of capital budgeting and investment decision has been underscored. The definition, techniques used in appraising projects have been illustrated. It is hoped that you will find this unit very useful in your Subsequent decision-making. The applicability of the techniques has been made quite simple and practicable.

6.0   TUTOR MARKED ASIGNMENT

a)   What are the merits and demerits of the pay-back criteria of investment decisions

7.0   REFERENCES AND OTHER RESOURCES

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        London Macmillans