MANAGERIAL ECONOMICS

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INTRODUCTION TO ECONOMIC ANALYSIS

STRUCTURE

1.0 LEARNING OBJECTIVE

The main objective of this lesson is to make the students learn about the basic concepts of economics with reference to modern economics and central economic problems.

1.1 INTRODUCTION

It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own.

Adam Smith, the Wealth of Nations

(1776)

Look for a moment to consider the contradictory words above, penned in 1776 by Adam Smith, the founder of modern economics. The American Declaration of Independence also marked that same year. It is no coincidence that both ideas appeared at the same time. Just as the American revolutionaries were proclaiming freedom from tyranny, Adam Smith was preaching a revolutionary doctrine emancipating trade and industry from the shackles of a feudal aristocracy.

In the last two centuries, most of the world has experienced an era of unimagined prosperity. In the United States and other high-income countries, most people today can afford to buy far more than the bare necessities of food, clothing and shelter. Superfast personal computers, high-tech home entertainment centres, and fast air transportation to any part of the globe are examples of an amazing range of goods and services that have become part of everyday life. Developing countries have also seen their standards of living rise rapidly in recent years.

But widespread prosperity has not brought economic security. In an average year, 60 million people lose their jobs and almost 3, 00,000 businesses go bankrupt. About 34 percent of households are designed as poor, as the number is almost 50 percent among households headed by females. Many families worry about the

catastrophic financial consequence of illness because they have no health insurance. The prosperous society is a fretful society.

For most of human history, people who experienced economic misfortunes lived on the mercy of their families or friends. Starting about a century age, governments introduced the "welfare state", which provided social insurance and income support to needy people. Gradually, poor people in rich countries got access to minimal levels of income, food, and health care. But rising taxes and growing government spending on health care and public pensions have produced a revolt of the middle class, which is the taxed class. In 1996, the United States removed its guarantee of income support for poor families. Everywhere, countries are rethinking the boundaries between state and market, trying to balance the growing need for providing public services with the increasing shout for cutting taxes and shrinking government.

This is the age of the global marketplace. Today, money, goods, and information cross national borders more readily than ever before. In earlier times, we did business with people down the street or in the next town, and we bought mainly local goods. Today, we ride in the "world car." Look at this world car or at a fast computer. It incorporates materials, labor, capital, and innovations from around the world. The rise of the global marketplace raises new challenges. Who can best adapt to increased foreign competition? Who can quickly adapt to the information age? The stakes are high. To the winners go the profits, while the losers lag behind.

1.2 WHY TO STUDY ECONOMICS?

As you begin your studies, you are probably wondering. Why study economics? Understanding the role of government and the challenges of the global marketplace are only two reasons why people study economics today. Some people study economics because they hope to make money. Others worry that they will be illiterate if they cannot understand the laws of supply and demand. Many people are

interested in learning about how we can improve our environment or why inequality in the distribution of income in the country has raised so sharply in recent years.

All these reasons and many more, make good sense. Still, we have come to realize, there is one overriding reason for learning the basic concepts of economics: All your life - from cradle to grave and beyond - you will run up against the vicious truths of economics. As a voter, you will make decisions on issues - on the government deficit, on taxes, on free trade, on inflation and unemployment - that cannot be understood until you have mastered the basics of economics.

Choosing your life's occupation is the most important economic decision you will make. Your future depends not only on your own abilities but also on how economic forces beyond your control affect your earnings. Also, economics may help you invest the nest egg you save from your earnings. Of course, studying economics cannot make you a genius. But without economics the dice of life are loaded against you.

There is no need to overstress the point. We hope you will find that, in addition to being useful, economics is a fascinating field in its own right. Generations of students, often to their surprise, have discovered how thought-provoking economics can be.

1.2.1 Basic Themes of Economics

What, then, is economics? Over the last 250 years the study of economics has expanded to include a vast range of topics. What are the major definitions of this growing subject? The important ones are that:

- Economics studies how the prices of labor, capital, and land are set in the economy, and how these prices are used to allocate resources.
- Economics explores the behaviour of the financial markets, and analyzes how hey allocate capital to the rest of the economy.

- Economics examines the distribution of income, and suggests ways that the poor can be helped without harming the performance of the economy.
- Economics looks at the impact of government spending, taxes and budget deficits on growth.
- Economics studies the swings in unemployment and production that make up the business cycle, and develops government policies for improving economic growth.
- Economics examines the patterns of trade among nations, and analyzes the impact of trade barriers.
- Economics looks at growth in developing countries, and proposes ways to encourage the efficient use of resources.

This list is a good one, yet you could extend it many times over. But if we boil down all these definitions, we find one common theme:

Economics is the study of how societies use scarce resources to produce valuable commodities and distribute them among different people. Behind this definition are two key ideas in economics: those goods are scarce and that society must use its resources efficiently. Indeed, economics is an important subject because of the fact of scarcity and the desire for efficiency.

Take **scarcity** first. If infinite quantities of every good could be produced or if human desires were fully satisfied, what would be the consequences? People would not worry about stretching out their limited incomes, because they could have everything they wanted; businesses would not need to fret over the cost of labour or health care; governments would not need to struggle over taxes or spending, because nobody would care. Moreover, since all of us could have as much as we pleased, no one would be concerned about the distribution of incomes among different people or classes.

In such an Eden of affluence, there would be no **economic goods**, that is, goods that are scarce or limited in supply. All goods would be free, like sand in the desert or

seawater at the beach. Prices and markets would be irrelevant. Indeed, in such case, economics would no longer be a useful subject.

But no society has reached a utopia of limitless possibilities. Goods are limited, while wants seem limitless. Even after two centuries of rapid economic growth, production in the World is simply not high enough to meet everyone's consumption desires. Our global output would have to be many times larger before the average World could live at the level of the average doctor or lawyer. And in some countries, particularly in Africa and Asia, hundreds of millions of people suffer from hunger and material deprivation.

Given unlimited wants, it is important that an economics makes the best use of its limited resources. That brings us to the critical notion of **efficiency**. Efficiency denotes the most effective use of a society's resources in satisfying people's wants and needs. More specifically, the economy is producing efficiently when it cannot increase the economic welfare of anyone without making someone else worse off.

The essence of economics is to acknowledge the reality of scarcity and then figure out how to organize society in a way that produces the most efficient use of resources. That is where economics makes its unique contribution.

1.2.2 Microeconomics and Macroeconomics

Adam Smith is usually considered the founder of the **microeconomics**, the branch of economics, which today is concerned, with the behaviour of individual entities as markets, firms, and households. In *The Wealth of Nations*, Smith considered how individual prices are set, studied the determination of prices of land, labor, and capital, and inquired into the strengths and weaknesses of the market mechanism. Most important, he identified the remarkable efficiency properties of markets and saw that economic benefit comes from the self-interested actions of individuals. All these are still important issues today, and while the study of microeconomics has

surely advanced greatly since Smith's day, he is still cited by politicians and economists alike.

The other major branch of our subject is **macroeconomics**, which is concerned with the overall performance of the economy. Macroeconomics did not even exist in its modern form until 1935, when John Maynard Keynes published his revolutionary book General *Theory of Employment, Interest and Money*. At the time, England and the United States were still stuck in the Great Depression of the 1930s, and over one-quarter of the American labor force was unemployed. In his new theory Keynes developed an analysis of what causes unemployment and economic downturns, how investment and consumption are determined, how central banks manage money and interest rates, and why some nations thrive while others stagnate. Keynes also argues that government had an important role in smoothing out the ups and downs of business cycles. Although macroeconomics has progressed far since his first insights, the issues addressed by Keynes still define the study of macroeconomics today.

The two branches - microeconomics and macroeconomics - covers to form modern economics. At one time the boundary between the two areas was quite distinct; more recently, the two sub-disciplines have merged as economists have applied the tools of microeconomics to such topics as unemployment and inflation.

1.2.3 The Logic of Economics

Economic life is an enormously complicated hive of activity, with people buying, selling, bargaining, investing, persuading, and threatening. The ultimate purpose of economic science and of this text is to understand this complex undertaking. How do economists go about their task?

Economists use the *scientific approach* to understand economic life. This involves observing economic affairs and drawing upon statistics and the historical record. For complex phenomena like the impact of budget deficits or the causes of inflation,

historical research has provided a rich mine of insights. Often, economics relies upon analyses and theories. Theoretical approaches allow economists to make broad generalization, such as those concerning the advantages of international trade and specialization or the disadvantages of tariffs and quotas.

A final approach is the use of statistical analyses. Economists have developed a specialized technique known as econometrics, which applies the tools of statistics to economic problems. Using econometrics, economists can sift through mountains of data to extract simple relationships. For example, in recent years people have argued about the impact of a higher minimum wage on employment. From dozens of studies, economists have concluded that it is likely that raising the minimum wage will reduce employment of low-wage workers. This knowledge is essential to policymakers who are struggling with the question of how high to set the minimum wage.

Budding economists must also be alert to common fallacies in economic reasoning. Because economic relationships are often complex, involving many different variables, it is easy to become confused about the exact reason behind events or the impact of policies on the economy. The following are some of the common fallacies encountered in economic reasoning:

- **The post hoc fallacy**. The first fallacy involves the inference of causality. The post hoc fallacy occurs when we assume that, because one event occurred before other events, the first events caused the second event. An example of this syndrome occurred in the Great Depression of the 1930s in the United States. Some people had observed that periods of business expansions were preceded or accompanied by rising prices. From this, they concluded that the appropriate remedy for depression was to raise wages and prices. This idea led to a host of legislation and regulations to prop up wages and prices in an inefficient manner. Did these measures promote economic recovery? Almost surely not. Indeed, they probably slowed recovery, which

did not occur until total spending began to rise as the government increased military spending in preparation for World War II.

- **Failure to hold other things constant**. A second pitfall is failure to hold other things constant when thinking about an issue. For example, we might want to know whether raising tax rates will rise or lower tax revenues. Some people have put forth the seductive argument that we can eat our cake and have it too. They argue that cutting tax rates will at the same time raise government revenues and lower the budget deficit. They point to the Kennedy-Johnson tax cuts of 1964, which lowered tax rates sharply and were followed by an increase in government revenues in 1965. Ergo, they argue, lower tax rates produce higher revenues.

  What is wrong with this reasoning? This argument overlooks the fact that the economy grew from 1964 to 1965. Because people's incomes grew during that period, government revenues also grew, even though tax rates were lower. Careful studies indicate that revenues would have been even higher in 1965 had tax rates not been lowered in 1964. Hence, this analysis fails to hold other things (namely, total incomes) constant.

  Remember to hold other things constant when you are analyzing the impact of a variable on the economic system.

- **The fallacy of composition**. Sometimes we assume that what holds true for part of a system also holds true for the whole. In economics, however, we often find that the whole is different from the sum of the parts. When you assume that what is true for the part is also true for the whole, you are committing the fallacy of composition.

Here are some true statements that might surprise you if you ignore the fallacy of composition (1) if one farmer has a bumper crop, she has a higher income; if all farmers produce a record crop, and farm incomes will fall. (2) If one person

receives a great deal more money, that person will be better off; if everyone receives a great deal more money, the society is likely to be worse off. (3) If a high tariff is put on the product of a particular industry, the producers in that industry are likely to get profit; if high tariffs are put on all industries, most producers and consumers will be worse off. (4) When teachers grade on a curve, grades are a "zero-sum game": if one student performs well, he will raise his grade; if all students perform well, the average grade is unchanged.

These examples contain no tricks or magic. Rather, they are the results of systems of interacting individuals. When individuals interact, often the behaviour of the aggregate looks very different from the behaviour of individual people.

We state these fallacies only briefly in this lesson. Later, as we introduce the tools of economics, we will reinforce this discussion and provide examples of how inattention to the logic of economics can lead you to false and sometimes costly errors. When you reach the end of this subject, you can look back to see why each of these paradoxical examples is true.

1.2.4 What Can Economics Do?

Since the time of Adam Smith, economics has grown from a tiny acorn into a mighty oak. Under its spreading branches we find explanations of the gains from international trade, advice on how to reduce unemployment and inflation, formulas for investing your retirement funds, and even proposals for selling the rights to pollute. Throughout the world, economists are laboring to collect data and improve our understanding of economic trends.

You might well ask, what is the purpose of this army of economists measuring, analyzing, and calculating? The ultimate goal of economic science is to improve the living conditions of people in their everyday lives. Increasing the gross domestic product is not just a numbers game. Higher incomes mean good food, warm houses,

and hot water. They mean safe drinking water and inoculations against the perennial plagues of humanity.

They mean even more. Higher incomes allow governments to build schools so that young people can learn to read and develop the skills necessary to operate complex technologies. As incomes rise further, nations can afford deep scientific inquiries into biology and discover yet other vaccines against yet other diseases. With the resources freed up by economic growth, talented artists have the opportunity to write poetry and compose music, while others have the leisure time to read, to listen, and to perform. Although there is no single pattern of economic development, and the evolution of culture will differ around the world, freedom from hunger, disease, and the elements is a universal human aspiration.

But centuries of human history also show that warm hearts alone will not feed the hungry or heal the sick. Determining the best route to economic progress requires cool heads, ones that objectively weigh the costs and benefits of different approaches, trying as hard as humanly possible to keep the analysis free from the taint of wishful thinking. Sometimes, economic progress will require shutting down an outmoded factory. Sometimes, as when the formerly socialist countries adopted market principles, things get worse before they get better. Choices are particularly difficult in the field of health care, where limited resources literally involve life and death.

You may have heard the saying, "From each according to his ability, to each according to his need." Governments have learned that no society can long operate solely on this utopian principle. To maintain a healthy economy, governments must preserve incentives for people to work and to save. Societies can shelter for a while those who become unemployed, but if social insurance becomes too generous, people come to depend upon the government. If they begin to believe that the government owes them a living, this may dull the sharp edge of enterprise. Just

because government programs derive from lofty purposes does not mean that they should be pursued without care and efficiency.

Society must find the right balance between the discipline of the market and the generosity of the welfare state. By using cool heads to inform our warm hearts, economic science can do its part in ensuring a prosperous and just society.

1.3 MAJOR PROBLEMS OF AN ECONOMY

Every human society-whether it is an advanced industrial nation, a centrally planned economy, or an isolated tribal nation-must confront and resolve three fundamental economic problems. Every society must have a way of determining what commodities are produced, how these goods are made, and for whom they are produced.

Indeed, these three fundamental questions of economic organization-what, how, and for whom-are as crucial today as they were at the dawn of human civilization. Let's look more closely at them:

- **What commodities are produced and in what quantities?** A society must determine how much of each of the many possible goods and services it will make, and when they will be produced. Will we produce pizzas or shirts today? A few high-quality shirts or many cheap shirts? Will we use scarce resources to produce many consumption goods (like pizzas)? Or will we produce fewer consumption goods and more investment goods (like pizza-making machines), which will boost production and consumption tomorrow.
- **How are goods produced?** A society must determine who will do the production, with what resources, and what production techniques they will use. Who farms and who teaches? Is electricity generated from oil, from coal, or from the sun? With much air pollution or with little?

- **For whom are goods products?** Who gets to eat the fruit of economic activity? Or, to put it formally, how is the national product divided among different households? Are many people poor and a few rich? Do high incomes go to managers or athletes or workers or landlords? Will society provide minimal consumption to the poor, or must they work if they are to survive?

In thinking about economic problems, we must distinguish questions of fact from questions of fairness. Positive economics describes the facts of an economy, while normative economics value judgments. **Positive economics** deals with questions such as: Why do doctors earn more than janitors? Does free trade raise or lower wages for most Americans? What is the economic impact of raising taxes? Although these are difficult questions to answer, they can all be resolved by reference to analysis and empirical evidence. That puts them in the realm of positive economics. **Normative economics** involves ethical precepts and norms of fairness. Should poor people be required to work if they are to get government assistance? Should unemployment be raised to ensure that price inflation does not become too rapid? Should the United States penalize China because it is pirating U.S. books and CDs? There is no right or wrong answers to these questions because they involve ethics and values rather than facts. They can be resolved only by political debate and decisions, not by economic analysis alone.

1.3.1 Alternative Economic Systems

What are the different ways that a society can answer the questions of what, how, and for whom? Different societies are organized through alternative economic systems, and economics studies the various mechanisms that a society can use to allocate its scarce resources.

We generally distinguish two fundamentally different ways of organizing an economy. At one extreme, government makes most economic decisions, with those on top of the hierarchy giving economic commands to those further down the ladder. At the other extreme, decisions are made in markets, where individuals or enterprises voluntarily agree to exchange goods and services, usually through payments of money. Let's briefly examine each of these two forms of economic organization.

In the most democratic countries, most economic questions are solved by the market. Hence their economic systems are called market economies. A market economy is one in which individuals and private firms make the major decisions about production and consumption. A system of prices, of markets, of profits and losses, of incentives and rewards determines what, how, and for whom. Firms produce the commodities that yield the highest profits (the what) by the techniques of production that are least costly (the how). Consumption is determined by individuals' decisions about how to spend the wages and property incomes generated by their labor and property ownership (the for whom). The extreme case of a market economy, in which the government keeps its hands off economic decisions, is called a **laissez-faire** economy.

By contrast, a **command economy** is one in which the government makes all-important decisions about production and distribution. In a command economy, such as the one which operated in the Soviet Union during most of this century, the government owns most of the means of production (land and capital); it also owns and directs the operations of enterprises in most industries; it is the employer of most workers and tells them how to do their jobs; and it decides how the output of the society is to be divided among different goods and services. In short, in a command economy, the government answers the major economic questions through its ownership of resources and its power to enforce decisions.

No contemporary society falls completely into either of these polar categories. Rather, all societies are **mixed economies**, with elements of market and command. There has never been a 100 percent market economy (although nineteenth-century England came close).

Today most decisions in the economic front are made in the marketplace. But the government plays an important role in overseeing the functioning of the market; governments pass laws that regulate economic life, produce educational and police services, and control pollution. Most societies today operate mixed economies.

1.3.2 Economic Inputs and Outputs

Each economy has a stock of limited resources - labor, technical knowledge, factories and tools, land, energy. In deciding what and how things should be produced, the economy is in reality deciding how to allocate its resources among the thousands of different possible commodities and services. How much land will go into growing wheat? Or into housing the population? How many factories will produce computers? How many will make pizzas? How many children will grow up to play professional sports or to be professional economists or to program computers?

Faced with the undeniable fact that goods are scarce relative to wants, an economy must decide how to cope with limited resources. It must choose among different potential bundles of goods (the what), select from different techniques of production (the how), and decide in the end that will consume the goods (the for whom).

To answer these three questions, every society must make choices about the economy's inputs and outputs. **Inputs** are commodities or services that are used to produce goods and services. An economy uses its existing technology to combine inputs to produce outputs. **Outputs** are the various useful goods or services that result from the production process and are either consumed or employed in further production. Consider the "production" of pizza. We say that the eggs, flour, heat,

pizza oven, and chef's skilled labor are the inputs. The tasty pizza is the output. In education, the inputs are the time of the faculty, the laboratories and classrooms, the textbooks, and so on, while the outputs are educated and informed citizens.

Another term for inputs is factors of production. These can be classified into three broad categories: land, labor and capital.

- **Land** - or, more generally, natural resources - represents the gift of nature to our productive processes. It consists of the land used for farming or for underpinning houses, factories, and roads; the energy resources that fuel our cars and heat our homes; and the no energy resources like copper and iron ore and sand. In today's congested world, we must broaden the scope of natural resources to include our environmental resources, such as clean air and drinkable water.
- **Labor** consists of the human time spent in production- working in automobile factories, tilling the land, teaching school, or baking pizzas. Thousands of occupations and tasks, at all skill levels, are performed by labor. It is at once the most familiar and the most crucial input for an advanced industrial economy.
- **Capital** resources form the durable goods of an economy, produced in order to produce yet other goods. Capital goods include machines, roads, computers, hammers, trucks, steel mills, automobiles, washing machines, and buildings. As we will later see, the accumulation of specialized capital goods is essential to the task of economic development.

Restating the three economic problems in terms of inputs and outputs, a society must decide (1) what outputs to produce, and in what quantity; (2) how to produce them - that is, by what techniques inputs should be combined to produce the desired outputs; and (3) for whom the outputs should be produced and distributed.

Societies cannot have everything they want. The resources and the technology available to them are limited. Take defense spending as an example.

TABLE 1.1. Limitation of Scare Resources Implies the Guns-Butter Tradeoff

Possibilities	Butter (millions of rupees)	Guns (thousands)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

Scarce inputs and technology imply that the production of guns and butter is limited. As we go from A to B.... to F, we transferring labor, machines, and land from the gun industry to butter and can thereby increase butter production.

Countries are always being forced to decide how much of their limited resources go to their military and how much goes into other activities (such as new factories or education). Some countries, like Japan, allocate about 1 percent of their national output to their military. The United States spends 5 percent of its national output on defense, while a fortress economy like North Korea spends up to 20 percent of its national output on the military. The more output that goes for defense, the less there is available for consumption and investment.

Let us dramatize this choice by considering an economy, which produces only two economic goods, guns and butter. The guns, of course, represent military spending, and the butter stands for civilian spending. Suppose that our economy decides to throw all its energy into producing the civilian good, butter. There is a maximum amount of butter depends on the quantity and quality of the economy's resources and

the productive efficiency with which they are used. Suppose 5 million rupees of butter is the maximum amount that can be produced with the existing technology and resources.

At the other extreme, imagine that all resources are instead devoted to the production of guns. Again, because of resource limitations, the economy can produce only a limited quantity of guns. For this example, assume that the economy can produce 15,000 guns of a certain kind if no butter is produced.

These are two extreme possibilities. In between are many others. If we are willing to give up some butter, we can have some guns. If we are willing to give up still more butter, we can have still more guns.

A schedule of possibilities is given in Table1.1, Combination F shows the extreme where all butter and no guns are produced, while A depicts the opposite extreme where all resources go into guns. In between at E, D, C and B increasing amounts of butter are given up in return for more guns.

How, you might well ask, can a nation turn butter into guns? Butter is transformed into guns not physically but by the alchemy of diverting the economy's resources from one use to the other.

- **Opportunity Costs -** Life is full of choices. Because resources are scarce, we must always consider how to spend our limited incomes or time. When you decide whether to study economics, buy a car, or go to college, in each case you must consider how much the decision will cost in terms of forgone opportunities. The cost of the forgone alternative is the opportunity cost of the decision.

  Consider the real-world example of the cost of opening a gold mine near Yellowstone National Park. The developer argues that the mine will have but a small cost because the fees for Yellowstone will hardly be affected. But an economist would answer that the dollar receipts are too narrow a measure of cost. We should ask whether the unique and

precious qualities of Yellowstone might be degraded if a gold mine were to operate, with the accompanying noise, water and air pollution, and degradation of amenity value for visitors. While the dollar cost might be small, the opportunity cost in lost wilderness values might be large indeed.

In a world of scarcity, choosing one thing means giving up something else. The **opportunity cost** of a decision is the value of the good or service forgone.

- **Efficiency-** All of our explanations up to now have implicitly assumed that the economy is producing efficiently that is, it is on, rather than inside, the production possibility frontier. Remember that efficiency means that the economy's resources are being used as effectively as possible to satisfy people's needs and desires. One important aspect of overall economic efficiency is productive efficiency. Productive efficiency occurs when an economy cannot produce more of one good without producing less of another good; this implies that the economy is standing on its production-possibilities.

1.3.3 Economic Analysis

Economic analysis is used in many situations. When British Petroleum sets the price for its Alaskan crude oil, it uses an estimated demand model, both for gasoline consumers and also for the refineries to which BP sells. The demand for oil by refineries is governed by a complex economic model used by the refineries and BP estimates the demand by refineries by estimating the economic model used by refineries. Economic analysis was used by experts in the antitrust suit brought by the U.S. Department of Justice, both to understand Microsoft's incentive to foreclose (eliminate from the market) rival Netscape and consumer behavior in the face of alleged foreclosure. Stock market analysts use economic models to forecast the

profits of companies in order to predict the price of their stocks. When the government forecasts the budget deficit or considers a change in environmental regulations, it uses a variety of economic models.

Economic analysis is used for two main purposes. The first is a scientific understanding of how allocations of goods and services – scarce resources – are actually determined. This is a *positive* analysis, analogous to the study of electromagnetism or molecular biology, and involves only the attempt to understand the world around us. The development of this positive theory, however, suggests other uses for economics. Economic analysis suggests how distinct changes in laws, rules and other government interventions in markets will affect people, and in some cases, one can draw a conclusion that a rule change is, on balance, socially beneficial. Such analyses combine positive analysis – predicting the effects of changes in rules – with value judgments, and are known as *normative* analyses. For example, a gasoline tax used to build highways harms gasoline buyers (who pay higher prices), but helps drivers (who face fewer potholes and less congestion). Since drivers and gasoline buyers are generally the same people, a normative analysis may suggest that everyone will benefit. This type of outcome, where everyone is made better off by a change, is relatively uncontroversial.

In contrast, *cost-benefit analysis* weighs the gains and losses to different individuals and suggests carrying out changes that provide greater benefits than harm. For example, a property tax used to build a local park creates a benefit to those who use the park, but harms those who own property (although, by increasing property values, even non-users obtain some benefits). Since some of the taxpayers won't use the park, it won't be the case that everyone benefits on balance. Cost-benefit analysis weighs the costs against the benefits. In the case of the park, the costs are readily monetized (turned into dollars), because the costs to the tax-payers are just the amount of the tax. In contrast, the benefits are much more challenging to estimate. Conceptually, the benefits are the amount the park users would be willing

to pay to use the park if the park charged admission. However, if the park doesn't charge admission, we would have to estimate willingness-to-pay. In principle, the park provides greater benefits than costs if the benefits to the users exceed the losses to the taxpayers. However, the park also involves transfers from one group to another.

Welfare analysis provides another approach to evaluating government intervention into markets. Welfare analysis posits social preferences and goals, like helping the poor. Generally a welfare analysis involves performing a cost-benefit analysis taking account not just of the overall gains and losses, but also weighting those gains and losses by their effects on other social goals. For example, a property tax used to subsidize the opera might provide more value than costs, but the bulk of property taxes are paid by the lower and middle income people, while the majority of opera-goers are rich. Thus, the opera subsidy represents a transfer from relatively low income people to richer people, which is generally not consistent with societal goals of equalization. In contrast, elimination of sales taxes on basic food items like milk and bread generally has a relatively greater benefit to poor, who spend a much larger percentage of their income on food, than to the rich. Thus, such schemes may be considered desirable not so much for their overall effects but for their redistribution effects.

Economics is helpful not just in providing methods for determining the overall effects of taxes and programs, but also the *incidence* of these taxes and programs, that is, who pays, and who benefits. What economics can't do, however, is say that ought to benefit. That is a matter for society at large to decide.

1.4 CHECK YOUR PROGRESS

Answer the following fill up on the basis of your knowledge regarding this chapter:

1- Managerial Economics as a subject gained popularity first in_____.

2- Which subject studies the behaviour of the firm in theory and practice_____.

3- Any activity aimed at earning or spending money is called_____.

4- When the subject Managerial Economics gained popularity_____.

5- _____is known as father of economics.

1.5 SUMMARY

Economics is the study of how societies choose to use scarce productive resources that have alternative uses, to produce commodities of various kinds, and to distribute them among different groups. We study economics to understand not only the world we live in but also the many potential worlds that reformers are constantly proposing to us. Goods are scarce because people desire much more than the economy can produce. Economic goods are scarce, not free, and society must choose among the limited goods that can be produced with its available resources. Microeconomics is concerned with the behavior of individual entities such as markets, firms, and households. Macroeconomics views the performance of the economy as a whole. Through all economics, beware of the fallacy of composition and the post hoc fallacy, and remember to keep other things constant.

Every society must answer three fundamental questions: what, how and for whom? What kinds and quantities are produced among the wide range of all possible goods and services? How are resources used in producing these goods? Whom are the goods produced (that is, what is the distribution of income and consumption among different individuals and classes)? Societies answer these questions in different ways. The most important forms of economic organization today are command and market. The command economy is directed by centralized government control; a market economy is guided by an informal system of prices and profits in which most decisions are made by private individuals and firms. All societies have different combinations of command market; all societies are mixed economies.

Productive efficiency occurs when production of one good cannot be increased without curtailing production of another good. Production-possibilities illustrate many basic economic processes: how economic growth pushes out the frontier, how a nation chooses relatively less food and other necessities as it develops, how a

country chooses between private goods and public goods, and how societies choose between consumption goods and capital goods that enhance future consumption.

Economic reasoning is rather easy to satirize. One might want to know, for instance, what the effect of a policy change – a government program to educate unemployed workers, an increase in military spending, or an enhanced environmental regulation – will be on people and their ability to purchase the goods and services they desire. Unfortunately, a single change may have multiple effects. As an absurd and tortured example, government production of helium for (allegedly) military purposes reduces the cost of children's birthday balloons, causing substitution away from party hats and hired clowns. The reduction in alternatives for clowns reduces clowns' wages and thus reduces the costs of running a circus. This cost reduction increases the number of circuses, thereby forcing zoos to lower admission fees to compete with circuses. Thus, were the government to stop subsidizing the manufacture of helium, the admission fee of zoos would likely rise, even though zoos use no helium. This example is superficially reasonable, although the effects are so miniscule as to be irrelevant.

To make any sense at all of the effects of a change in economic conditions, it is helpful to divide up the effect into pieces. Thus, we will often look at the effects of a change "other things equal," that is, assuming nothing else changed. This isolates the effect of the change. In some cases, however, a single change can lead to multiple effects; even so, we will still focus on each effect individually. A gobbledygook way of saying "other things equal" is to use Latin and say "*ceteris paribus*." Part of your job as a student is to learn economic jargon, and that is an example. Fortunately, there isn't too much jargon. We will make a number of assumptions that you may not find very easy to believe. Not all of the assumptions are required for the analysis, and instead merely simplify the analysis. Some, however, are required but deserve an explanation. There is a frequent assumption that the people we will talk about seem exceedingly selfish relative to most people we know. We model the choices

that people make, assuming that they make the choice that is best for them. Such people – the people in the models as opposed to real people – are known occasionally as "homo economicus." Real people are indubitably more altruistic than homo economicus, because they couldn't be less: homo economicus is entirely selfish. (The technical term is acting in one's *selfinterest.*)

1.6 KEYWORDS

Economics- It is the study of how societies use scarce resources to produce valuable commodities and distribute them among different people.

Microeconomics- It the branch of economics, which today is concerned, with the behaviour of individual entities as markets, firms, and households.

Macroeconomics- It is a major branch of our subject i.e. Economics and it is concerned with the overall performance of the economy.

Laissez-faire Economy- The extreme case of a market economy, in which the government keeps its hands off economic decisions, is called a **laissez-faire** economy.

Command Economy- It is economy in which the government makes all-important decisions about production and distribution.

1.7 SELF-ASSESSMENT TEST

1. Define economics. Discuss the significance of economics in modern times.
2. "Scarcity and efficiency go hand to hand in a society". Discuss the statement in the light of the twin themes of economics.
3. Discuss and differentiate between the microeconomics and macroeconomics. Which economics is more useful to the nation?
4. *Explain the term economic system. Discuss the alternative economic systems in different countries of the World. "Economics may be defined*

as the study of the allocation of scarce resources among competing ends." Examine the statement.

5. *Discuss and illustrate the different tools of economic analysis that are essentials in decision making process.*
6. *"The objective of economic analysis is not merely to discover the truth but also to assist in the solution of concrete problems." Comment.*
7. Explain and illustrate the input and output analysis in economics. Elaborate how various problems are solved through this analysis.
8. " The use of Internet has been increasing in the study of economics but the necessary precautions are more important". Discuss

FUNDAMENTAL ECONOMIC CONCEPTS

Structure

2.0 LEARNING OBJECTIVES

On learning this lesson, the students will be able to understand the fundamental economic concepts and their relevance in economic analysis.

2.1 INTRODUCTION

The discipline now called economics originated as "political economy." Its first great exponent was Adam Smith (The Wealth of Nations, 1776). Unlike the earlier speculations of philosophers like Aristotle, or even the French "physiocrats" the

form of logic, and the nature of the appeal to evidence, placed Smith and his followers within the framework of science. The pattern of fragmentation and specialization common to the twentieth century split off political science from economics, although in public policy analysis the term political economy still applies.

Economics has two main divisions: 1) Macroeconomics, the economics of large units (nations and larger), concentrates on issues of aggregate price level changes (inflation) and unemployment. 2) Microeconomics, the economics of small units-individuals, firms (producing units), and the markets for particular goods. The second is seen as the more fundamental; since theories and phenomena in (1) are considered to be depend on how things work in (2).

Economics is harder, in some ways, to learn and to use than the "physical" sciences like physics, chemistry, or even biology. It is much harder to use techniques such as controlled experiments in this discipline (though some use is made of such experiments). Economists are very dependent on statistical measurements and inferences. However, some aspects of this discipline, like all other sciences, cannot really be tested, but are fundamental assumptions about the nature of reality, in this case a set of assumptions about social reality. The nature and importance of some of these assumptions will become clear in the material presented below.

Smith and his followers are usually termed the classical school. In the mid to late 19th century, some of their methods and conclusions were challenged by Karl Marx, though he kept, in revised form, much of their analysis (especially that of David Ricardo). One of the assumptions Marx criticized and discarded was the assumption that society was really just the sum of the individuals who make it up. He considered that this assumption concealed the way societies were formed out of social classes.

The neoclassical school we will be using in this course arose, in part, as a reaction to Marx's challenge, a way to salvage the fundamentals of the classical school's basic assumptions and to avoid some of Marx's conclusions. [This required the discarding

of a feature common to Smith, Ricardo, and Marx-the "labor theory of value." That theory will not be used in this course.] The neoclassical school maintained the assumption that society could be analyzed by looking at the individuals who make it up. They disavowed the central role of classes; indeed they ignored the entire concept of class.

This assumption, the centrality of the individual, was the most fundamental assumption of the classical school (excluding Marx) and now it is equally fundamental for the neoclassical school. It implies that to understand economic reality it is necessary to begin with a model of individual behavior. [Note that to Marx the equally fundamental assumption is that one must begin with the behavior and relationships of classes. There is no role whatever for discussions of group behavior in neoclassical analysis, and the term class might just as well not exist.]

In any situation, the first thing a neoclassical economist should consider is: what is the optimum (best possible) decision that an individual in this situation could make? In this context the "best" means best for the individual human being making the decision. This is often called the assumption of "homo economicus" [which is Latin for economic man], a sort of cartoon version of real people. This does not necessarily exclude concerns an individual may have for family, country, etc., but such concerns are ignored when doing economic analysis, unless there is some very specific reason to include them.

The neoclassical school doesn't just consider the individual as the best place to begin an analysis, it also trusts the individual. That is, the individual is considered to be the best judge of his or her own best interests. From this it follows that anything which interposes anyone else's judgment (government for example) is usually a bad thing. As a result the institution that economists of the neoclassical variety tend to rely on most is the market. Markets are a kind of institution in which all that matters are individual choices; people interact with others only to the extent that they want to interact. Markets foster individuality and impersonality. They foster (as will be

shown later) efficiency in production and consumption of goods and services. However, markets have no place for friendship or compassion, and those things will play very little role in the remainder of this course.

A common neoclassical definition of the domain of the discipline of economics is that it examines "the allocation of scarce resources to meet unlimited goals." This definition is more relevant to microeconomics (the focus of this course) than macroeconomics. This definition points to another key assumption in this approach to the discipline. That is, that the assumption that goals (i.e., human desires) are potentially infinite. This means that with finite resources it is never possible for people to have all they want. Without that assumption, the approach employed in the rest of this course is meaningless. With this assumption, the material in the next section is the basis for all the analysis done in this field.

The goal of the individual is presumed to be to get the best possible outcome for him or her self, but the word "possible" is central to the problems this course addresses. Neoclassical economics virtually never deals with situations where individuals can get all that they want without running into some kind of limit. Almost always the individual cannot get more of one thing he or she desires without giving up something else which is also desired. The general term used for this is "opportunity cost."

For you to get another sandwich, you might have to give up having another beer. No matter how large your income, it is not so large that you can have all you could want of both (and all the rest of the goods you desire). Similarly, to invest funds in one place means those funds are not available to invest someplace else. There are never enough funds available to anyone to allow them to get involved in all the potentially profitable opportunities in the world.

Opportunity cost is the truest measure of the cost of any choice made. Money amounts are just a way of summarizing what else could have been done. In making

any decision, to make the best choice a person's attention should always be on how this decision ranks relative to the alternatives that could be chosen.

Another term, originally used in the United States, is TANSTAAFL, which stands for "ThereAren't No Such Thing as a Free Lunch." The reference is to an old American business practice: eating and drinking establishments would offer a "free lunch" to those who bought drinks (usually beer). The "free" food was usually very salty meats, peanuts, pickles-all foods that made people very thirsty, so they would buy more beer. The price of the "free food" was not zero; it was hidden in the price of the beer. The lesson is that when something is called free, it is never really free; there is always a price, even if you can't see it. One job for economists is to find the price-what had to be given up-and ask if the price was too high.

These days, as you will see in some of the later material, the description of what people want, the "best," the opportunity costs, and the constraint, are presented in mathematical form whenever possible. This allows greater precision in describing the problem of optimizing-finding the best solution-when faced with limits, and in determining the response of people to changes in their circumstances.

In neoclassical analysis it is usually assumed that, if you can determine what the best response is, people will choose that one. People are assumed to be good at making decisions in their own best interests. If, in a given case, you think a bad decision was made, this style of analysis suggests that you had better look again. It is possible that the person who made the decision knew things about the situation that you do not know. It is not impossible to find people making errors, and to analyze their errors, it is just more like the last thing to consider, not the first.

Mathematical formulations of the foregoing assumptions, structured to describe specific situations, allow the use of statistics to estimate the quantitative relationships between variables involved in making any decision. Such formulations also allow statistical predictions of what a change in one or more variables will do to individual decisions, and ultimately to predictions of market results. Such

procedures are vital to the practical use of economics by decision makers in business and elsewhere.

2.2 FUNDAMENTAL CONCEPTS OF ECONOMICS

Many other industrialized countries has increased considerably particularly since the Great Depression of the 1930s. Central banks took control of the monetary system; labor unions, supported by government legislation gained in influence; regulations about worker safety, antidiscrimination and anti-trust (against big businesses) multiplied; social programs, such as social security, unemployment compensation, and subsidies to farmers were deemed necessary; new deal types of government spending (Tennessee Valley Authority) to artificially create jobs became commonplace; and to fund the direct government expenses and the exponentially growing number of government employees, taxes to individuals and businesses skyrocketed. Before we delve into the question as to whether the increased role of the government in the United States and other industrialized countries has been beneficial, let's take a look at some fundamental concepts about the economy and the way it works.

1. Economics

What is economics about? Many people relate it to anything having to do with money and how to make as much of it as possible. Others claim that it deals with making choices and facing tradeoffs. Still others associate it with government fiscal and monetary policies and how they can best help a country's economic health. The real purpose of economics research is its ability to explain how we can most optimally achieve the highest standard of living possible. A good definition therefore is: economics is the study of how we can best increase a country's wealth with the resources that we have available to us. Wealth in this definition includes

tangible (cars, houses, etc) as well as intangible (more leisure time, cleaner air, etc.) products. As you may know, there is quite some disagreement over how a country should go about achieving the optimum amount of wealth. Some economics advocate a great amount of government involvement, price controls, active monetary policy, etc. Others believe that government involvement should be minimal and limited to tasks related to defending individual rights, defense, police and fire protection, etc. And many believe that a combination of moderate government involvement and private initiative is ideal in achieving the highest standard of living. There are also various opinions about the role of profits, consumer spending, saving, capital formation, unions, etc. in our economy. Should we tax profits to more equally distribute the wealth in our country? Should we encourage spending (and discourage saving) to stimulate economic growth? Do unions raise real wages? We will touch on this and other important economic issues in this workbook.

2. Economic Analysis

Economic analysis is used in many situations. When British Petroleum sets the price for its Alaskan crude oil, it uses an estimated demand model, both for gasoline consumers and also for the refineries to which BP sells. The demand for oil by refineries is governed by a complex economic model used by the refineries and BP estimates the demand by refineries by estimating the economic model used by refineries. Economic analysis was used by experts in the antitrust suit brought by the U.S. Department of Justice; both to understand Microsoft's incentive to foreclose (eliminate from the market) rival Netscape and consumer behavior in the face of alleged foreclosure. Stock market analysts use economic models to forecast the profits of companies in order to predict the price of their stocks. When the government forecasts the budget deficit or considers a change in environmental regulations, it uses a variety of economic models.

Economic analysis is used for two main purposes. The first is a scientific understanding of how allocations of goods and services – scarce resources – are actually determined. This is a *positive* analysis, analogous to the study of electromagnetism or molecular biology, and involves only the attempt to understand the world around us. The development of this positive theory, however, suggests other uses for economics. Economic analysis suggests how distinct changes in laws, rules and other government interventions in markets will affect people, and in some cases, one can draw a conclusion that a rule change is, on balance, socially beneficial. Such analyses combine positive analysis – predicting the effects of changes in rules – with value judgments, and are known as *normative* analyses. For example, a gasoline tax used to build highways harms gasoline buyers (who pay higher prices), but helps drivers (who face fewer potholes and less congestion). Since drivers and gasoline buyers are generally the same people, a normative analysis may suggest that everyone will benefit. This type of outcome, where everyone is made better off by a change, is relatively uncontroversial.

3. Cost-benefit Analysis

In contrast, *cost-benefit analysis* weighs the gains and losses to different individuals and suggests carrying out changes that provide greater benefits than harm. For example, a property tax used to build a local park creates a benefit to those who use the park, but harms those who own property (although, by increasing property values, even non-users obtain some benefits). Since some of the taxpayers won't use the park, it won't be the case that everyone benefits on balance. Cost-benefit analysis weighs the costs against the benefits. In the case of the park, the costs are readily monetized (turned into dollars), because the costs to the tax-payers are just the amount of the tax. In contrast, the benefits are much more challenging to estimate. Conceptually, the benefits are the amount the park users would be willing to pay to use the park if the park charged admission. However, if the park doesn't

charge admission, we would have to estimate willingness-to-pay. In principle, the park provides greater benefits than costs if the benefits to the users exceed the losses to the taxpayers. However, the park also involves transfers from one group to another.

4. Welfare Analysis

Welfare analysis provides another approach to evaluating government intervention into markets. Welfare analysis posits social preferences and goals, like helping the poor. Generally a welfare analysis involves performing a cost-benefit analysis taking account not just of the overall gains and losses, but also weighting those gains and losses by their effects on other social goals. For example, a property tax used to subsidize the opera might provide more value than costs, but the bulk of property taxes are paid by the lower and middle income people, while the majority of opera-goers are rich. Thus, the opera subsidy represents a transfer from relatively low income people to richer people, which is generally not consistent with societal goals of equalization. In contrast, elimination of sales taxes on basic food items like milk and bread generally has a relatively greater benefit to poor, who spend a much larger percentage of their income on food, than to the rich. Thus, such schemes may be considered desirable not so much for their overall effects but for their redistribution effects.

5. **Opportunity *Cost***

Economists use the idea of cost in a slightly quirky way that makes sense once you think about it, and we use the term *opportunity cost* to remind you occasionally of our idiosyncratic notion of cost. For an economist, the cost of something is not just the cash payment, but all of the value given up in the process of acquiring the thing. For example, the cost of a university education involves tuition, and text book purchases, and also the wages that would have been earned during the time at

university, but were not. Indeed, the value of the time spent in acquiring the education – how much enjoyment was lost – is part of the cost of education. However, some "costs" are not opportunity costs. Room and board would not generally be a cost because, after all, you are going to be living and eating whether you are in university or not. Room and board are part of the cost of an education only insofar as they are more expensive than they would be otherwise. Similarly, the expenditures on things you would have otherwise done – hang-gliding lessons, a trip to Europe – represent savings. However, the value of these activities has been lost while you are busy reading this lesson.

The concept of opportunity cost can be summarized by a definition: *The opportunity cost is the value of the best foregone alternative.* This definition captures the idea that the cost of something is not just its monetary cost but also the value of what you didn't get. The opportunity cost of spending $17 on a CD is what you would have done with the $17 instead, and perhaps the value of the time spent shopping. The opportunity cost of a puppy includes not just the purchase price of the puppy, but also the food, veterinary bills, carpet cleaning, and the value of the time spent dealing with the puppy. A puppy is a good example, because often the purchase price is a negligible portion of the total cost of ownership. Yet people acquire puppies all the time, in spite of their high cost of ownership. Why? The economic view of the world is that people acquire puppies because the value they expect to get exceeds the opportunity cost. That is, they acquire a puppy when the value of a puppy is higher than the value of what is foregone by the acquisition of a puppy.

Even though opportunity costs include lots of non-monetary costs, we will often monetize opportunity costs, translating the costs into dollar terms for comparison purposes. Monetizing opportunity costs is clearly valuable, because it gives a means of comparison. What is the opportunity cost of 30 days in jail? It used to be that judge's occasionally sentenced convicted defendants to "thirty days or thirty dollars," letting the defendant choose the sentence. Conceptually, we can use the

same idea to find out the value of 30 days in jail. Suppose you would choose to pay a fine of $750 to avoid the thirty days in jail, but wouldn't pay $1,000 and instead would choose time in the slammer. Then the value of the thirty day sentence is somewhere between $750 and $1000. In principle, there exists a price where at that price you pay the fine, and at a penny more you go to jail. That price – at which you are just indifferent to the choice – is the monetized or dollar cost of the jail sentence. The same idea as choosing the jail sentence or the fine justifies monetizing opportunity costs in other contexts. For example, a gamble has a *certainty equivalent*, which is the amount of money that makes one indifferent to choosing the gamble versus the certain amount. Indeed, companies buy and sell risk, and much of the field of *risk management* involves buying or selling risky items to reduce overall risk. In the process, risk is valued, and riskier stocks and assets must sell for a lower price (or, equivalently, earn a higher average return). This differential is known as a *risk premium*, and it represents a monetization of the risk portion of a risky gamble.

6. Ceteris Paribus

To make any sense at all of the effects of a change in economic conditions, it is helpful to divide up the effect into pieces. Thus, we will often look at the effects of a change "other things equal," that is, assuming nothing else changed. This isolates the effect of the change. In some cases, however, a single change can lead to multiple effects; even so, we will still focus on each effect individually. A gobbledygook way of saying "other things equal" is to use Latin and say "*ceteris paribus*." Part of your job as a student is to learn economic jargon, and that is an example. Fortunately, there isn't too much jargon. We will make a number of assumptions that you may not find very easy to believe. Not all of the assumptions are required for the analysis, and instead merely simplify the analysis. Some, however, are required but deserve an explanation. There is a frequent assumption that the people we will talk about seem exceedingly selfish relative to most people we know. We model the choices

that people make, assuming that they make the choice that is best for them. Such people – the people in the models as opposed to real people – are known occasionally as "homo economicus." Real people are indubitably more altruistic than homo economicus, because they couldn't be less: homo economicus is entirely selfish. (The technical term is acting in one's *self-interest.*)

That doesn't necessarily invalidate the conclusions drawn from the theory. However, people often make decisions as families or households rather than individuals, and it may be sensible to consider the household as the "consumer." That households are fairly selfish is more plausible perhaps than individuals being selfish. Economics is pretty much silent on *why* consumers want things. You may want to make a lot of money so that you can build a hospital or endow a library, which would be altruistic things to do. Such motives are broadly consistent with self-interested behavior. Corporations are often required to serve their shareholders by maximizing the share value, inducing self-interested behavior on the part of the corporation. Even if corporations had no legal responsibility to act in the financial interest of their shareholders, capital markets may force them to act in the self-interest of the shareholders in order to raise capital. That is, people choosing investments that generate a high return will tend to force corporations to seek a high return. There are many good, and some not-so-good, consequences of people acting in their own self-interest, which may be another reason to focus on self-interested behavior.

Thus, while there are limits to the applicability of the theory of self-interested behavior, it is a reasonable methodology for attempting a science of human behavior. Self-interested behavior will often be described as "maximizing behavior," where consumers maximize the value they obtain from their purchases, and firms maximize their profits. One objection to the economic methodology is that people rarely carry out the calculations necessary to literally maximize anything. However, that is not a sensible objection to the methodology. People don't carry out the physics calculations to throw a baseball or thread a needle, either, and yet they

accomplish these tasks. Economists often consider that people act “as if” they maximize an objective, even though no calculations are carried out.

The way economics is performed is by a proliferation of mathematical models, and this proliferation is reflected in this book. Economists reason with models. Models help by removing extraneous details from a problem or issue, letting one analyze what remains more readily. In some cases the models are relatively simple, like supply and demand. In other cases, the models are relatively complex. In all cases, the models are the simplest model that lets us understand the question or phenomenon at hand. The purpose of the model is to illuminate connections between ideas. A typical implication of a model is “when *A* increases, *B* falls.” This “comparative static” prediction lets us see how *A* affects *B*, and why, at least in the context of the model. The real world is always much more complex than the models we use to understand the world. That doesn’t make the model useless, indeed, exactly the opposite. By stripping out extraneous detail, the model represents a lens to isolate and understand aspects of the real world.

7. Supply And Demand

Supply and demand are the most fundamental tools of economic analysis. Most applications of economic reasoning involve supply and demand in one form or another. When prices for home heating oil rise in the winter, usually the reason is that the weather is colder than normal and as a result, demand is higher than usual. Similarly, a break in an oil pipeline creates a short-lived gasoline shortage, as occurred in the Midwest in the year 2000, which is a reduction in supply. The price of DRAM, or dynamic random access memory, used in personal computers falls when new manufacturing facilities begin production, increasing the supply of memory.

Eating a French fry makes most people a little bit happier, and we are willing to give up something of value – a small amount of money, a little bit of time – to eat one.

What we are willing to give up measures the value – our personal value – of the French fry. That value, expressed in dollars, is the *willingness to pay* for French fries. That is, if you are willing to give up three cents for a single French fry, your willingness to pay is three cents. If you pay a penny for the French fry, you've obtained a net of two cents in value. Those two cents – the difference between your willingness to pay and the amount you do pay – is known as *consumer surplus*. Consumer surplus is the value to a consumer of consumption of a good, minus the price paid.

8. Market Demand

Individuals with their own supply or demand trade in a market, which is where prices are determined. Markets can be specific or virtual locations – the farmer's market, the New York Stock Exchange, eBay – or may be an informal or more amorphous market, such as the market for restaurant meals in Billings, Montana or the market for roof repair in Schenectady, New York.

Individual demand gives the quantity purchased for each price. Analogously, the *market demand* gives the quantity purchased by all the market participants – the sum of the individual demands – for each price. This is sometimes called a "horizontal sum" because the summation is over the quantities for each price.

9. Equilibrium

Economists use the term *equilibrium* in the same way as the word is used in physics, to represent a steady state in which opposing forces are balanced, so that the current state of the system tends to persist. In the context of supply and demand, equilibrium refers to a condition where the pressure for higher prices is exactly balanced by a pressure for lower prices, and thus that the current state of exchange between buyers and sellers can be expected to persist.

10. Surplus and Shortage

When the price is such that the quantity supplied of a good or service exceeds the quantity demanded, some sellers are unable to sell because fewer units are purchased than are offered. This condition is called a *surplus*. The sellers who fail to sell have an incentive to offer their good at a slightly lower price – a penny less – in order to succeed in selling. Such price cuts put downward pressure on prices, and prices tend to fall. The fall in prices generally reduces the quantity supplied and increases the quantity demanded, eliminating the surplus. That is, a surplus encourages price cutting, which reduces the surplus, a process that ends only when the quantity supplied equals the quantity demanded.

Similarly, when the price is low enough that the quantity demanded exceeds the quantity supplied, a *shortage* exists. In this case, some buyers fail to purchase, and these buyers have an incentive to accept a slightly higher price in order to be able to trade. Sellers are obviously happy to get the higher price as well, which tends to put upward pressure on prices, and prices rise. The increase in price tends to reduce the quantity demanded and increase the quantity supplied, thereby eliminating the shortage. Again, the process stops when the quantity supplied equals the quantity demanded.

The equilibrium of supply and demand balances the quantity demanded and the quantity supplied, so that there is no excess of either. Would it be desirable, from a social perspective, to force more trade, or to restrain trade below this level?

11. Production Possibilities

Production possibilities frontiers provide the basis for a rudimentary theory of international trade. To understand the theory, it is first necessary to consider that there are fixed and mobile factors. *Factors of production* are jargon for inputs to the production process. Labor is generally considered a fixed factor, because most countries don’t have borders wide open to immigration, although of course some

labor moves across international borders. Temperature, weather, and land are also fixed – Canada is a high-cost citrus grower because of its weather.

There are other endowments that could be exported, but are expensive to export because of transportation costs, including water and coal. Hydropower – electricity generated from the movement of water – is cheap and abundant in the Pacific Northwest, and as a result, a lot of aluminum is smelted there, because aluminum smelting requires lots of electricity. Electricity can be transported, but only with losses (higher costs), which gives other regions a disadvantage in the smelting of aluminum. Capital is generally considered a mobile factor, because plants can be built anywhere, although investment is easier in some environments than in others. For example, reliable electricity and other inputs are necessary most factories. Moreover, the presence of a functioning legal system and the enforcement of contracts, and the absence of bribery, is a comparative advantage of some nations, because enforcement of contracts increases the return on investment by increasing the probability the return isn't taken by others.

12. International Trade

The basic model of international trade was first described by David Ricardo (1772-1823), and suggests that nations, responding to price incentives, will specialize in the production of goods in which they have a comparative advantage, and purchase the goods in which they have a comparative disadvantage. He described England as having a comparative advantage of manufacturing cloth, and Portugal for producing wine, and thus gains from trade from the specialization.

The Ricardian theory suggests that the United States, Canada, Australia and Argentina should export agricultural goods, especially grains that require a large land area for the value generated (they do). It suggests that complex technical goods should be produced in developed nations (they are) and that simpler products and natural resources exported by the lesser developed nations (they are). It also suggests

that there should be more trade between developed and underdeveloped nations than between developed and other developed nations. The theory falters on this prediction – the vast majority of trade is between developed nations. There is no consensus for the reasons for this, and politics plays a role – the North American Free Trade Act vastly increased the volume of trade between the United States and Mexico, for example, suggesting that trade barriers may account for some of the lack of trade between the developed and the underdeveloped world. Trade barriers don't account for the volume of trade between similar nations, which the theory suggests should be unnecessary. Developed nations sell each other mustard and tires and cell phones, exchanging distinct varieties of goods they all produce.

It is fair to say that if factor price equalization works fully in practice, it works very, very slowly. Differences in taxes, tariffs and other distortions make it a challenge to test the theory across nations. On the other hand, within the United States, where we have full factor mobility and product mobility, we still have different factor prices – electricity is cheaper in the Pacific Northwest. Nevertheless, nations with a relative abundance of capital and skilled labor export goods that use these intensively, nations with a relative abundance of land export land intensive goods like food, nations with a relative abundance of natural resources export these resources, and nations with an abundance of low-skilled labor export goods that make intensive use of this labor. The reduction of trade barriers between such nation's works like Ann and Bob's joint production of party platters: by specializing in the goods in which they have a comparative advantage, there is more for all.

13. Business Cycle

An important aspect of the business cycle is that many economic variables move together, or *covary*. Some economic variables vary less with the business cycle than others. Investment varies very strongly with the business cycle, while overall employment varies weakly. Interest rates, inflation, stock prices, unemployment and

many other variables also vary systematically over the business cycle. Some economic variables are much more variable than others. For example, investment, durable goods purchases, and utilization of production capacity vary more dramatically over the business cycle than consumption and employment

14. Nominal and Real Values

When we refer to nominal values, such as nominal prices, earnings, wages or nominal interest rates, we refer to the dollar value of the prices, earnings, wages, or the numerical value of the interest rates. A person earning $10 per hour in today's dollars is said to be earning a nominal wage of $10. Real values are always values in comparison, or relative, to other related economic variables. Thus a person earning a nominal wage of $10 in 1996 may only be earning a real wage of $5 relative to today's doubled prices since, say, 1986. Applying the concept to interest rates, a 12% nominal interest rate is only a 2% real interest rate if prices are rising by 10%.

15. Positive and Normative Economics

Positive economic statements are facts or relationships which can be proven or disproven. A normative economic statement is someone's opinion or value judgment about an economic issue. Such a statement can never be proven. *Au contraire* (as the French would say), a normative statement is one which people commonly argue about. Note that a positive statement does not have to be a true statement; the statement could be disproven. It would be a false positive statement. Also keep in mind that predictions, such as "The Orioles should win the World Series this year," or "The 'skins will be in the Super Bowl again this season," are not considered normative statements, but predictions or hopes (or wishful thinking…) unrelated to facts or value judgments.

16. Cause and Effect

It is tempting to conclude that if one event occurs after another, that the first occurring event caused the second event. After winning its first three games while you were out with an injury, you conclude that it was your fault that your baseball team lost its fourth game as you regained your position in the starting rotation. Of course, your presence could have something to do with it, but you can not necessarily conclude this. Other variables may have played a role: the weather, the umpire, the opponent, your other teammates' performance that day, etc.

Similarly, in economics, people sometimes conclude that if one event follows another, the other must have caused the one. The period following World War II has seen a rising standard of living in industrialized countries around the world. This period has also been accompanied by much greater government involvement in these countries. Can we conclude that greater government involvement causes higher standards of living?

2.3 CHECK YOUR PROGRESS

On the basis of your knowledge answer the following fill in the blanks:

1-_____refers to the integration of economics theory with business practices.

2-_____is defined as the study of aggregate economy studied as a whole.

3- _____is the discipline that studies the use of statistical tools to estimate economic models.

4- The last stage in the five step decision process described in the text is to_____.

5- The economic term for the costs associated with negotiating and enforcing the contract is_____.

2.4 SUMMARY

Economics is integration of different theories, concepts and statistical tools. These concepts are described in detail so that a complete understanding of economics can be gained. The real purpose of economics research is its ability to explain how we can most optimally achieve the highest standard of living possible. Economic

analysis is used for two main purposes. The first is a scientific understanding of how allocations of goods and services – scarce resources – are actually determined. This is a *positive* analysis and involves only the attempt to understand the world around us. In the other cases, one can draw a conclusion that a rule change is, on balance, socially beneficial. Such analyses combine positive analysis – predicting the effects of changes in rules – with value judgments, and are known as *normative* analyses. Now, the economic analysis can be done because we had adequate knowledge regarding the concepts such as demand, supply, market, opportunity cost, nominal and real values, cause and effect, etc.

2.5 KEYWORDS

Cost-benefit analysis- It weighs the gains and losses to different individuals and suggests carrying out changes that provides greater benefits than harm.

Equilibrium- It refers to a condition where the pressure for higher prices is exactly balanced by a pressure for lower prices, and thus that the current state of exchange between buyers and sellers can be expected to persist.

Surplus- When the price is such that the quantity supplied of a good or service exceeds the quantity demanded, some sellers are unable to sell because fewer units are purchased than are offered. This condition is called a *surplus*.

Shortage- When the price is low enough that the quantity demanded exceeds the quantity supplied, a *shortage* exists.

2.6 SELF-ASSESSMENT TEST

1. "Economics may be defined as the study of the allocation of scarce resources among competing ends." Examine the statement.
2. Discuss and illustrate the different concepts of economics that are essentials in decision making process.
3. "The objective of economic analysis is not merely to discover the truth but also to assist in the solution of concrete problems." Comment.

LAW OF DEMAND

Structure

3.0 LEARNING OBJECTIVE

The overall objective of this lesson is to give you an understanding of the Law of Demand; there by enabling the students to understand the factors and forces that determine the demand.

3.1 INTRODUCTION

Business firms may have different objectives – profit maximisation, sales maximisation, output maximisation, security profits, satisfaction maximisation, utility maximisation, growth maximization or satisfying. But the basic business activity of all firms is same – *they all produce and sell goods and services that are in "demand"*. Demand is the basis of all productive activities, rightly termed as *"mother of production"*. It is, therefore, necessary for business managers to have clear understanding of ...

- What are the sources of demand?
- What are the determinants of demand?
- How do buyers decide the quantity of a product to be purchased?
- How do buyers respond to the change in a product price; their income; prices of other goods or services; and change in other determinants of demand?
- How can total or market demand for a product be assessed or forecast?

In a free market economy it is the price-mechanism that settles its fundamental problems of *what, how and for whom*. The price of any commodity in the market is determined by the general interaction of the forces of demand and supply. In this lesson, we will deal with the concepts of demand. Before proceeding further, we may define the term 'commodity' and 'market'.

A ***commodity*** is any goods produced for sale in the market. By this definition, food produced in the home kitchen for consumption of the family is not a commodity. But the same food prepared by a hotel for its customers' consumption is a commodity.

Market in Economics is more than a geographical area or a 'mandi' where goods are bought and sold. It means all the areas in which buyers and sellers are in contact with each other for the purchase and sale of the commodity. Thus, a commodity may have a local market, a regional market, a national market or even an international market.

3.2 DEMAND FOR A COMMODITY

In any market, there are a vast number of individual purchasers of a commodity. The basic unit of consumption being the individual household, "how much of a commodity would an individual household be willing to buy?" - is the demand for the commodity. We may define

The demand for a commodity of the individual household is the quantity of the commodity that he is willing to buy in the market in a given period of time at a given price.

Thus, a want with three attributes – *'desire to buy', 'willingness to pay'* and *'ability to pay'* – becomes effective demand. Demand for a commodity has always a reference to *'a price', 'a period of time'* and *'a place'*. For this reason, "demand for apples in 5" carries no meaning for a business decision.

3.2.1 DETERMINANTS OF INDIVIDUAL DEMAND

Knowledge of different factors and forces that determine the demand for a commodity and the nature of relationship between the demand and its determinants are very helpful in analyzing and estimating demand. The demand for a commodity of the individual household depends upon a number of factors - some are quantifiable while some are not quantifiable. These factors are:

a. Price of the commodity

b. The money income of the individual household

c. The tastes and preferences of the individual household

d. The prices of other commodities

3.2.2 DEMAND FUNCTION

A function is a symbolic statement of relationship between the dependent and the independent variables, *i.e.*

Dependent Variable = *f* (Independent Variables)

Thus, the relationship of quantity demanded of a commodity to the factors that determine it may be expressed in the form of a function that is called ***demand function***.

So Demand = f (Determinants of the Demand)

Or $Qd_x = f\ (P_x, P_1 \ldots\ldots P_n, I, T)$

Where Qd_x is the individual household's demand for commodity X,

P_x is the price of the commodity X,

$P_1 \ldots\ldots P_n$ are the prices of all other commodities (other than X),

I is the income of the household, and

T stands for tastes and preferences of the members of the household.

This lesson is concerned with the relationship between quantity demanded of a commodity and its price, while all the other determinants of demand are assumed to remain unchanged. In real life they do change. Before we discuss the relationship between the price of a commodity and the quantity demanded of it, let us first have some rudimentary idea of how the other variables affect demand for a commodity.

1. Income of the Household

Demands for goods of different nature have different kinds of relationship with income of different categories of consumers (see Figure 5-1).

a. In case of normal goods, a rise in income is generally associated with increase in their demand, and a fall in income with a decrease in their demand. In other words, both income and demand for commodities move in the same direction.

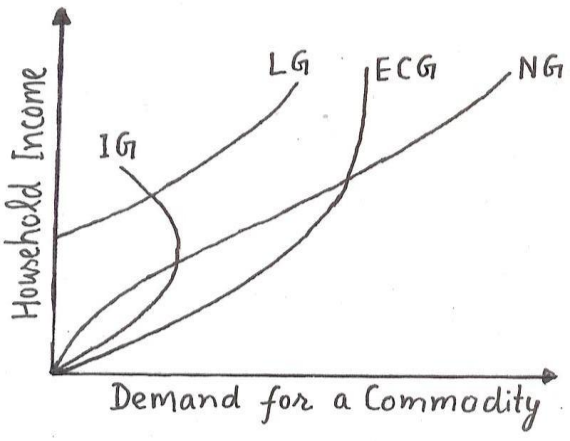


Figure 3.1 Household Income and Demand for a Commodity

b. In case of essential consumer goods, an increase in income may have no effect on their demand. For example, in case of salt, even with a rise in income, the demand for salt is likely to remain unaffected.

c. In case of inferior goods, a rise in income may actually lead to a decrease in their demand. For example, the household may be consuming toned milk. A rise in income may induce it to consume whole milk and its demand for toned milk may go down.

d. In case of luxury and prestige goods, their demand starts after a particular level of income and may have positive relationship with income after that level.

2. Prices of Other Commodities

The relationship between the demand for a commodity and prices of other commodities can be one of the following types:

a. The relationship may be the positive one. In other words, a fall (rise) in the price of other commodities reduces (increases) the household demand for a particular commodity. This is the case of substitute goods. If tea and coffee are substitutes, the individual household's demand for tea, among other things, depend upon the price of tea. A fall in the price of coffee would divert demand from tea to coffee and a rise in the price of coffee would divert demand from coffee to tea and increase the demand for tea (see Figure 5-2*a*).

b. The relationship may be the inverse one. In other words, a fall (rise) in the price of other commodities increases (reduces) the household demand for a particular commodity. This is the case of complementary goods. If bread and butter go together, a fall in the price of butter may expand its demand and increase the demand of bread (see Figure 5-2*b*).

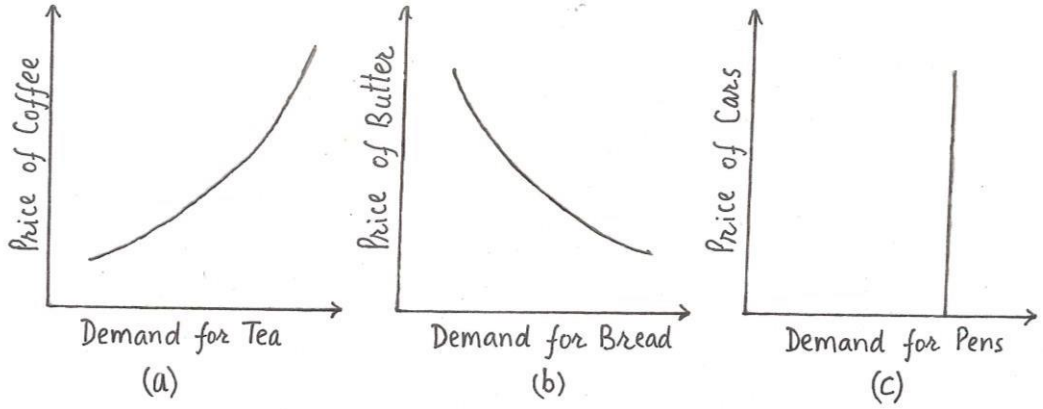


Figure 3.2 Prices of Other Commodities and Demand for a Commodity

c. There may be no relationship. This is the case of unrelated goods. A gall or rise in the price of cars may leave the demand for ball pens unaffected (see Figure 5-2*c*).

3. Taste or Preferences of the Household

Tastes and preferences of individual households influence their demand for a commodity. Tastes and preferences generally depends on the changing life-style, fashion, social customers, religious value, habit, the general level of the living of the society, age etc. If tastes and preferences change in response to these factors, or as a result of advertisement, or are simply the desire to imitate neighbors, demand for commodities may change. Households may reduce or give up consumption of some goods and add new ones in their consumption pattern. For example, advertisement may induce households to change the preference for a particular brand of soap.

3.2.3 THE LAW OF DEMAND

When all factors affecting the demand for a commodity, other than its price, are assumed to remain unchanged, the demand for a commodity is the function of its price.

$$Qd_x = f(P_x) \qquad I°, P_1°\ldots\ldots P_n°, T°$$

The relationship between demand and price may be expressed in the form of the Law of Demand in the following words:

The quantity demanded of a commodity varies inversely with its price, other determinants of demand remaining unchanged.

The inverse relationship between quantity demanded and price may be of

a. Linear form: $Qd_x = a - bP_x$ or (see Figure 5-3*a*).

b. Non-linear or Curvilinear form: The most common form of a non-linear demand function is $Qd_x = a\,P_x^{-b}$ (see Figure 5-3*b*).

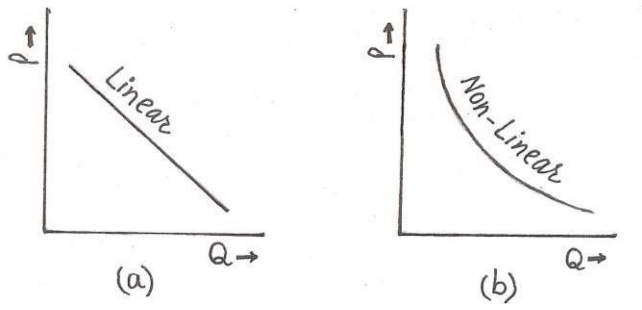


Figure 3.3 Demand Curves: (a) Linear (b) Non-linear or Curvilinear

HOUSEHOLD DEMAND SCHEDULE AND DEMAND CURVE

An individual household's demand refers to the quantities of a commodity demanded by him at various prices, other things remaining unchanged. An individual household's demand for a commodity is shown on the demand schedule and on the demand curve. *A demand schedule is a list of prices and corresponding quantities demanded and its graphic representation is a demand curve.*

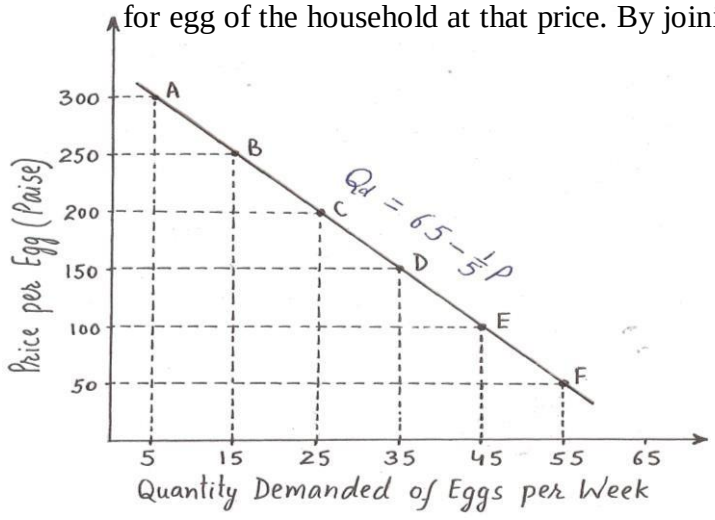
Let us illustrate the law of demand by drawing a hypothetical household demand function $Qd_e = 65 - \frac{1}{5}P_e$ for eggs. The demand schedule is shown in Table 5-1. In the first column are given alternate prices per egg and in the second column against each price is shown quantity demanded of eggs, during, say a week.

Price per Egg (Paise)	Quantity Demanded of Eggs
300	5
250	15
200	25
150	35
100	45
50	55

Table 3.1 Individual Household Demand Schedule of Eggs

The demand schedule represented on a graph gives the demand curve for eggs of the household. On the *Y*-axis is shown the independent variable, price per egg and on the *X*-axis is given the dependent variable, the quantity of eggs demanded at each price.

Each point A, B, C, D, E, F represents a pair of values; price of an egg and the demand for egg of the household at that price. By joining these points,



we get the demand curve AF for eggs of the household, for the given period.

Figure 3.4 Individual Household Demand Curve for Eggs

The demand curve depicts the relationship between the price of the commodity and an estimate of the quantity demanded of it for the given period at any point of time. The demand curve slopes downward from left to right. A demand curve sloping downward from left to right is also called a negatively sloped demand curve because the rate of change in Q in response to change in P is denoted by negative value *i.e.* $\frac{dQ}{dP}$ is negative.

Why the Demand Curve Slopes Downward?

It is a matter of empirical observation that households behave in this fashion for most of the commodities. They buy more of the goods at lower prices than at higher prices. But the question is why do they behave in this fashion? An explanation of this may be found in the theories of consumer behaviour: the **Marginal Utility Theory** of Professor **Marshall**, the **Indifference Curves Approach** of **Professor Hicks**, and the theory of **Revealed Preferences** of **Professor Samualson**. The reason for the negative slope of demand curve can be found in *income* and *substitution effects* of the price change:

Income Effect: When the price of commodity falls, less has to be spend on the purchase of the same quantity of the commodity. This has the effect of increasing the purchasing power of the given money. This is the *income effect* of a fall in the price of the commodity. With this increase in real income, the household buys more of the commodity in question. The effects operate in reverse when the price of the commodity rises.

Substitution Effect: When the price of a commodity falls, it becomes cheaper relative to other commodities. This leads to substitution of other commodities (which are now relatively more expensive). This is called the *substitution effect* and the demand for the cheaper commodity rises in

consequence. When the price of the commodity rises, this effect operates in reverse.

Thus, Income effect and substitution effect together explain the behaviour of individual household in the form of law of demand.

Giffen Paradox: The Positively Sloped Demand Curve

If the commodity in question is an inferior good, the increase in real income resulting from the reduction in its price will lead the consumer to purchase less, not more, of the commodity. Thus, the income effect will be negative while the substitution effect continues to be positive to lead the consumer to purchase more of the commodity when its price falls. For most of the inferior goods, the positive substitution effect will more than offset the negative income effect so that he demand curve is negatively sloped.

However, in the very rare case when the consumer spends so much on the inferior commodity that the strong negative income effect overwhelms the positive substitution effect the quantity demanded of the commodity will fall when its price falls and rise when its price rises. In other words, the demand curve in this case will be positively sloped. The commodity in question is then called a ***Giffen*** good, after the nineteenth century English economist **Robert Giffen**, who first discussed it. This is what is called ***Giffen Paradox*** that makes the demand curve to have a positive slope.

3.2.4 THE MARKET DEMAND FOR THE COMMODITY

So far we have considered only the demand of the individual household. What about the market demand for a commodity? The market demand may be defined as the estimates of quantity demanded of the commodity per time period at various alternate prices, by all the individual households in the market.

Geometrically, the market demand curve is obtained by a horizontal summation of the individual household demand curves in the market.

This will become clear form the following hypothetical example. Let us say, there are three households in the market for eggs. The demand functions of the households are:

Household H_1 : $Qd_e = 40 - \frac{1}{10} P_e$

Household H_2 : $Qd_e = 65 - \frac{1}{5} P_e$

Household H_3 : $Qd_e = 50 - \frac{1}{10} P_e$

The demand for eggs at different prices of these three households is given in the schedule (Table 5-2). By adding the quantity demanded by each household against the given price, we get the market demand for eggs per unit of time, a week in our example.

By plotting quantities demanded by households against alternate prices, we get the demand curves for eggs of the three households, in the market, marked H_1, H_2 and H_3. By summing up quantities demanded by the three households against each price along the horizontal (*0X*) axis, we get the market demand curve for eggs. This is done is Figure 5-5.

Price per Egg (Paise)	**Quantity Demanded of Eggs**			
	Household H_1	**Household H_2**	**Household H_3**	**Market Demand**
300	10	5	20	35
250	15	15	25	55
200	20	25	30	75
150	25	35	35	95
100	30	45	40	115
50	35	55	45	135

Table 5-2 Demand Schedules of Eggs

At each price demand by each household is added up to obtain the market demand for eggs per week. Thus, geometrically, the market demand curve for a commodity is obtained by a horizontal summation of the demand curves of the households comprising the market.

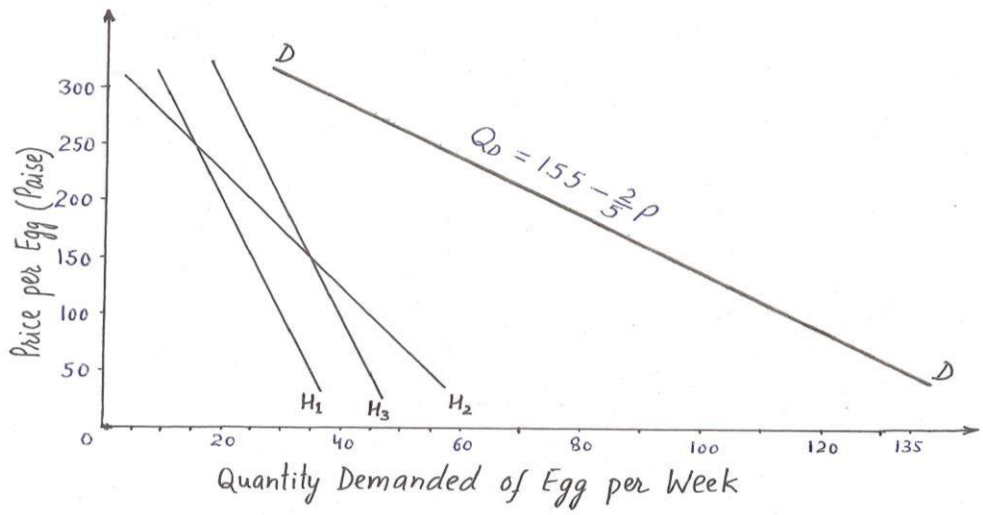


Figure 5-5 Market Demand Curve for Eggs

The market demand curve for a commodity shows the various quantities of the commodity demanded in the market per time period at various alternative prices of the commodity while holding every other factor constant. Just as an individual's demand curve, the market demand curve for a commodity is negatively sloped; indicating that price and quantity demanded is inversely related.

The various factors held constant in drawing the market demand curve for a commodity are:

- The number of the households in the markets
- Households' income
- The price of other commodities
- The tastes and preferences of the households
- Consumers' expectations about future price and supply position

Thus the general market demand function for commodity X is

$$QD_x = f\,(P_x, N, I, P_1 \ldots\ldots P_n, T, E_{p,s})$$

The market demand function for eggs is

$$QD_e = 155 - \frac{2}{5} P_e$$

3.3 CHANGES IN DEMAND

Demand does not remain constant. It changes in response to change in any, some or all of its determinants. Whenever demand changes, there is either.

a. A movement along the demand curve, or

b. A shift of the entire demand curve

We use different expressions for the two types of changes in demand.

(a) Movement along the Demand Curve

A demand curve relates quantity demanded of a commodity to its prices. At higher prices less of the commodity is demanded, and at lower prices more of the commodity is demanded. As we move from higher prices to lower prices, we move down the demand curve, and as we move from lower prices to higher prices, we move up the demand curve. In other words, a change in the price of the commodity means a movement along the demand curve.

In Figure 5-6, a rise in price from P to P_1 and a fall in price from P to P_2 bring about changes in quantity demanded from PA to P_1B and P_2C. The movement from point A to B or C is a movement along the demand curve, DD.

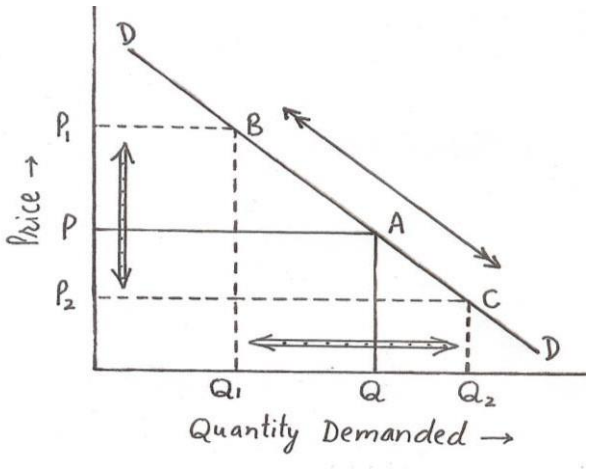


Figure 3.6 Movements along the Demand Curve

For these changes in demand due to change in price alone, we use the expressions *expansion* and *contraction* of demand to denote movement along the demand curve. Thus

Expansion of demand means a rise in demand that result from a decrease in price (movement down the demand curve).

Contraction of demand means a fall in demand that results from an increase in price (movement up the demand curve).

(b) Shift of the Demand Curve

But when the demand for a commodity changes not on account of a change in its price but due to changes in the other determinants of demand – income of the household, their tastes and preferences and prices of close substitutes – the demand curve may shift in accordance with the direction of the change.

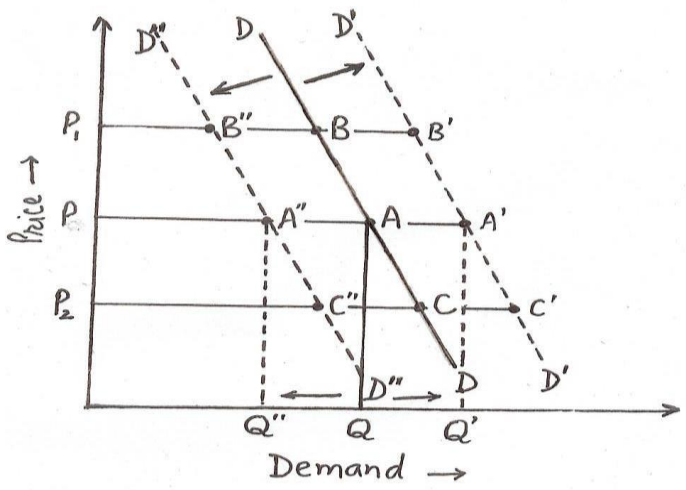


Figure 3.7 Shift of the Demand Curve

In Figure 3.7, at the same price P, the quantity demanded increases to point A' when the demand curve has shifted rightwards and the quantity demanded decreases to point A'' when the demand curve has shifted leftwards. Due to changes in demand brought about by factors other than price, the demand curve DD has shifted to the right to D'D' or to the left to D''D''.

For these changes in demand due to change in determinants other than price, we use the expressions *increase* and *decrease* of demand to denote the shift of demand curve. Thus

Increase in demand means a rightward shift of the demand curve – the demand for the commodity at the same price has increased.

Decrease in demand means a leftward shift of the demand curve – the demand for the commodity at the same price has decreased.

Figure 3.8 shows the change in demand for a commodity from initial demand Q_1 to final demand Q_3. Here Q_1Q_2 is the expansion of demand (due to decrease in price from P_1 to P_2) and Q_2Q_3 is the increase in demand due to rightward shift of the demand curve because of, say, household income increase.

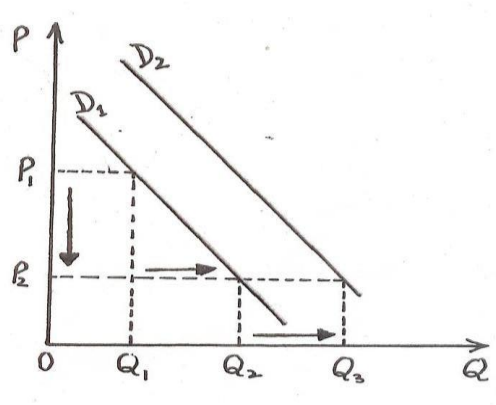


Fig. 3.8 Movements along the Demand Curve & Shift of the Demand Curve

3.4 CHECK YOUR PROGRESS

1- Normally a demand curve will have the shape_____.

2- Law of demand shows relation between_____.

3- The movement along a demand curve is due to_____.

4- Price and demand are positively correlated in case of_____.

5- Demand is a function of_____.

3.5 SUMMARY

The demand for a commodity of the individual household is the quantity of the commodity that he is willing to buy in the market in a given period of time at a given price. Knowledge of different factors and forces that determine the demand for a commodity and the nature of relationship between the demand and its determinants are very helpful in analyzing and estimating demand. It is a matter of empirical observation that households behave in this fashion for most of the commodities. They buy more of the goods at lower prices than at higher prices. Society follow the rule of law of demand because increase in prices leads to decrease in demand and decrease in prices leads to increase in demand. It the human nature to follow the inverse relationship of price and demand but still, this rule is not followed sometimes due to various factors affecting demand. Similarly, there are various other factors which are responsible for the movement of demand curve.

3.6 KEYWORDS

Demand - The demand for a commodity of the individual household is the quantity of the commodity that he is willing to buy in the market in a given period of time at a given price.

Demand Function - The relationship of quantity demanded of a commodity to the factors that determine it may be expressed in the form of a function that is called ***demand function***.

Demand Curve - The demand curve depicts the relationship between the price of the commodity and an estimate of the quantity demanded of it for the given period at any point of time.

Law of Demand - The quantity demanded of a commodity varies inversely with its price, other determinants of demand remaining unchanged, is known as Law of Demand.

Increase in Demand - Increase in demand means a rightward shift of the demand curve – the demand for the commodity at the same price has increased.

3.7 SELF- ASSESSMENT TEST

1. What is demand? Discuss briefly the various determinants of demand.
2. State and illustrate the law of Demand, giving its assumptions and importance.
3. What are the factors on which the market demand for a commodity depends? In which category would you place the following from the categories affecting market demand for a commodity?
    a) Liking for tea as against coffee?
    b) A decline in birth rate.
    c) Grant of dearness allowance to the employees
    d) A tax of Rs 3/- per kg on tea.
4. Why does the demand curve slopes downward to the right? Under what circumstances a demand curve slopes upward to the right?
5. Distinguish between:
    (a) Expansion in demand and Increase in demand
    (b) Contraction in demand and Decrease in demand
    Show this diagrammatically.
6. Answer the following in one or two sentences:
    (a) When does a consumer buy more of a commodity at a given price?
    (b) When does a consumer buy less of a commodity at a given price?
    (c) When is the demand for a commodity said to be completely inelastic?
    (d) Why the demand for coffee does increases when the price of tea increases?
    (e) Why the demand for ink does increases when the price of pen falls?
7. The demand function of a commodity X is given by $Q_x = 12 - 2 P_x$. Find out the individual demand schedule and the demand curve.
8. Write short notes on:
    (a) Demand function

(b) Demand schedule and demand curve

(c) Income and substitution effects of price change

(d) Giffen Paradox

DEMAND ELASTICITY

Structure

4.0 LEARNING OBJECTIVE

The overall objective of this lesson is to provide the students an understanding of the different elasticity of demand, thereby enabling them to appreciate the need and use of elasticity of demand for managerial decision-making.

4.1 INTRODUCTION

Demand is a function of its determinants. It changes in response to any change in any of its determinants. However, knowing alone the nature of relationship between

demand and its determinants is not sufficient. What is more important is to know the extent of relationship or how responsive the demand is to the changes in its determinants. The concept of elasticity of demand is extremely useful in this reference. It plays an important role in business decision-making. For example 'raising the price' of the product will prove beneficial or not depends on:

a. The price elasticity of demand for the product and

b. The price elasticity of demand for its substitutes.

Therefore, it is obvious that the understanding of different elasticities of demand is the basic prerequisite whenever a business manger is considering "price change" for his or her product. In general terms, the elasticity of demand is a measure of the responsiveness or sensitiveness of demand for a commodity to the change in its determinants. There are as many elasticities of the demand as its determinants. The most important of these elasticities are (a) the price elasticity, (b) the income elasticity, and (c) the cross elasticity of demand. In this lesson after discussing these elasticities of demand in detail, we will understand their use in managerial decision-making.

4.2 TYPES OF ELASTICITY DEMAND

There are as many elasticity of the demand as its determinants. The most important type of elasticity is (a) the price elasticity, (b) the income elasticity, and (c) the cross elasticity of demand. These are explained as under:

4.2.1 Price elasticity of demand

Consider the two demand curves A and B, given in the Figure 4.1. Curve A represents the demand for goods in market A. Curve B represent the demand for the same goods in market B. At price P_1, the demand in market A is $0Q_A$; while in market B, it is $0Q_B$. When the price falls from P_1 to P_2, the demand in market A expands from $0Q_A$ to $0Q_{A'}$ that is, by $Q_AQ_{A'}$. In case of market B, the same fall in

price leads to an expansion of demand by $Q_BQ_{B'}$. The expansion in demand in market B is greater than in market A. We describe this situation roughly by saying that the price elasticity of demand for the goods in market B is greater than that in market A.

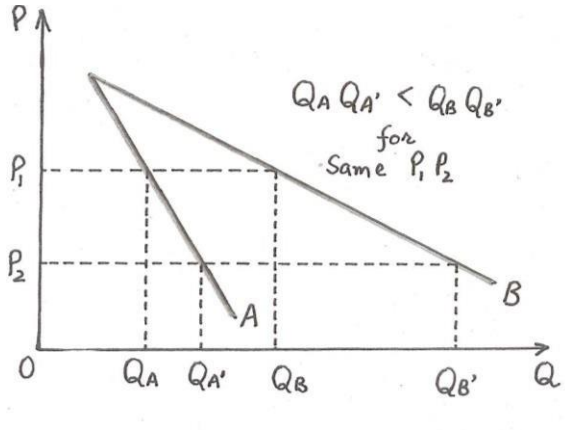


Figure 4.1 Demand Curves With different Price Elasticities

Therefore, price elasticity of demand is the measure of the degree of responsiveness of the demand for the commodity to the changes in its own price. *It measures the percentage change in the quantity demanded as a result of one percent change in its price, holding constant all other variables in the demand function.* That is:

$$e_p = \frac{\%\Delta Q}{\%\Delta P} \qquad \textit{ceteris peribus}$$

$$= \frac{\frac{\Delta Q}{Q} x100}{\frac{\Delta P}{P} x100}$$

$$= \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} \qquad \ldots\ldots\ldots\ldots \textit{(6-1)}$$

Where P and Q are initial price and quantity demanded respectively. ΔP and ΔQ refer, respectively, to the change in price and change in quantity.

$\Delta Q/\Delta P$ is negative, making the price elasticity always negative. This is because of inverse relationship between P and Q implied by the Law of Demand. However, we

generally omit the negative sign when writing the formula of the elasticity. We can measure the price elasticity of demand.

- On a point on demand curve, and call it *point price elasticity of demand*
- Between two points on a demand curve, and call it *arc price elasticity of demand*

Point Price Elasticity of Demand

When the changes in price are very small, we use *the point elasticity* of demand as a measure of the responsiveness of demand. Thus *point elasticity of demand is defined as the proportionate change in the quantity demanded resulting from a very small proportionate change in price.*

If we consider very small changes in P and Q, then $\Delta P \approx \partial P$ and $\Delta Q \approx \partial Q$

That is $$e_p = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q} \qquad \ldots\ldots\ldots (4.2)$$

If the demand curve is linear

$$Q = a - bP$$

Then $\frac{\partial Q}{\partial P} = b$, so we have

$$e_p = b.\frac{P}{Q} \qquad \ldots\ldots\ldots (4.3)$$

Here b is the reciprocal of the slope of the demand curve.

Eq.(4.2) and *Eq.(4.3)* imply that the point price elasticity changes at the various points of the linear demand curve. This is because of the change in P/Q along the demand curve.

Example 4.1

Consider the demand function for a commodity X

$Q = 300\text{-}50P$ *ceteris peribus*

Calculate the price elasticity at the price of Rs2.

Solution: At $P = 2$, we have

$Q = 300 - 50(2) = 200$

So price elasticity at $P = 2$,

$$e_p = b.\frac{P}{Q} = 50.\frac{2}{200} = \frac{1}{2}$$

It means, at price $P = 2$; a 1 percent change in price results in 0.5 percent opposite change in quantity demanded, *ceteris peribus*.

Graphic Measure of Point Price Elasticity of Demand

We can obtain a graphic measure of the point price elasticity of demand by manipulating *Eq.(4.3)*.

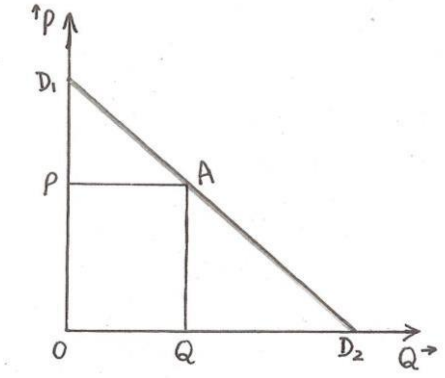


Figure 4.2 Point Price Elasticity

We have

$e_p = b.\frac{P}{Q}$, From Figure 4.2, we see that $b = \frac{QD_2}{AQ}$, $P = 0P$ and $Q = 0Q$

So $e_p = \frac{QD_2}{AQ}.\frac{0P}{0Q} = \frac{QD_2}{0Q}$ [as $AQ = 0P$]

$= \frac{PA.\frac{AD_2}{D_1A}}{0Q}$ [as ΔD_1PA and ΔAQD_2 are similar, so $\frac{QD_2}{PA} = \frac{AD_2}{D_1A}$ or

$QD_2 = PA.\frac{AD_2}{D_1A}] = \frac{AD_2}{D_1A}$ [as $PA = 0Q$]

$$= \frac{\text{Lower Segment of the Demand Curve}}{\text{UpperSegment of the Demand Curve}} \qquad \ldots\ldots\ldots(4.4)$$

So we can obtain the point price elasticity of demand graphically by the ratio of the segments of the demand curve to the right and to the left of the particular point. We can also have another form of graphic measure of point price elasticity of demand.

We have

$$e_p = \frac{AD_2}{D_1A} = \frac{AQ}{D_1P} \qquad [\text{as } \Delta AQD_2 \text{ and } \Delta D_1PA \text{ are similar, so } \frac{AD_2}{D_1A} = \frac{AQ}{D_1P}]$$

$$= \frac{0P}{0D_1 - 0P} \qquad [\text{as } AQ = 0P \text{ and } D_1P = 0D_1 - 0P] = \frac{P}{P_0 - P} \qquad \ldots\ldots\ldots(4.5)$$

In other words, the point price elasticity of demand can also be obtained geometrically by dividing the price of the commodity (P) at the particular point by P_0 - P, where P_0 is the price at which the quantity demanded is zero (*i.e.* the price at which the demand curve crosses the vertical axis).

Point Price elasticity on a Curvilinear Demand Curve

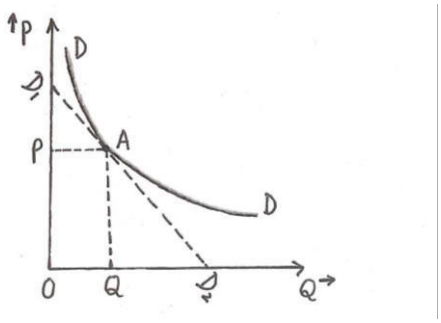


Figure 4.3 Point Price Elasticity on a Curvilinear Demand Curve

For a curvilinear (non-linear) demand curve, we draw a tangent to the demand curve at the point at which we want to measure the elasticity and then proceed as if we were dealing with a linear demand curve.

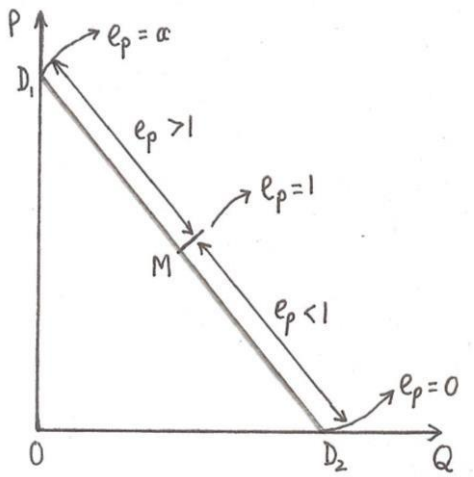


Figure 4.4 Point Price Elasticity

From the graphical measurement of the point price elasticity of demand, it is obvious that at mid-point of the linear demand curve $e_p = 1$ (point M in Figure 4.4). At any point to the right of M, $e_p < 1$; and at any point to the left of M, $e_p > 1$. At point D_1 the $e_p = \alpha$, while at point D_2 the $e_p = 0$.

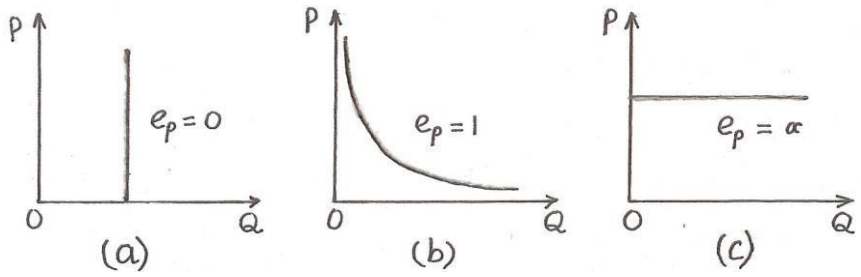


Figure 4.5 Demand Curves With different Price Elasticities

Thus, the range of values of the elasticity is

$$0 \leq e_p \leq \alpha$$

- If $e_p = 0$, the demand is perfectly inelastic (Figure 4.5*a*).
- If $e_p = 1$, the demand has unitary elasticity (Figure 4.5*b*).
- If $e_p = \alpha$, the demand is perfectly elastic (Figure 4.5*c*).
- If $0 < e_p < 1$, we say that the demand is inelastic.
- If $1 < e_p < \alpha$, we say that the demand is elastic.

Are Price Elasticity of Demand

When the changes in price are not small, we use the *arc elasticity* of demand as a measure of the responsiveness of demand. Arc elasticity measures the elasticity of demand between two points on the demand curve. However, if we use the *Eq.(4.1)* *i.e.* $e_p = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$, we will get different results depending on whether the price rose or fell. This is because of the different values of the initial price (P) and initial quantity (Q) for the rise and fall of the price. Therefore, we use the average of the two prices

and the average of the two quantities in the calculations and use the following formula for the arc price elasticity of demand:

$$e_p = \frac{\Delta Q}{\Delta P} \cdot \frac{\frac{P_1 + P_2}{2}}{\frac{Q_1 + Q_2}{2}} \qquad \textit{ceteris peribus}$$

$$= \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1 + P_2}{Q_1 + Q_2} \qquad \ldots\ldots\ldots\ldots (4.6)$$

Where the subscripts *1* and *2* refer to the original and to the new values, respectively, of price and quantity.

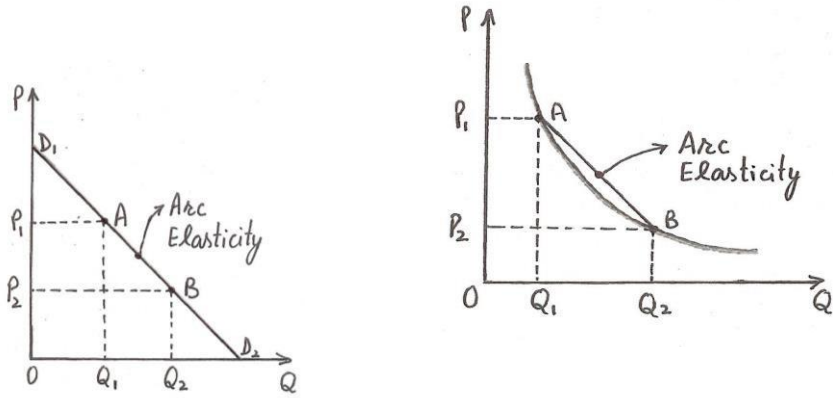


Figure 4.6 Arc Elasticity

Example 4.2

Consider the demand schedule for men's Levi's jeans in a store:

Price	1000	950	900	850	800	750	700
Quantity Demanded	50	60	68	78	90	105	125

Calculate the price elasticity between an original price of Rs950 and new price of Rs850.

Solution: We have

Original values of price and quantity demanded: $P_1 = 950$, $Q_1 = 60$

New values of price and quantity demanded: $P_2 = 850$, $Q_2 = 78$

So $$e_p = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1 + P_2}{Q_1 + Q_2} = \frac{78 - 60}{850 - 950} \cdot \frac{850 + 950}{78 + 60} = -\frac{18}{100} \cdot \frac{1800}{138}$$

= -2.34

This means that in the price range (850-950), a 1 percent change in price results, on the overage, in a 2.34 percent opposite change in the demand for Levi's jeans.

With the helps of price elasticity of demand, we can compute a price that would have to be charged to achieve a particular level of sales. Consider Example 6-3

Example 4.3

Nike sells 10500 pains (at price Rs2500) of a particular brand of football shoes before a price cut by its major competitor Adidas. After this the sales declined to 8500 pairs. From its part experience Nike has estimated the e_p = -2 in this price-quantity range. What price should Nike charge to maintain the sales level of 10500 pairs?

Solution: We have, $P_1 = 2500$ $Q_1 = 8500$ $Q_2 = 10500$ $e_p = -2$

We can find P_2 from the relation $e_p = \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_2 + P_1}{Q_2 + Q_1}$

i.e. $-2 = \frac{10500 - 8500}{P_2 - 2500} \cdot \frac{P_2 + 2500}{10500 + 8500}$

By solving for P_2 we get, $P_2 = 2250$

So Nike should reduce the price to Rs2250, to maintain the sales level of 10500 pairs. The arc elasticity is a measure of the average elasticity, that is, the elasticity at the mid point of the chord that connects the two points (A and B) on the demand curve defined by the initial and new price levels (Figure 6-6). It should be clear that the measure of the arc elasticity is an approximation of the true elasticity of the section AB of the demand curve, which is used when we know only the two points A and B from the demand curve, but not the intermediate ones.

Price Elasticity, Total Revenue and Marginal Revenue

The price elasticity of demand bears an important relationship with the total revenue and marginal revenue. Total revenue (*TR*) is equal to price (*P*) times quantity (*Q*),

while marginal revenue (*MR*) is the change in total revenue per unit change in output or sales (quantity demanded) that is

$$TR = P.Q$$

$$MR = \frac{d(TR)}{dQ} = \frac{d(PQ)}{dQ} = P + Q\frac{dP}{dQ} = P\left(1 + \frac{dP}{dQ}.\frac{Q}{P}\right)$$

Now $\frac{dP}{dQ}.\frac{Q}{P} = -\frac{1}{e_p}$

So $$MR = P\left(1 - \frac{1}{e_p}\right) \qquad \ldots\ldots\ldots(4.7)$$

From the relationship between e_p and *MR* in *Eq (4.7)*, it is clear that

- When $e_p > 1$, $MR > 0$

In other words, when demand is elastic, total revenue increases with a decline in price and decreases with a rise in price. This is because when demand is elastic, a price change leads to a proportionately larger opposite change in quantity demanded that results an increase in total revenue when price declines and a decrease in total revenue when price rises.

- When $e_p = 1$, $MR = 0$

That is, when demand is unitary elastic, the total revenue remains unchanged with a decline or rise in price. The reason for this is that when demand is unitary elastic, a change in price leads to an equal proportionate opposite change in quantity demanded thereby leaving the total revenue unchanged.

- When $e_p < 1$, $MR < 1$

That is, if demand is inelastic, a change in price leads to a smaller proportionate opposite change in quantity demanded. This results a decrease in the total revenue when price declines and an increase when price rises.

Chart 4.1 e_p, ***MR*** **and** ***TR***

$e_p > 1$	$MR > 0$	$P \uparrow \approx TR \downarrow$

		$P \downarrow \approx TR \uparrow$
$e_p = 1$	$MR = 0$	$P \uparrow \approx TR \rightarrow$ $P \uparrow \approx TR \rightarrow$
$e_p < 1$	$MR < 1$	$P \uparrow \approx TR \uparrow$ $P \downarrow \approx TR \downarrow$

A linear-demand curve is elastic above the midpoint, unitary elastic at the midpoint, and inelastic below the midpoint. So a reduction in price leads to an increase in *TR* (*MR* is positive) down to the midpoint of the demand curve (where *TR* is maximum and *MR* is zero) and to a decline thereafter (*MR* is negative). We can summarize the above discussion in Chart 4.1.

Example 4.4

Consider the demand function of a commodity X

$Q = 300 - 50P$ *ceteris peribus*

a. Analyze the relationship between price, quantity demanded, marginal revenue, total revenue and price elasticity of demand.

b. At present the firm is charging a price of Rs4 for the commodity X. Is it beneficial for the firm to raise the price?

Solution: The relationship between price (*P*), quantity demanded (*Q*), marginal revenue (*MR*), total revenue (*TR*) and price elasticity of demand (e_p) is shown in Table 4.1 and Figure 4.7.

Table 4.1 The Relationship between *P, Q, MR, TR* and e_p

P	Q	$e_p = \frac{d(TR)}{dQ}$	$TR = PQ$	$MR = 6 - \frac{Q}{25}$
6	0	∞	0	--
5	50	5	250	4
4	100	2	400	2
3	150	1	450	0

2	200	½	400	-2
1	250	1/5	250	-4
0	300	0	0	-6

We have, $Q = 300\text{-}50P$; So, $P = 6\text{-}\frac{Q}{50}$

Now $TR = PQ = 6Q\text{-}\frac{Q^2}{50}$, $MR = \frac{d(TR)}{dQ} = 6\text{-}\frac{Q}{25}$

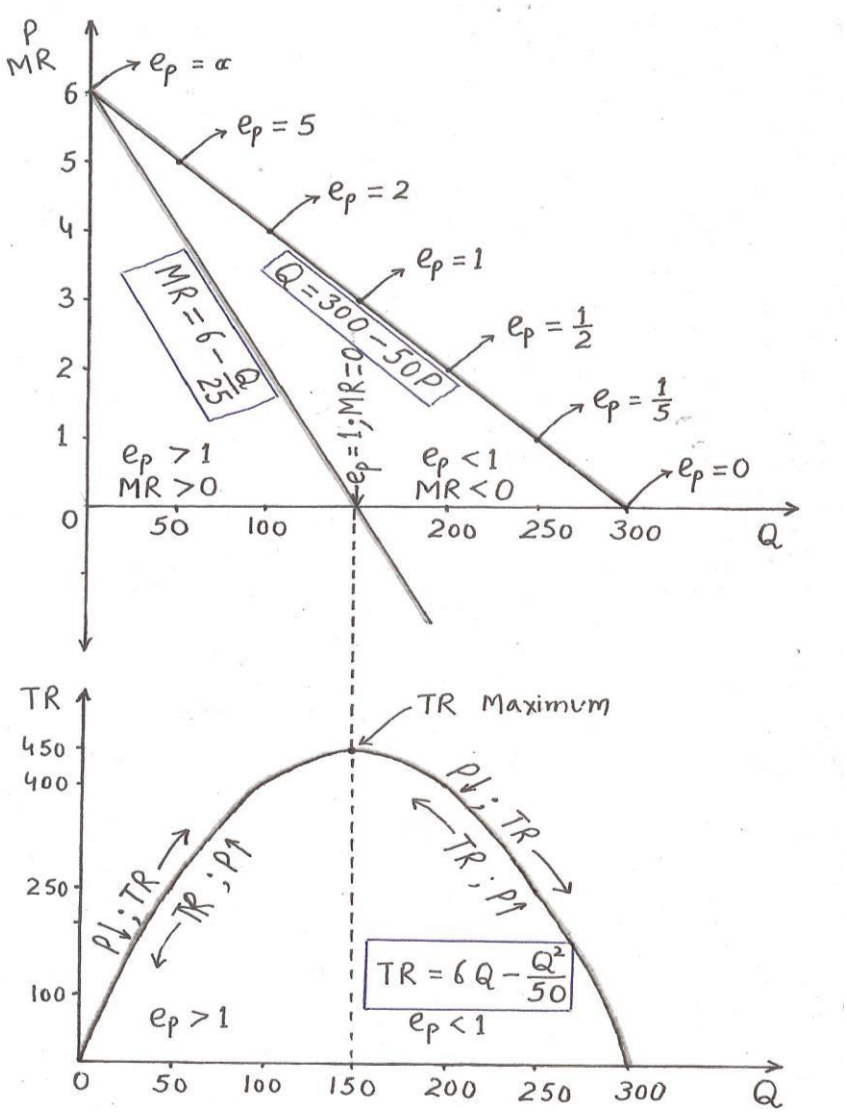


Figure 4.7 The Relationship between *P*, *Q*, *MR*, *TR* and e_p

As long as demand is price elastic (*i.e.* up to Q =150), a price reduction (increase) increases (reduces) total revenue (*TR*), and marginal revenue (*MR*) is positive, At Q =150, demand is unitary price elastic, *TR* is maximum, and *MR* = 0. When demand is price inelastic (*i.e.* for Q >150) a price reduction (increase) reduces (increase) *TR*, and *MR* is negative.

(b) At $P = 4$, $e_p > 1$ *i.e.* $MR > 0$. So it is not beneficial for the firm to raise the price as it will result in a fall in total revenue (*TR*). In fact, a reduction up to $P = 3$ is beneficial for the firm to increase its total revenue.

Factors Affecting the Price Elasticity of Demand

The basic determinants of the price elasticity of demand for a commodity are:

- ✓ Availability and closeness of substitutes; demand for a commodity is more elastic if there are close substitutes for it.
- ✓ Nature of the commodity; in general the demand for necessities is less elastic, for comforts are moderately elastic and for luxuries is more elastic. Demand for prestige goods is price inelastic. Also the demand for durables is more price elastic than that for non-durables.
- ✓ Time frame of analysis; demand is more elastic in the long run than in short run.
- ✓ Variety of uses of the commodity; the more the possible uses of a commodity the greater its price elasticity will be.
- ✓ The proportion of income spent; in general the demand for commodities which entail a large proportion of the income of the consumer is more elastic than that of commodities with a small proportion of income.
- ✓ Level of prices; the demand for commodities is elastic when price level is high and is less elastic when price level is low.

4.2.2 Cross price elasticity of demand

The demand for a commodity also depends on the price of other commodities, and changes in response to any change in the price of other commodities. The cross price elasticity of demand measures the responsiveness of the demand for commodity X to a change in the price of commodity Y. Thus, *cross-price elasticity of demand is the ratio of the percentage change in the demand for commodity X to the percentage change in the price of commodity Y, assuming all other factors influencing demand remain unchanged*

i.e. $e_{xy} = \frac{\%\Delta Q_x}{\%\Delta P_y}$ *ceteris peribus*

$$= \frac{\frac{\Delta Q_x}{Q_x} x100}{\frac{\Delta P_y}{P_y} x100}$$

$$= \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{P_y}{Q_x} \qquad \ldots\ldots\ldots (4.8)$$

Point Cross-Price Elasticity of Demand

Point cross-price elasticity of demand for commodity X provides a measure of the responsiveness at a specific point P_y over the demand function. It is measured as:

$$e_{xy} = \frac{\partial Q_x}{\partial P_y} \cdot \frac{P_y}{Q_x} \qquad \text{ceteris peribus}$$

$\ldots\ldots\ldots$*(6-9)*

Example 4.5

Consider the demand function of a commodity X

$$Q_x = 300 - 50P_x - 25\,P_y$$

Calculate the cross-price elasticity at $P_y = 2$ when $P_x = 3$ remains constant.

Solution: At $P_y = 2$ and $P_x = 3$, we have

$$Q_x = 300 - 50(3) - 25(2)$$

= 200

Also $\frac{\partial Q_x}{\partial P_y}$ = 25 when P_x remains constant.

So the cross-price elasticity at $P_y = 2$

$$e_{xy} = \frac{\partial Q_x}{\partial P_y} \cdot \frac{P_y}{Q_x}$$

$$= 25.\frac{2}{200}$$

$$= 1/4$$

Thus from the price $P_y = 2$ of commodity Y, we can expect demand for commodity X to change (in the same direction) by 0.25% for each 1% change in the price of commodity Y, *ceteris peribus.*

Are Cross-Price Elasticity of Demand

Arc cross-price elasticity of demand for commodity X is a technique for computing cross-price elasticity between two price levels of commodity Y. It is measured as:

$$e_{xy} = \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{\frac{P_y^2 + P_y^1}{2}}{\frac{Q_x^2 + Q_x^1}{2}}$$

$$= \frac{Q_x^2 - Q_x^1}{P_y^2 - P_y^1} \cdot \frac{P_y^2 + P_y^1}{Q_x^2 + Q_x^1} \qquad \textit{ceteris peribus.....(4.10)}$$

Example 4.6

The quantity demanded for coffee increases from 500 to 600 units as a result of an increase in the price of tea from Rs80 to Rs90 per Kg. Find the cross-price elasticity of demand for coffee over this price change of tea.

Solution: We have

$Q_c^1 = 500$ $\qquad$ $Q_c^2 = 600$

$P_t^1 = 80$ $\qquad$ $P_i^2 = 90$

So, $e_{ct} = \frac{Q_c^2 - Q_c^1}{P_t^2 - P_t^1} \cdot \frac{P_t^2 + P_t^1}{Q_c^2 + Q_c^1}$

$$= \frac{600 - 500}{90 - 80} \cdot \frac{90 + 80}{600 + 500}$$

$$= 1.64$$

This means that a 1 percent change in price of tea in the price range (80-90); results, on the overage, in a 1.64 percent same change in the demand for coffee.

Interpreting Cross Price Elasticity of Demand

The cross price elasticity of demand for a commodity X, tells us about the nature of other commodities. If the cross price elasticity between X and Y

- $e_{xy} > 0$; X and Y are substitutes and higher the value of e_{xy}, the closer the substitutes (high degree of substitutability).
- $e_{xy} < 0$; X and Y are complements and higher the value of e_{xy}, the closer the compliments (high degree of complementarity).
- $e_{xy} = 0$; X and Y are unrelated commodities.

The cross-price elasticity of demand is a very important concept in managerial decision-making. Firms often use this concept to measure the effect of changing price of a product they sell on the demand of other related products that the firm also sells.

4.2.3 Income Elasticity of Demand

The level of consumer's income is also a very important determinant of demand. We can measure the responsiveness of the demand for a commodity to a change in consumers' income by the income elasticity of demand. *It is measured as the ratio of the percentage change in demand for the commodity to the percentage change in consumers' income, assuming that all the other factors influencing demand remain unchanged.*

So $e_i = \frac{\%\Delta Q}{\%\Delta I}$ *ceteris peribus*

$$= \frac{\frac{\Delta Q}{Q} x100}{\frac{\Delta I}{I} x100}$$

$$= \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q} \qquad \ldots\ldots\ldots (4.11)$$

Point Income Elasticity of Demand

Point income elasticity provides a measure of the responsiveness of demand for a commodity at a specific income level over the demand function. It is measured as:

$$e_i = \frac{\partial Q}{\partial I} \cdot \frac{I}{Q} \qquad \text{ceteris peribus} \ldots\ldots\ldots\ldots\ldots (4.12)$$

Example 4.7

Consider the demand function of a commodity X

$$Q_x = 15000 - 2500P_x - 2.50\, I$$

Calculate the income elasticity at the income level $I = 6000$ when $P_x = 8$ remains constant.

Solution: At $I = 2$ and $P_x = 8$, we have

$$Q_x = 15000 - 2500(8) - 2.50(6000)$$

$$= 10000$$

Also $\frac{\partial Q}{\partial I} = 2.50$ when P_x remains constant.

So the income elasticity at $I = 6000$

$$e_i = \frac{\partial Q}{\partial I} \cdot \frac{I}{Q}$$

$$= 2.50 . \frac{6000}{10000}$$

$$= 1.50$$

Thus from the income level of Rs 6000, we can expect demand for commodity X to change (in the same direction) by 1.50% for each 1% change in the consumers' income, *ceteris peribus.*

Are Income Elasticity of Demand

Arc income elasticity of demand for a commodity is a technique for computing income elasticity between two income levels of the consumers. It is measured as:

$$e_i = \frac{\Delta Q}{\Delta I} \cdot \frac{\frac{I_2 + I_1}{2}}{\frac{Q_2 + Q_1}{2}}$$

$$= \frac{Q_2 - Q_1}{I_2 - I_1} \cdot \frac{I_2 + I_1}{Q_2 + Q_1} \qquad \textit{ceteris peribus.....(4.13)}$$

Example 4.8

Assume that an increase in the disposable income in Haryana from Rs1.00 billion to Rs1.10 billion is associated with an increase in car sales in the state from 6000 to 7000 units. Calculate the income elasticity of demand for cars over this change of income.

Solution: We have

$Q_1 = 6000$ $\qquad$ $Q_2 = 7000$

$I_1 = 1.00$ $\qquad$ $I_2 = 1.10$

So $e_i = \frac{Q_2 - Q_1}{I_2 - I_1} \cdot \frac{I_2 + I_1}{Q_2 + Q_1}$

$$= \frac{7000 - 6000}{1.10 - 1.00} \cdot \frac{1.10 + 1.00}{7000 + 6000}$$

$$= 1.615$$

This means that a 1 percent change in the disposable income in the range (1.00-1.10); will result, on an average, in a 1.615 percent same change in the sales for cars.

Interpreting Income Elasticity of Demand

The income elasticity of demand tells about the nature of the commodity.

- $e_i > 0$ for most normal or income superior goods.
- $e_i < 0$ for inferior goods.
- $0 < e_i < 1$ (*i.e.* low income elasticity)for necessities (or perceived as necessities).
- $e_i > 1$ (*i.e.* high income elasticity) for luxuries and prestige items.

The income elasticity of demand is of a great significance in production planning and management in the long-run. It is use in forecasting the change in demand for the commodity that a firm sells under different economic conditions.

Other Demand Elasticity Measures

Price, cross and income elasticities are the most important application of the elasticity concept of demand analysis. Two other important elasticities of demand are:

Advertisement Elasticity of Sales: It measures the responsiveness of sales to the changes in advertisement expenditure and is very helpful in determining the optimum level of advertisement expenditure.

Elasticity of Price Expectations: During the period of Price fluctuations, consumers' price expectations play a much more important role in determining demand than any other factor. The concept of elasticity of price expectation is extremely useful for demand analysis during the period of price fluctuations.

4.3 ELASTICITY IN MANAGERIAL DECISION MAKING

Out of various factors that affect demand, some are well under the control of the firm, while others are not. A firm can usually set the prices of the commodity it sells and decide on the level of its expenditures on advertising, product quality and customer service. However, it has no control over the level and growth of consumers' income, consumers' price expectations, competitors' policies regarding price, expenditures on advertisement, product quality and customer service. The

analysis of all these factors and reliable estimates of their quantitative effect on sales are essential for the firm to determine the optimal operational policies, and plans for its growth, and for responding most effectively to competitors' policies. To make these points clear, consider the instances.

1. If the demand for the product is price inelastic, the firm would not want to lower its price since that would reduce its total revenue, increase its total costs and this give it lower profits.
2. If the elasticity of the firm's sales *w.r.t.* advertisement expenditure is positive and higher than for its expenditures on product quality and customer service, then the firms would find more beneficial to concentrate its sales efforts on advertising rather than on product quality and customer service.
3. If the income elasticity is very low for the form's product, management knows that the firm will not benefit much from rising income or may find it beneficial to improve product quality and customer service.
4. If the firm has estimated that the cross-price elasticity of demand for its product *w.r.t.* the price of a competitor's product is very high, it will be quick to respond to a competitor's price reduction.

Thus, the firm should first identify all the important variables that affect the demand for the product it sells. Then it should get reliable estimates of their quantitative effect and obtain the demand function. The firm can use this information to estimate the elasticity of demand for the product it sells *w.r.t.* each of the variable in demand function. These are essential for optimal managerial decisions in the short run and in planning for growth in the long run.

Example 4.9

Casio India Co. Pvt. Ltd. is planning to increase the price of its watch by 10% and its advertisement expenditure by 8% in the coming year. The company also expects personal disposable income to rise by 4% and Titan (its major competitor) watch's

price to rise by 7%. From the past experience the company knows the various demand elasticities.

e_p = - 2.0 e_i = 1.8 e_{ct} = 0.8 e_a = 1.3

The current sale of the company is 2,000,000 watches. What is the forecasted sale of the next year?

Solution: Given the demand elasticities, we can find the changes in sales.

$\%\Delta Q = e_p \%\Delta P$ The effect of price change

$\%\Delta Q = e_i \%\Delta I$ The effect of income change

$\%\Delta Q = e_{ct} \%\Delta P_t$ The effect of price change of Titan watch

$\%\Delta Q = e_a \%\Delta A$ The effect of change in advertisement expenditure

So we have the forecasted sale for the next year

$$Q_2 = Q_1 + Q_1(e_p \%\Delta P) + Q_1(e_i \%\Delta I) + Q_1(e_{ct} \%\Delta P_t) + Q_1(e_a \%\Delta A)$$

$$= Q_1\left[1 + (-2)\frac{10}{100} + (1.8)\frac{4}{100} + (0.8)\frac{7}{100} + (1.3)\frac{8}{100}\right]$$

$$= Q_1\left[1 - 0.200 + 0.072 + 0.056 + 0.104\right]$$

$$= Q_1\left[1.032\right]$$

= 2,000,000 *x* 1.032

= 2,064,000

So the decline in quantity demanded associated with price increase is offset by the positive impact of the projected changes in other variables.

The firm can also use the information about the projected changes in other variables, for deciding the price change that will maintain its current sale of 2,000,000 watches.

The firm will maintain its current sale when

$$e_p \%\Delta P + e_i \%\Delta I + e_{ct} \%\Delta P_t + e_a \%\Delta A = 0$$

$$e_p \frac{\Delta P}{100} + 0.072 + 0.056 + 0.104 = 0$$

$$-2.\frac{\Delta P}{50} = -0.2320$$

$$\Delta P = 11.6$$

So even by increasing the price by 11.6% the firm can maintain its current level of sales.

4.4 CHECK YOUR PROGRESS

Answer the following questions on the basis of your knowledge regarding this chapter:

1. Other things equal, if a good has more substitutes, its price elasticity of demand is_____.
2. If quantity demanded is completely unresponsive to changes in price, demand is_____.
3. Price of a product falls by 10% and its demand rises by 30%. The elasticity of demand is_____.
4. When demand is perfectly inelastic, an increase in price will result in_____.
5. If price and total revenue move in the same direction, then demand is_____.

4.5 SUMMMARY

Demand changes in response to any change in any of its determinants. However, knowing alone the nature of relationship between demand and its determinants is not sufficient. What is more important is to know the extent of relationship or how responsive the demand is to the changes in its determinants. The concept of elasticity of demand is extremely useful in this reference. It plays an important role in business decision-making. Therefore, it is obvious that the understanding of different elasticity of demand is the basic prerequisite whenever a business manager is considering “price change” for his or her product. In general terms, the elasticity of demand is a measure of the responsiveness or sensitiveness of demand for a commodity to the change in its determinants. A firm can usually set the prices of the commodity it sells and decide on the level of its expenditures on advertising, product quality and customer service. However, it has no control over the level and growth

of consumers' income, consumers' price expectations, competitors' policies regarding price, expenditures on advertisement, product quality and customer service. The analysis of all these factors and reliable estimates of their quantitative effect on sales are essential for the firm to determine the optimal operational policies, and plans for its growth, and for responding most effectively to competitors' policies.

4.6 KEYWORDS

Elasticity of Demand- The elasticity of demand is a measure of the responsiveness or sensitiveness of demand for a commodity to the change in its determinants.

Cross Price Elasticity of Demand- It is the ratio of the percentage change in the demand for commodity X to the percentage change in the price of commodity Y, assuming all other factors influencing demand remain unchanged.

Point Income Elasticity of Demand- It provides a measure of the responsiveness of demand for a commodity at a specific income level over the demand function.

Arc income elasticity - It is a technique for computing income elasticity between two income levels of the consumers.

Income Elasticity of Demand- It is measured as the ratio of the percentage change in demand for the commodity to the percentage change in consumers' income, assuming that all the other factors influencing demand remain unchanged.

4.7 SELF- ASSESSMENT TEST

1. Define the concept of elasticity of demand. Discuss its significance in theory of demand.
2. "The concept elasticity is a versatile tool of economic analysis." Discuss the validity of this statement with appropriate examples.
3. What do you understand by price elasticity of demand? How is it measured?
4. Discuss briefly the factors on which price elasticity of demand for a commodity depends.

5. What do you understand by point and arc price elasticities of demand? How are these measured?
6. A list of goods is given below. Will there demand be less elastic, moderately elastic, highly elastic or completely inelastic? Give brief reasons in support of your answer.
   (a) demand for petrol (b) demand for needles
   (c) demand for textbooks (d) demand for seasonal vegetables
   (e) demand for salt (f) demand for milk
   (g) demand for cars (h) demand for Hutch cellular services
7. Discuss the relationship between price, quantity demanded, marginal revenue, total revenue and price elasticity of demand.
8. What do you understand by cross-price elasticity of demand? How is it measured?
9. What do you understand by point and arc cross-price elasticities of demand? How are these measured?
10. What do you understand by income elasticity of demand? How is it measured?
11. What do you understand by point and arc income elasticities of demand? How are these measured?
12. Write short notes on:
   (a) Point elasticity
   (b) Arc elasticity
   (c) Advertisement elasticity of sales
   (b) Elasticity of price expectation

CONSUMER BEHAVIOUR: CARDINAL ANALYSIS

STRUCTURE

5.0 LEARNING OBJECTIVE

After going through this lesson the students should be able to explain the meaning of utility and cardinal concept of utility with reference to consumer behavior.

5.1 INTRODUCTION

Generally, we know that our needs are unlimited and we require or demand for the products/commodities to satisfy the needs. Because of the products are of "bundle of utilities". In other words, the consumers demand a commodity because they derive or expect to derive utility from that commodity. The expected utility from a commodity is the basis of demand for it.

5.2 MEANING OF UTILITY

Even though, the term 'utility' is very commonly used term. But, it has a specific meaning and use in the analysis of consumer demand or consumer behaviour in terms of cardinal analysis. The concept of utility can be looked upon from two angles: the commodity angle and the consumers' angle. At the first sight, utility is the want- satisfying property of a commodity. And the other, utility is the psychological feeling of satisfaction; pleasure, happiness or well being which a consumer derives from the consumption, possession or the use of a commodity. There is a disparity between these two concepts, which must be kept in mind. The concept of a want-satisfying property of a commodity is 'absolute' in the sense that this property is inbuilt in the commodity irrespective of whether one needs it or not. For example, a pen has its own utility of writing irrespective of whether a person is literate or illiterate. Another important feature of the 'absolute' concept of utility is that it is 'ethical neutral' because a commodity may satisfy socially immoral needs, e.g. alcohol. In contrary, from the consumer's point of view, utility is supposed as a post-consumption phenomenon as one derives satisfaction from a commodity only when one consumes or uses it.

Utility in terms of satisfaction is a subjective or relative concept because (i) a commodity need not be useful for all, e. g. cigarettes do not hove any utility for non-smokers, and meat has no utility for pure vegetarians; (ii) utility of a commodity varies from person to person and from time to time; and (iii) a commodity need not

have the same utility for the same consumer at different points of times, at different levels of consumption and at different moods of a consumer. In consumer analysis, only the 'subjective' concept of utility is used.

TOTAL UTILITY

Assuming that utility is measurable and additive, total utility may be defined as the sum of the utilities derived by a consumer from the various units of goods and services he consumes. Suppose a consumer consumes four units of a commodity, X, at a time and derives utility as u_1, u_2, u_3 and u_4. His total utility from commodity X (TU_x) can be measured as follows.

$$TU_x = u_1 + u_2 + u_3 + u_4$$

If a consumer consumes *n* number of commodities, his total utility, TU_n, will be the sum of total utilities derived form each commodity. For example, if the consumed goods are X, Y and Z and their total respective utilities are U_x, U_y, and U_z, then

$$TU_n = U_x + U_y + U_z$$

MARGINAL UTILITY

Marginal utility is another most important concept used in economic analysis. Marginal utility may be defined as the utility derived from the marginal unit consumed. It may also be defined as the addition to the total utility resulting from the consumption of one additional unit. Marginal Utility (MU) thus refers to the change in the Total Utility (i.e.. ΔTU) obtained from the consumption of an additional unit of a commodity. It may be expressed as

$$MU = \frac{\Delta TU}{\Delta Q}$$

Where TU = total utility, and ΔQ = change in quantity consumed by one unit.

Another way of expressing marginal utility (MU), when the number of units consumed is n, can be as follows:

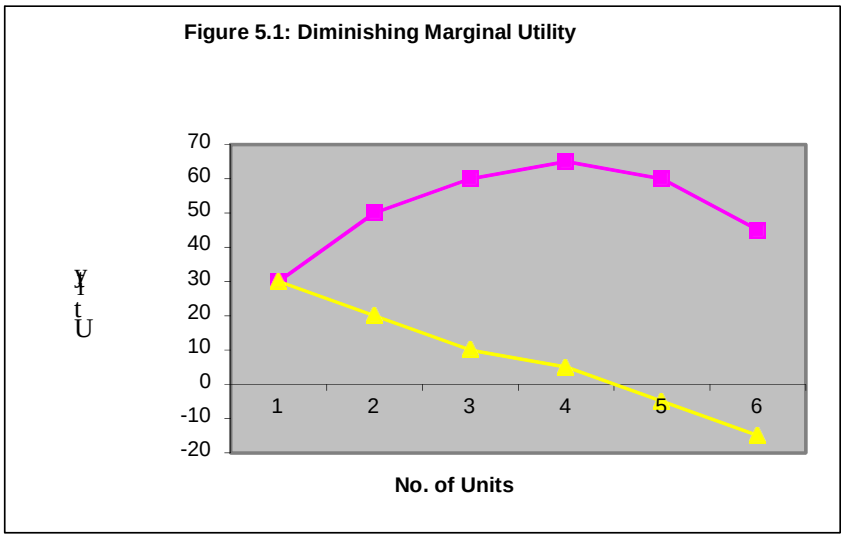
$$MU \text{ of } n\text{th unit} = TU_n - TU_{n-1}$$

5.2.1 The law of diminishing marginal utility

The law of diminishing marginal utility is one of the fundamental laws of economics. It states, as the quantity consumed of a commodity increases, the utility derived from each successive unit decreases, remaining the same consumption of all other commodities. In simple words, when a person consumes more and more units of a commodity per unit of time, e.g., ice cream, keeping the consumption of all other commodities constant, the utility which he derives from the successive units of consumption goes on diminishing. This law applies to all kinds of consumer goods-durable and non-durable sooner or later. Let us assume that utility is measurable in quantitative terms and illustrate the law of diminishing marginal utility. The law of diminishing marginal utility is illustrated numerically in Table 5.1 and graphically in Figure 5.1.

Table 5.1: Total and Marginal Utility Schedules

No. of units	Total Utility	Marginal Utility
1	30	30
2	50	20
3	60	10
4	65	5
5	60	-5
6	45	-15



As shown in Table 8.1, with the increase in the number of units consumed per unit of time, the TU increases but at a diminishing rate. The diminishing MU is shown in the last column. Fig. 8.1 illustrates graphically the law of diminishing MU. The rate of increase in TU as the result of increase in the number of units consumed is shown by the MU curve in Fig. 8.1. The downward sloping MU curve shows that marginal utility goes on decreasing as consumption increases: After four units consumption, the TU reaches its maximum level, the point of saturation, and MU becomes zero. Beyond this, MU becomes negative and TV begins to decline. The downward sloping MV curve illustrates the law of diminishing marginal utility.

WHY DOES THE MU DECREASE?

The utility gained from a unit of a commodity depends on the intensity of the desire for it. When a person consumes successive units of a commodity, his need is satisfied by degrees in the process of consumption and the intensity of his need goes

on decreasing: Therefore, the utility obtained from each successive unit goes on decreasing.

Assumptions: The law of diminishing marginal utility holds only under certain conditions. These conditions are referred to as the assumptions of the law. The assumptions of the law of diminishing marginal utility are: (i) the unit of the consumer good must be a standard one, *e.g.,* a cup of tea, a bottle of cold drink, a pair of shoes or trousers, etc. If the units are excessively small or large the law may not hold; (ii) the consumer's taste or preference must remain the same during the period of consumption; (iii) there must be continuity in consumption. Where a break in continuity is necessary, the time interval between the consumption of two units must be appropriately short; and (iv) the mental condition of the consumer must remain normal during the period of consumption.

Given these conditions, the law of diminishing marginal utility holds universally. In some cases, e.g., accumulation of money, collection of hobby items like stamps, old coins, rare paintings and books, melodious songs, etc. the marginal utility may initially increase rather than decrease. But eventually it does decrease. As a matter of fact, the law of marginal utility generally operates universally.

5.2.2 Cardinal and ordinal concepts of utility

Utility is a psychological phenomenon. It is a feeling of satisfaction, pleasure or happiness. Measurability of utility has, however, been a controversial issue. The classical economists like Jeremy Bentham, Leon Walrus, Carl Menger, etc. and neo-classical economist, notably Alfred Marshall-believed that utility is cardinally or quantitatively measurable like height, weight, length, temperature and air pressure. This belief resulted in the Cardinal Utility concept. The modern economists, most notably J.R. Hicks and R.G.D. Allen, however, hold the view that utility is not quantitatively measurable-it is not measurable in absolute terms. Utility can be expressed only ordinally, relatively or in terms of less than or more than. It is,

therefore, possible to list the goods and services in order of their preferences or desirability. This is known as the ordinal concept of utility.

CARDINAL UTILITY

The concept of cardinal utility implies that utility can be assigned a cardinal number like I, 2, 3, etc. the Neo-classical economists built up the theory of consumption on the assumption that utility is cardinally measurable. They used a term “util” meaning 'units of utility'. In their economic analysis, they assumed (i) that one 'util' equals one unit of money, and (ii) that utility of money remains constant. It has, however, been realised over time that absolute or cardinal measurement of utility is not possible. Difficulties in measuring utility have proved to be impossible. Neither economists nor scientists have succeeded in devising a technique or an instrument for measuring the feeling of satisfaction, i. e., utility. Nor could an appropriate measure of unit be devised. Numerous factors affect the state of consumer’s mood, which are impossible to determine and quantify. Utility is therefore immeasurable in cardinal terms.

APPROACHES TO CONSUMER DEMAND ANALYSIS

There are two approaches to the analysis of consumer behaviour.

(i) **Cardinal Utility Approach:** attributed to Alfred Marshall and his followers, is also called the Neo-classical Approach.

(ii) **Ordinal Utility Approach:** pioneered by J.R. Hicks, a Nobel laureate and R.G.D. Allen, is also called the Indifference Curve Analysis.

The two approaches are not in conflict with one another. In fact, they represent two levels of superiority in the analysis of consumer behaviour. Both the approaches are important for managerial decisions depending on the level of superiority required. It is important to note in this regard that in spite of tremendous developments in consumption theory based on ordinal utility, the classical demand theory based on

cardinal utility has retained its appeal and applicability to the analysis of market behaviour. Besides, the study of classical demand theory serves as a foundation for understanding the advanced theories of consumer behaviour. The study of classical theory of demand is of particular importance and contributes a great deal in managerial decisions.

In the following sections, we will discuss the theory of consumer behaviour based on the cardinal utility approach. Consumption theory based on the ordinal utility approach is discussed in the subsequent chapter.

5.3 ANALYSIS OF CONSUMER BEHAVIOUR: CARDINAL UTILITY APPROACH

The central theme of the consumption theory is the utility maximizing behaviour of the consumer. The fundamental postulate of the consumption theory is that all the consumers: individuals and households aim at utility maximisation and all their decisions and actions as consumers are directed towards utility maximization. The cardinal utility approach to consumer analysis makes the following assumptions.

(i) Consumer is rational: It is assumed that the consumer is a rational being in the sense that he satisfies his wants in the order of their preference. That is, he or she buys that commodity first which yields the highest utility and that last which gives the least utility.

(ii) Limited income: The consumer has a limited income to spend on the goods and services he or she chooses to consume. Limitedness of income, along with utility maximization objective makes the choice between goods inevitable.

(iii) Maximization of satisfaction: Every rational consumer intends to maximize his/her satisfaction from his/her given money income.

(iv) Utility is cardinally measurable: The cardinalists have assumed that utility is cardinally measurable and that utility of one unit of a commodity equals the money which a consumer is ready to pay for it or 1 util = 1 unit of money.

(v) Diminishing marginal utility: It is assumed that the utility gained from the successive units of a commodity consumed decreases as a consumer consumes larger quantity of the commodity.

(vi) Constant marginal utility of money: The cardinal utility approach assumes that marginal utility of money remains constant whatever the level of a consumer's income. This assumption is necessary to keep the scale of measuring rod of utility fixed. It is important to recall in this regard that cardinalists used money as a measure of utility.

(vii) Utility is additive: Cardinalists assumed not only that utility is cardinally measurable but also that utility derived from various goods and services consumed by a consumer can be added together to obtain the total utility. In other words, the consumer has a utility function, which may be expressed as:

$U = f(X_1, X_2, X_3, X_n)$, where X_1, X_2, X_3, X_n denote the total quantities of the various goods consumed.

Given the utility function, total utility obtained form *n* items can be ex pressed as

$U_n = U_1(X_1) + U_2(X_2) + U_3(X_3) + ... + U_n(X_n)$

It is this utility function, which the consumer aims to maximize.

CONSUMER'S EQUILIBRIUM

Conceptually, a consumer is said to have reached his equilibrium position when he has maximized the level of his satisfaction, given his resources and other conditions. Technically, a utility-maximizing consumer reaches his equilibrium position when allocation of his expenditure is such that the last penny spent on each commodity yields the same utility. How does a consumer reach this position? We know from assumptions 2 and 5, that the consumer has limited income and that the utility, which he derives from various commodities, is subject to diminishing returns. We also know that the *MU* schedules of various commodities may not be the same. Some commodities yield a higher marginal utility and some lower for the same

number of units consumed. In some cases, *MU* decreases more rapidly than in case of others for the same number of units consumed. A rational and utility-maximising consumer consumes commodities in the order of their utilities. He first picks up the commodity, which yields the highest utility followed by the commodity yielding the second highest utility and so on. He switches his expenditure from one commodity to the other in accordance with their marginal utilities. He continues to switch his expenditure from one commodity to another till 'he reaches a stage where MU 'Of each commodity is the same per unit of expenditure. This is the state of consumer's equilibrium.

(i) Consumer's Equilibrium: One-Commodity Model:

Let us first illustrate consumer's equilibrium in a simple one-commodity model. Suppose that a consumer with certain money income consumes only one commodity, X. Since both his money income and commodity X have utility) for him, he can either spend his income on commodity X or retain it in the form of asset. If the marginal utility of commodity X, (MU_x), is greater than marginal utility of money (MU_m) as an asset, a utility-maximizing consumer will exchange his money income for the commodity. By assumption, MU_x is subject to diminishing returns (assumption 5), whereas marginal utility of money (MU_m) as an asset remains constant (assumption 6). Therefore, the consumer will exchange his money income on commodity X so long as $MU_x > P_x(MU_m)$, P_x being the price of commodity X and $MU_m = 1$ (constant). The utility maximizing consumer reaches his equilibrium, i.e., the level of maximum satisfaction, where

$$MU_x = P_x(MU_m)$$

Alternatively, the consumer reaches equilibrium point where,

$$\frac{MU_x}{P_x(MU_m)} = 1$$

The horizontal line $P_x(MU_m)$ shows the constant utility of money weighted by the price of commodity X (i.e. P_x) and MU_x curve represents the diminishing marginal utility of commodity X. The $P_x(MU_m)$ line and MU_x curve intersect each other at point E. Point E indicates that at quantity OQ_x consumed, $MU_x = P_x(MU_m)$, Therefore, the consumer is in equilibrium at point E. At any point beyond *E*, $MU_x > P_x(MU_m)$. Therefore, if the consumer exchanges his money for commodity *X*, he will increase his total satisfaction because his gain in terms of MU_x is greater than his loss in terms of MU_m, This conditions exists till he reaches point *E*. And, at Quantity any point below *E*, $MU_x < P_x(MU_m)$. Therefore, if he consumes more than OQ_x, he loses more utility than he gains.

He is therefore a net loser. The consumer can, therefore, increase his satisfaction by reducing his consumption. This means that at any point other than *E*, consumer's total satisfaction is less than maximum satisfaction. Therefore, point E is the point of equilibrium.

(ii) Consumer's Equilibrium with Multiple-Commodity Model or The Law of Equi-Marginal Utility:

In real life, however, a consumer consumes multiple numbers of goods and services. So the question arises: How does a consumer consuming multiple goods reach his equilibrium? The law of equi-marginal utility explains the consumer's equilibrium in a multi-commodity model. This law states that a consumer consumes various goods in such quantities that the MU derived per

unit of expenditure on each good is the same. In other words, a rational consumer spends his income on various goods he consumes in such a manner that each rupee spent on each good yields the same MU. Let us now explain consumer's equilibrium in a multi-commodity model. Here, we will consider only a two-commodity case. Suppose that a consumer consumes only two commodities, X and Y, their prices being P_x and P_y, respectively. Following the equilibrium rule of the single commodity case, the consumer will distribute his income between commodities X and Y, so that

$MU_x = P_x(MU_m)$ and $MU_y = P_y(MU_m)$

Given these conditions, the consumer is in equilibrium where

$$\frac{MU_x}{P_x(MU_m)} = 1 = \frac{MU_y}{P_y(MU_m)} \quad \text{.....(8.1)}$$

Since, according to assumption (6), MU of each unit of money (or each rupee) is constant at I, Equation (5.1) can be rewritten as

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} \quad \text{.....(5.2)}$$

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y} \quad \text{.....(5.3)}$$

Equation (5.2) leads to the conclusion that the consumer reaches his equilibrium when the marginal utility derived from each rupee spent on the two commodities *X* and *Y* is the same. The two-commodity case can be used to generalize the rule for consumer's equilibrium for a consumer consuming a, large number of goods and services with a given income and at different prices. Supposing, a consumer consumes *A* to Z goods and services, his equilibrium condition may be expressed as

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B} = \ldots\ldots = \frac{MU_Z}{P_Z} = MU_m \quad \text{.....(5.4)}$$

Equation (5.4) gives the Law of Equi-marginal Utility.

It is important to note that, in order to achieve his equilibrium, what a utility maximizing consumer intends to equalize is not the marginal utility of each commodity he consumes, but the marginal utility per unit of his money expenditure on various goods and services.

5.4 CHECK YOUR PROGRESS

1. A commodity that the consumer prefers less to more of is referred to as a 'bad'.(T/F)
2. If the total utility obtained from consuming a given good is maximised then marginal utility will be approaching zero. (T/F)
3. Transitivity of choice implies that if the consumer prefers one good to another they should never change that preference. (T/F)
4. The characteristics approach to consumer demand sees utility as being derived from the characteristics inherent within the good. (T/F)
5. Total utility at zero level of consumption is zero. (T/F)

5.5 SUMMARY

An individual demand the commodities due to their utility and utility is the want-satisfying property of a commodity. In addition, it is the psychological feeling of satisfaction; pleasure, happiness or well being which a consumer derives from the consumption, possession or the use of a commodity. Further, the demand for goods in terms of quantity is based upon their MU. If the marketers increase MU in terms of reuse of the product, reduction in price, change in the design of the product etc.; than they may create the demand for the same commodities.

5.6 KEYWORDS

1. **Utility:** utility is the want- satisfying property of a commodity.
2. **Total Utility:** total utility may be defined as the sum of the utilities derived by a consumer from the various units of goods and services

he consumes.

3. **Marginal Utility:** Marginal utility may be defined as the utility derived from the marginal unit consumed.

5.7 SELF-ASSESSMENT TEST

1. What do you mean by utility and the concept of cardinal utility?
2. Define the law of diminishing marginal utility.
3. What is the meaning of consumer equilibrium with reference to cardinal approach?
4. Define the marginal rate of substitution. What is the law behind the diminishing marginal rate of substitution?
5. Define the concepts of TU and MU and distinguish them.

CONSUMER BEHAIOUR: ORDINAL ANALYSIS

STRUCTURE

6.0 LEARNING OBJECTIVE

After going through this lesson the students should be able to explain the meaning of ordinal utility, indifference curve and ordinal concept of utility with reference to

consumer behaviour.

6.1 INTRODUCTION

The modern economists have discarded the concept of cardinal utility and have instead employed the concept of ordinal utility for analysing consumer behaviour. The concept of ordinal utility is based on the fact that it may not be possible for consumers to express the utility of a commodity in absolute terms, but it is always possible for a consumer to tell introspectively whether a commodity is more or less or equally useful as compared to another. For example, a consumer may not be able to tell that an ice-cream gives 5 utils and a chocolate gives to utils. But he or she can always tell whether chocolate gives more or less utility than ice-cream. This assumption forms the basis of the ordinal theory of consumer behaviour. While neo-classical economists maintained that cardinal measurement of utility is practically possible and is meaningful in consumer analysis, modem economists maintain that utility being a psychological phenomenon is inherently immeasurable, theoretically or conceptually and quantitatively as well. They also maintain that the concept of ordinal utility is a practical concept and it meets the conceptual requirement of analysing the consumer behaviour in the absence of any cardinal measures of utility.

6.2 ORDINAL UTILITY APPROACH

Unlike Marshall, the modern economists-Hicks in particular-have used the ordinal utility concept to analyse consumer's behaviour. This is called ordinal utility approach. Hicks has used a different tool of analysis called "indifference curve" to analyse consumer behaviour.

ASSUMPTIONS OF ORDINAL UTILITY THEORY

(i) Rationality of consumer: The consumer is assumed to be a rational being. Rationality means that a consumer aims at maximizing his total satisfaction given his income and prices of the goods and services that he consumes and his decisions are consistent with this objective.

(ii) **Ordinal Utility:** Indifference curve analysis asslli1es that utility is only ordinally expressible. That is, the consumer is only able to tell the order of his preference for different basket of goods.

(iii) **Transitivity and consistency of choice:** Consumer's choices are assumed to be transitive. Transitivity of choice means that if a consumer prefers A to B and B to C, he must prefer A to C. Or, if he treats A=B and B=C, he must treat A=C. Consistency of choice means that if he prefers A to B in one period, he will not prefer B to A in another period or even treat them as equal.

(iv) **No saturation:** It is also assumed that the consumer is never over-supplied with goods in question. That is, he has not reached the point of saturation in case of any commodity. Therefore, a consumer always prefers a larger quantity of all the goods.

(v) **Diminishing marginal rate of substitution:** The marginal rate of substitution is the rate at which a consumer is willing to substitute one commodity (X) for another (Y) so that his total satisfaction remains the same. This rate is given as D_Y/D_X. The ordinal utility approach assumes that D_Y/D_X goes on decreasing when a consumer continues to substitute X for Y.

6.2.1 MEANING AND NATURE OF INDIFFERENCE CURVE

An indifference curve may be defined as the locus of points. Each point represents a different combination of two substitute goods, which yield the same utility or level of satisfaction to the consumer. Therefore, he/she is indifferent between any two combinations of goods when it comes to making a choice between them. Such a situation arises because he/she consumes a large number of goods and services and often finds that one commodity can be substituted for another. It gives him/her an opportunity to substitute one commodity for another, if need arises and to make various combinations of two substitutable goods which give him/her the same level

of satisfaction. If a consumer faced with such combinations, he/she would be indifferent between the combinations. When such combinations are plotted graphically, the resulting curve is called indifference curve. An indifference curve is also called Isoutility curve or Equal utility curve. For example, let us suppose that a consumer makes five combinations a, b, c, d and e of two substitute commodities, X and Y, as presented in Table 6.1. All these combinations yield the same level of satisfaction.

TABLE 6.1: INDIFFERENCE SCHEDULE OF COMMODITIES X AND Y

Combination	Units of Commodity Y	Units of Commodity X	Total Utility
a	25	3	U
b	15	6	U
c	8	9	U
d	4	17	U
e	2	30	U

Table 6.1 is an indifference schedule-a schedule of various combinations of two goods, between which a consumer is indifferent. The last column of the table shows an undefined utility (U) derived from each combination of X and Y. The combinations a, b, c, d and e given in Table 6.1 are plotted and joined by a smooth curve (as shown in Figure 6.1).

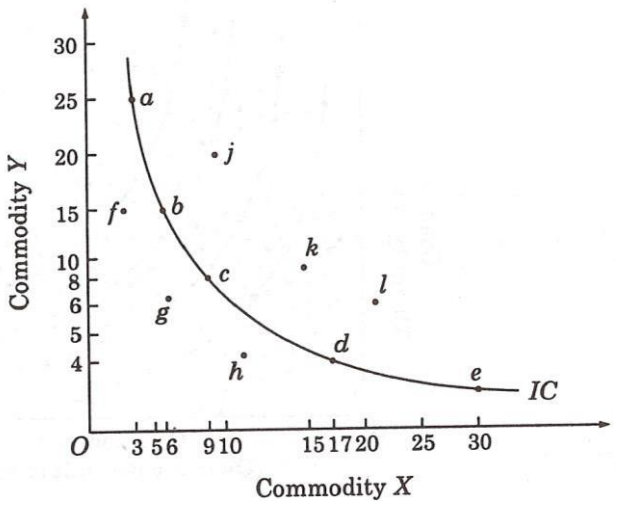


Figure 6.1: Indifference Curve

The resulting curve is known as an indifference curve. On this curve, one can locate many other points showing different combinations of X and Y which yield the same level of satisfaction. Therefore, the consumer is indifferent between the combinations, which may be located on the indifferent curve.

Indifference Map: The combinations of the two commodities, X and Y, given in the indifference schedule or those indicated by the indifference curve are by no means the only combinations of the two commodities. The consumer may make many other combinations with less of one or both of the goods-each combination yielding the same level of satisfaction but less than the level of satisfaction indicated by the indifference curve (IC) in Figure 6.1. As such, an indifference curve below the one given in Figure 6.1 can be drawn, say, through points f, g and h. Similarly, the consumer may make many other combination with more of one or both the goods; each combination yielding the same satisfaction but greater than the satisfaction indicated by IC. Thus, another indifference curve can be drawn above IC, say, through points j, k and l. This exercise may be repeated as many times as one wants, each time generating a new indifference curve. In fact; the space between X and Y-axes is known as the 'indifference plane' or 'commodity space'. This plane is full of finite points and each point on the plane indicates a different combination of goods X and Y. Intuitively, it is always possible to locate any two or more points a indicating different combinations of goods X and Y yielding the same satisfaction. It is thus possible to draw a number of indifference curves without intersecting or touching the other, as shown in Figure 6.2.

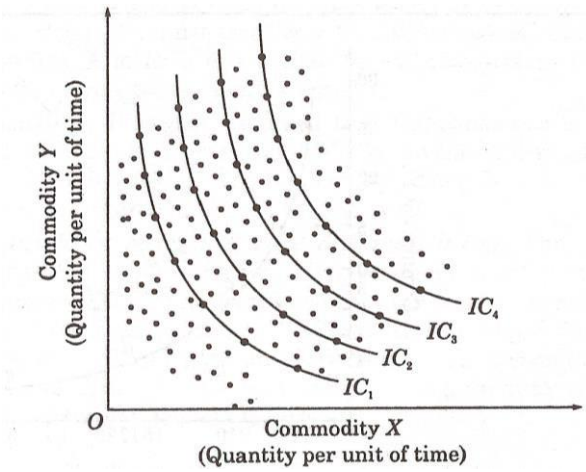


Figure 6.2. : **Indifference Map**

The set of indifference curves IC_1, IC_2, IC_3 and IC_4 drawn in this manner make the indifference map. In fact, an indifference map may contain any number of indifference curves, ranked in the order of consumer's preferences.

THE MARGINAL RATE OF SUBSTITUTION (MRS)

Substituting one good for another forms an indifference curve. The MRS is the rate at which one commodity can be substituted for another, the level of satisfaction remaining the same. The MRS between two commodities X and Y, may be defined as the quantity of X which is required to replace one unit of Y (or quantity of Y required to replace one unit of X), in the combination of the two goods so that the total utility remains the same. This implies that the utility of X (or Y) given up is equal to the utility of additional units of Y (or X). The MRS is expressed as D_Y/D_X, moving down the curve. The Diminishing MRS The basic postulate of ordinal utility theory is that $MRS_{y,x}$ (or $MRS_{x,y}$) decreases. It means that the quantity of a commodity that a consumer is willing to sacrifice for an additional unit of another goes on decreasing when he goes on substituting one commodity for another. The diminishing $MRS_{x,y}$ obtained from combinations of X and Y given in Table 6.1 are presented in Table 6.2.

Table 6.2: The Diminishing MRS between Commodities X and Y

Indifference Points	Combinations Y + X	Change in Y (-ΔY)	. Change in X (ΔX)	$MRS_{y,x}$ (ΔY/ΔX)
a	25 + 3	-	-	-
b	15 + 6	-10	3	- 3.3
c	8 + 9	-7	3	- 2.3
d	4 + 17	-4	9	- 0.4
e	2 + 30	-2	13	- 0.2

As Table 6.2 shows, when the consumer moves from point *a* to *b* on his indifference curve (Figure 6.1) he/she gives up 10 units of commodity Y and gets only 3 units of commodity X, so that

$$MRS_{y,x} = \frac{\Delta Y}{\Delta X} = \frac{-10}{3} = -3.3$$

As he moves down from point b to c, he loses 7 units of Y and gains 3 units of X, giving

$$MRS_{y,x} = \frac{\Delta Y}{\Delta X} = \frac{-10}{3} = -3.3$$

The $MRS_{y,x}$ goes on decreasing as the consumer moves further down along the indifference curve, from point c through d and e. The diminishing marginal rate of substitution causes the indifference curves to be convex to the origin.

WHY DOES *MRS* DIMINISH?

The MRS decreases along the IC curve because, in most cases, no two goods are perfect substitutes for one another. In case any two goods are perfect substitutes, the indifference curve will be a straight line with a negative slope and constant MRS. Since goods are not perfect substitutes, the subjective value attached to the additional quantity (i.e., subjective MU) of a commodity decreases fast in relation to the other commodity whose total quantity is decreasing. Therefore, when the quantity of one commodity (X) increases and that of the other (Y) decreases, the subjective MU of Y increases and that of X decreases. Therefore, the consumer becomes increasingly unwilling to sacrifice more units of Y for one unit of X. But, if he is required to sacrifice additional units of Y, he will demand increasing units of X to maintain the level of his satisfaction. As a result, the MRS decreases.

Furthermore, when combination of two goods at a point on indifference curve is such that it includes a large quantity of one commodity (Y) and a small quantity of the other commodity (X), then consumer's capacity to sacrifice Y is greater than to sacrifice X. Therefore, he can sacrifice a larger quantity of Y in favour of a smaller

quantity of X. For example, at combination a (see the indifference schedule; Table 6.1), the total stock of Y is 25 units and that of X is 5 units. That is why the consumer is willing to sacrifice 10 units of Y for 3 unit of X (Table 6.2). This is an observed behavioural rule that the consumer's willingness and capacity to sacrifice a commodity is greater when its stock is greater and it is lower when the stock of a commodity is smaller. These are the reasons why MRS between the two substitute goods decreases all along the indifference curve.

PROPERTIES OF INDIFFERENCE CURVE

Indifference curves have the four basic properties: Indifference curves have a negative slope; Indifference curves are convex to the origin; Indifference curves do not intersect nor are they tangent to one another; and upper indifference curves indicate a higher level of satisfaction. These properties of indifference curves, in fact, reveal the consumer's behaviour, his choices and preferences. They are, therefore, very important in the modern theory of consumer behaviour. Now, we will observe their implications.

Indifference Curves have a negative slope: In the words of Hicks, “so long as each commodity has a positive marginal utility, the indifference curve must slope downward to the right", as shown in Fig. 6.1. The negative slope of indifference curve implies (i) that the two commodities can be substituted for each other; and (ii) that if the quantity of one commodity decreases, quantity of the other commodity must increase so that the consumer stays at the same level of satisfaction. If quantity of the other commodity does not increase simultaneously, the bundle of commodities will decrease as a result of decrease in the quantity of one commodity. And, a smaller bundle of goods is bound to yield a lower level of satisfaction. The consumer's satisfaction cannot remain the same if indifference curves have a positive slope (i.e., $\Delta Y/\Delta X>0$) or if slope is equal to infinity, (i.e., $\Delta Y/\Delta X>\infty$). These situations are shown in Fig. 6.3 through inconsistent indifference curves.

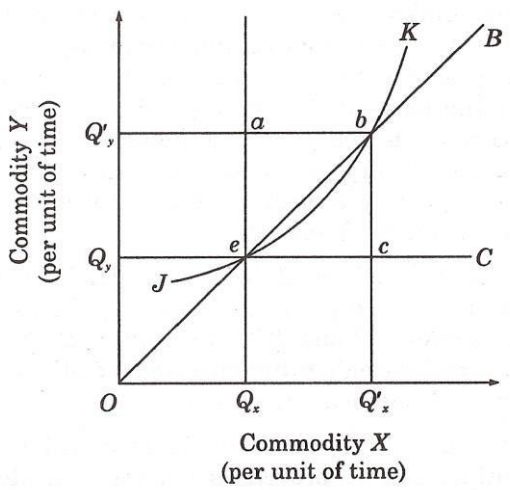


Figure 6.3: Inconsistent Indifference Curves

Let us suppose that the consumer is initially at point *e* where he/she is deriving some utility from OQ_x of X and OQ_y of Y. If an indifference curve has a positive slope (i.e., $\Delta Y/\Delta X>0$); as shown by the line OB and curve JK, it implies that the consumer is equally satisfied with larger and smaller baskets of X and Y. This means an irrational behaviour of the consumer. For example, if the consumer moves from point *e* to *b*, the combination of the two goods increases by *ea* (= bc) of Y and *ec* (= ab) of X. Unless *MU* of *ea* and *ec* are equal to zero, the level of satisfaction is bound to increase whereas on an indifference curve, the total utility is supposed to remain the same. Therefore, line OB and curve JK cannot be indifference curves.

Similarly, in the case of a vertical indifference line, aQ_x, and the movement from *e* to *a* means an increase in the quantity of Y by *ea*, while quantity of X remains the same, OQ_x. If MU of $ea>0$, the total utility will increase. So is the case if an indifference curve takes the shape of a horizontal line, like Q_yC.

Indifference Curves are Convex to Origin: Indifference curves are not only negatively sloped, but are also convex to the origin. The convexity of the indifference curves implies two properties: (a) the two commodities are imperfect substitutes for one another, and (b) the marginal rate of substitution (MRS) between the two goods decreases as a consumer moves along an indifference curve. This

characteristic of indifference curves is based on the postulate of diminishing marginal rate of substitution.

The postulate of diminishing MRS, as mentioned above, states an observed fact that if a consumer substitutes one commodity (X) for another (Y), his willingness to sacrifice more units of Y for one additional unit of X decreases, as quantity of Y decreases. There are two reasons for this: (i) two commodities are not perfect substitutes for one another, and (ii) MU of a commodity increases as its quantity decreases and vice versa, and, therefore, more and more units of the other commodity are needed to keep the total utility constant.

Indifference Curves can Neither Intersect nor be Tangent with one another: If two indifference curves intersect or are tangent with one another, it will reflect two rather impossible conclusions: (i) that two equal combinations of two goods yield two different levels of satisfaction, and (ii) that two different combinations-one being larger than the other-yield the same level of satisfaction. Such conditions are impossible if the consumer's subjective valuation of a commodity is greater than zero. Besides, if two indifference curves interest, it would mean negation of consistency or transitivity assumption in consumer's preferences.

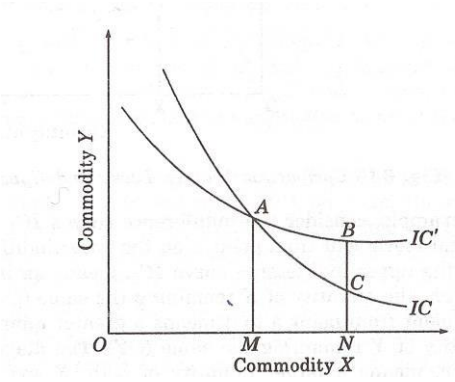


Figure 6.4: Intersecting Indifference Curves

Let us now see what happens when two indifference curves, IC and IC^1, intersect each other at point A (Fig. 6.4). Point A falls on both the indifference curves, IC and IC^1. It means that the same basket of goods (OM of X + AM of Y) yields different

levels of utility below and above point A on the same indifference curve. The inconsistency that two different baskets of X and Y yield the same level of utility can be proved as follows. Consider two other points: point B on indifference curve IC^1 and point C on indifference curve IC both being on a vertical line. Points A, Band C represent three different combinations of commodities X and Y. Let us call these combinations as A, Band C, respectively. Note that combination A is common to both the indifference curves. The intersection of the two IC_s implies that in terms of utility, A=B; and A=C; therefore A=C. But if B = C it would mean that in terms of utility,

ON of X + BN of Y = ON of X + CN of Y

Since ON of X is common to both the sides, the above equation would mean that

BN of Y = CN of Y

But, Figure 6.4 shows BN> CN. Therefore, combinations Band C cannot be equal in terms of satisfaction. The intersection, therefore, violates the transitivity rule, which is a logical necessity in indifference curve analysis. The same reasoning is applicable when two indifference curves are tangent with each other.

Upper Indifference Curves Represent a Higher Level of Satisfaction than the Lower Ones: An indifference curve placed above and to the right of another represents a higher level of satisfaction than the lower one. In Figure 6.5, indifference curve IC_2 is placed above the curve IC_1. It represents, therefore, a higher level of satisfaction. The reason is that an upper indifference curve contains all along its length a larger quantity of one or both the goods than the lower indifference curve. And a larger quantity of a commodity is supposed to yield a greater satisfaction than the smaller quantity of it, provided MU>0. For example, consider the indifference curves IC_1 and IC_2 in, Figure 6.5.

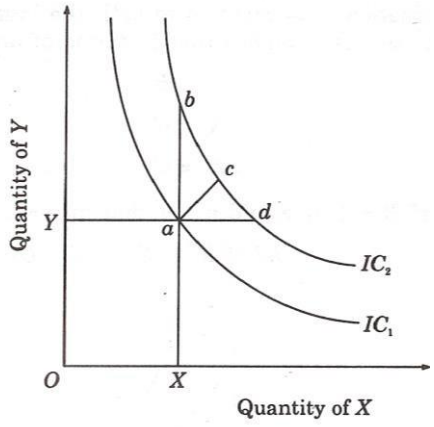


Figure 6.5: Comparison between Lower and Upper Indifference Curves

The vertical movement from point a on the lower indifference curve IC_1 to point b and Quantity of X on the upper indifference curve IC_2, means an increase in the quantity of Y by *ab*, the quantity of X remaining the same (OX). Similarly, a horizontal movement from point a to d means a greater quantity (*ad*) of commodity X, quantity of Y remaining the same (OY). The diagonal movement, i.e., from *a* to *c*, means a larger quantity of both X and Y. Unless the utility of additional quantities of X and Yare equal to zero, these additional quantities will yield additional utility. Therefore, the level of satisfaction indicated by the upper indifference curve (IC_2) would always be greater than that indicated by the lower indifference curve (IC_1).

6.2.2 BUDGETARY CONSTRAINT AND THE BUDGET LINE

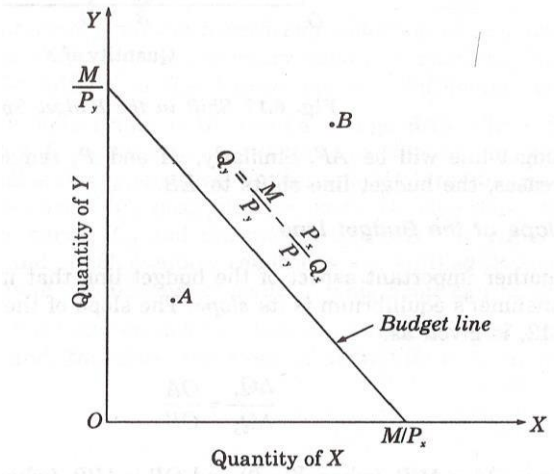
Given the indifference map, a utility maximizing consumer would like to reach the highest possible indifference curve on his indifference map. But the consumer is assumed to have a limited income. The limitedness of income acts as a constraint on how high a consumer can ride on his indifference map. This is known as budgetary constraint. In a two-commodity model, the budgetary constraint, may be expressed through a budget equation as

$$P_x \cdot Q_x + P_y \cdot Q_y = M$$

Where P_x and P_y are prices of X and Y, respectively, and Q_x and Q_y are their respective quantities; M is the consumer's money income. The budget equation states that the total expenditure of the consumer on goods X and Y cannot exceed his total income, M. The quantities of X and Y can be easily obtained from the budget equation, as shown below.

$$Q_x = \frac{M}{P_x} - \frac{P_y}{P_x} Q_y \quad \text{and} \quad Q_y = \frac{M}{P_y} - \frac{P_x}{P_y} Q_x$$

These equations are also called budget equations. Given Y the budget equations, if



M, P_x and P_y are known, the values of Q_x and Q_y and different combinations thereof can be easily calculated. Now, Q_x or Q_y may be alternatively assigned any positive numerical value and the corresponding values of Q_y and Q_x may be obtained. When the values of Q_x and Q_y are plotted on the X and Y axes, we get a line with a negative slope, which is called the budget line or price line, as shown in Figure 6.6.

Figure 6.6: Budget Line and Budget Space

An easier method of drawing the budget line is to mark point M/P_y on the Y axis (assuming $Q_x = 0$) and point M/P_x on X-axis (assuming Qy = 0) and to join these points by a line. This gives the same budget line as given by the equation in Figure 6.6. The budget line shows the market opportunities available to the consumer given his income and the prices of X and Y. The budget line divides the commodity space into two parts: (i) feasibility area, and (ii) non-feasibility area. The area under the budget line (including the budget line) is feasibility area (Figure 6.6). For, any combination of goods X and Y represented by a point within this area (e.g., point A) or on the boundary line (i.e., on the budget line) is a feasible combination, given M, P_x and P_y The area beyond the budget line is non-feasibility area because any point falling in this area, e.g., point B, is unattainable (given M, P_x and P_y). Shifts in the Budget Line The budget line shifts upward or downward or swivels due to change in

the consumer's income and prices of the commodities. If the consumer's income increases, prices remaining the same, the budget line shifts upwards, and remaining parallel to the original budget line. Suppose, the original budget line is given by line *AB* in Figure 6.7.

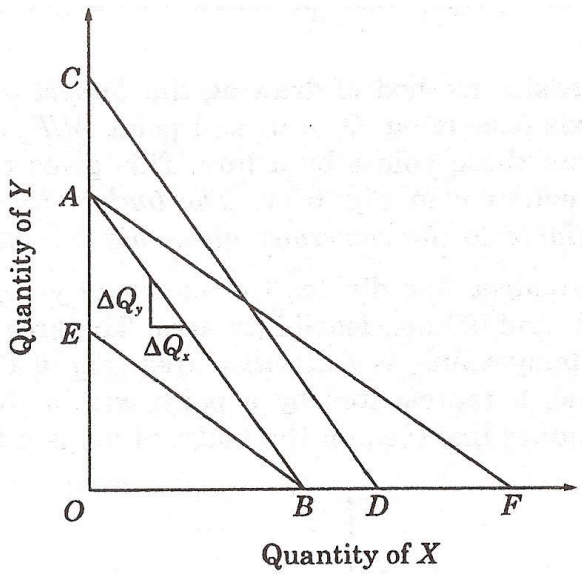


Fig. 6.7: Shift in the Budget Space

If M increases (prices remaining the same), the budget line AB will shift to CD. And, if M decreases by the same amount, the budget line will shift backward to its original position AB. Income remaining the same, if prices change, the budget line changes its position. For example, if M and P_y remain constant and P_x decreases to a half then the budget line will be AF. Similarly, M and P_x remaining constant; if P_y increases, the budget line shifts to EB.

Slope of the Budget Line: Another important aspect of the budget line that matters in determining a consumer's equilibrium is its slope. The slope of the budget line (AB) in Figure 6.8, is given as:

$$\frac{\Delta Q_y}{\Delta Q_x} = \frac{OA}{OB}$$

Since OA = M/P_y (when X = 0) and OB = M/ P_x (when Y = 0), the slope of the budget line AB in Fig. 6.8 may be rewritten as

$$\frac{OA}{OB} = \frac{M / P_y}{M / P_x} = \frac{P_x}{P_y}$$

Thus, the slope of the budget line is the same as the price ratio of the two commodities.

6.3 CONSUMER'S EQUILIBRIUM

As noted earlier, a consumer attains his equilibrium when he maximizes his total utility, given his income and market prices of the goods and services that he consumes. The ordinal utility approach specifies two conditions for the consumer's equilibrium: (i) necessary or the first order condition and (ii) supplementary or the second order condition. In a two-commodity model, the necessary or the first order condition under ordinal utility approach is the same as equilibrium condition under cardinal utility approach. It is given as

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

Since, by implication, $MU_x/MU_y = MRS_{x,y}$ the necessary condition of equilibrium under ordinal utility approach can be written as

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

This is a necessary but not a sufficient condition of consumer's equilibrium. The, second order or supplementary condition requires that the necessary condition be fulfilled at the highest possible indifference curve.

Consumer's equilibrium is illustrated in Figure 6.8. The indifference curves IC), IC2 and IC3 present a hypothetical indifference map of the consumer. The line AB is the hypothetical budget line. Both the budget line AB and the indifference curve IC_2 pass through point E. Therefore, the slopes of the indifference curve IC_2 and the budget line (AB) are equal. Thus, both the necessary and supplementary conditions

are fulfilled at point E. Therefore; consumer is in equilibrium at point E. This point can' be proved as follows.

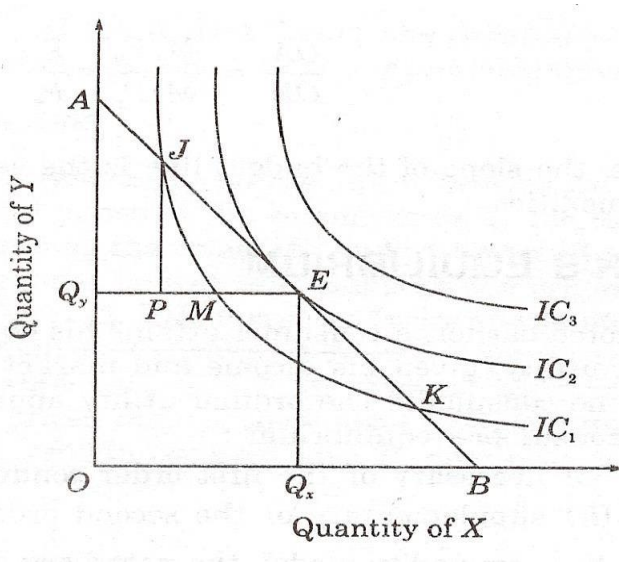


Figure 6.8: Equilibrium of the Consumer

We know that between any two points on an indifferent curve, $\Delta Y.MU_y = \Delta X. MU_x$ and, therefore, the slope of an indifference curve is given by

$$\frac{\Delta Y}{\Delta X} = \frac{MU_x}{MU_y} = MRS_{x,y}$$

We know also that the slope of the budget line is given by

$$\frac{OA}{OB} = \frac{P_Y}{P_X}$$

As shown in Figure 6.8, at point E, $MRS_{x,y} = \frac{P_Y}{P_X}$. Therefore, the consumer is in equilibrium at point E. The tangency of IC_2 with the budget line AB indicates that IC_2 is the highest possible indifference curve, which the consumer can reach, given his budgetary constraint and the prices. At equilibrium point E, the consumer consumes OQ_x of X and OQ_y of Y, which yield him the maximum satisfaction. Although, the necessary condition is also satisfied on two other points, J and K (i.e.,

the points of intersection between the budget line AB and indifference curve IC_1), these points do not satisfy the second order condition. Indifference curve IC_1 is not the highest possible curve on which the necessary condition is fulfilled. Since indifference curve IC_1 lies below the curve IC_2, at any point on IC_I, the level of satisfaction is lower than the level of satisfaction indicated by IC_2. So long as the utility maximizing consumer has an opportunity to reach the curve IC_2, he would not like to settle on a lower indifference curve.

From the information contained in Figure 6.8, it can be proved that the level of satisfaction at point E is greater than that on any other point on IC_I. Suppose the consumer is at point J. If he moves to point M, he will be equally well-off because points J and M are on the same indifference curve. If he moves from point J to M, he will have to sacrifice JP of Y and take PM of X. But in the market, he can exchange JP of Y for PE of X. That is, he gets extra ME (= PE - PM) of X. but in the market he can exchange JP of Y for PE of X. That is, he gets extra utility ME (= PE-PM) of X. Since ME gives him extra utility, the consumer moves to point E which means a utility higher than the point M. Therefore, point E is preferable to point M. The consumer will, therefore, have a tendency to move to point E from any other point on .the curve IC_1 in order to reach the highest possible indifference curve, all other things (taste., preference and prices of goods) remaining the same. Another fact which is obvious from Figure 6.8 is that, due to budget constraint, the consumer cannot move to an indifference curve placed above and to the right of IC_2. For example, his income would be insufficient to buy any combination of two goods at the curve IC_3. Note that the indifference curve IC_3 falls in the infeasibility area.

6.3.1 EFFECTS OF CHANGE IN INCOME ON CONSUMER DEMAND

Generally, it is observed that the income of consumer change the quantity demanded by a consumer. Assuming, other things remaining the same; when a consumer's income changes, his capacity to buy goods and services changes too, these changes may be shown by a parallel upward or downward shift in the consumer's budget line.

As shown in Figure 6.7, when a consumer's income decreases, his budget line shifts downward and when his income increases, the budget line shifts upward. With the changes in his income, the consumer moves from one equilibrium point to another. Such movements show the rise and fall in the consumption basket. This is called, "income effect"; illustrated in Figure 6.9.

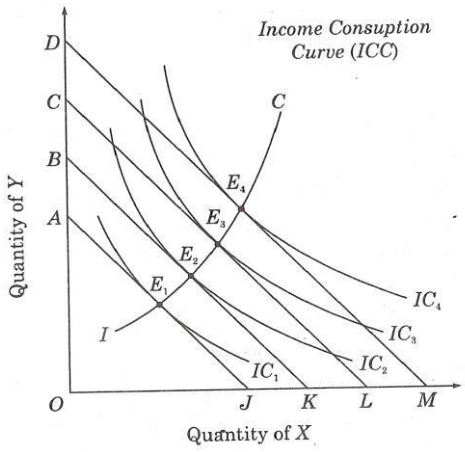


Figure 6.9: Income consumption curve of normal goods

The indifference curves IC_1, IC_2, IC_3 and IC_4 represent the consumer's indifference map. To analyse the effect of change in income on consumption, let us suppose that the consumer has a given income and prices of goods X and Y are given and his budget line is given by AJ, and that the consumer is initially in equilibrium at E_1 on the IC_1. Now let the consumer's income increase so that his budget line shifts from position AJ to BK and the consumer reaches a new equilibrium point, E_2 on IC_2. Similarly, if his income increases further, he moves from equilibrium E_2 to E_3 and then to E_4. Thus, with each successive upward shift in the budget line, the equilibrium position of the consumer moves upward. The successive equilibrium combinations of goods (X and Y) at four different levels of income are indicated by points E_1, E_2, E_3 and E_4 in Figure 6.9. If these points of equilibrium are joined by a curve, we, get the path of increase in consumption resulting from the increase in

income. Tl1is curve is called the income consumption curve (lCC). The income-consumption curve may be defined as the locus of points representing various equilibrium quantities of two commodities consumed by a consumer at different levels of income, all other things remaining constant. The movement from point E_1, towards point E_4 indicates increase in the consumption of the normal goods X and Y. This is called income effect.

Income-Effect on Inferior Goods

The income-effect on the consumption of different kinds of commodities is not uniform. It can be positive or negative or even neutral. Whether-the income effect is positive or negative depends on the nature of a commodity. In case of normal goods, income-effect is positive and in case of inferior goods, it is negative. By definition, an inferior good is one whose consumption decreases when income increases. In Figure 6.9, consumption of both the commodities, X and Y, increases with an increase in the consumer's income. Therefore, the income-effect on both X and Y is positive. Figure 6.10 (a) and (b) present the case of negative income effect. In Figure 6.10 (a), X is an inferior good; its consumption decrease when consumer's income increases. The income-effect on consumption of X is, therefore, negative. Similarly, in Fig. 6.10 (b), income-effect on Y is negative as Y is considered to be an inferior commodity. Consumption of Y decreases with increase in income.

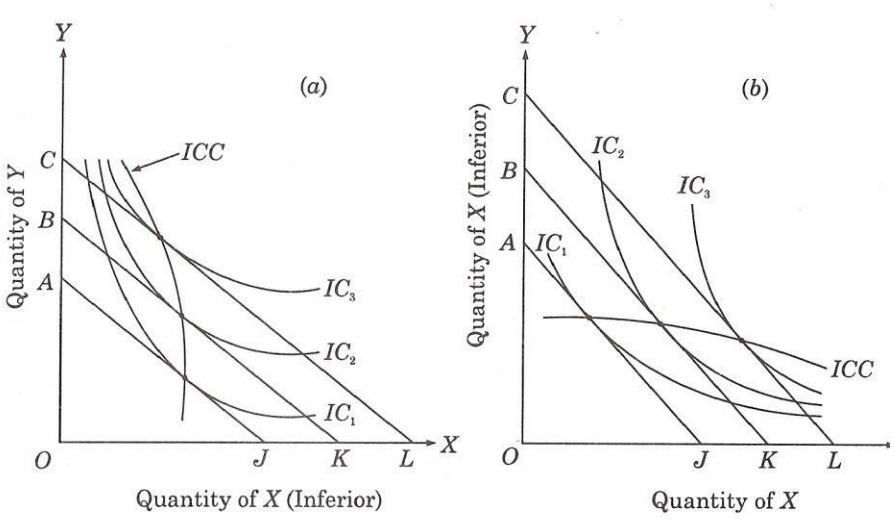


Figure 6.10: Income consumption curve of normal goods

In fact, whether a commodity is a normal good or an inferior good depends on whether income-effect on its consumption is positive or negative. If income effect is positive, the commodity is considered to be a 'normal good' and if it is negative, the commodity is said to be an 'inferior good'. Thus, the income consumption-curve may take various shapes depending on whether a commodity is a 'normal good' or an 'inferior good'.

Effects of Change in Prices on Consumption

The change in the price of a commodity changes the slope of the budget line and disturbs the consumer's equilibrium. A rational consumer adjusts his consumption basket with a view to maximizing his satisfaction under the new price conditions. The change in consumption basket is called “price-effect”. It may be defined as the total change in the quantity consumed of a commodity due to a change in its price. To examine the price-effect, let us introduce to our two-commodity model, it changes in price of commodity X. holding constant the consumer's income, his taste and preference and the price of commodity Y. The consumer's response to a change in the price of X and the resulting change in the combination of the two goods are illustrated in Figure 6.11.

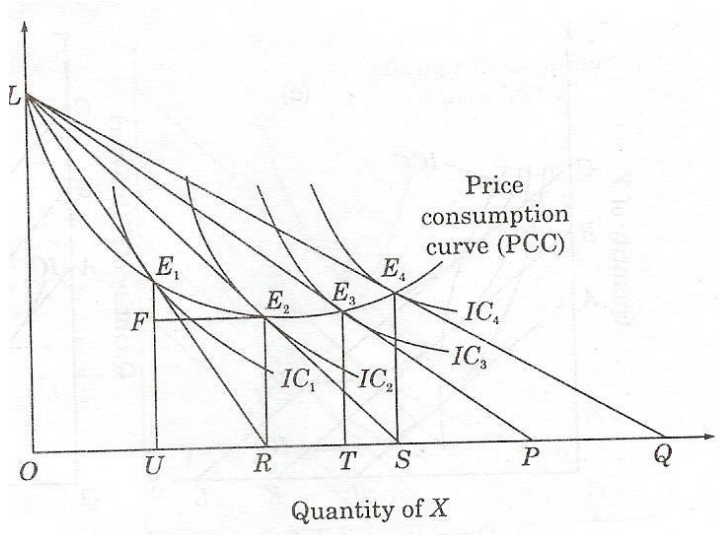


Figure 6.11: Price-consumption Curve

Suppose that the consumer is initially in equilibrium at point E_1. Now let the price of X fall, so that the consumer's budget line shifts from its initial position LR to the position LS. As a result, the consumer reaches a higher indifference curve IC_2 and his new equilibrium point is E_2. Here, his consumption of X increases by UR. This is the price-effect on the consumption of commodity X. As shown in Figure 6.11, with a successive fall in the price of X, consumer's equilibrium shifts from E_2 to E_3 and from E_3 to E_4. By joining the points of equilibrium E_1, E_2, E_3 and E_4, we get a curve called price-consumption-curve (PCC). Price-consumption-curve is a locus of points of equilibrium on indifference curves, resulting from the change in the price of a commodity. The price-consumption curve (PCC) shows the change in consumption basket due to a 'change in the price of commodity X. It can be seen from Figure 6.11 that the quantity of X consumed goes on increasing whereas that of Y first decreases and then increases.

Income and Substitution Effects of Price Change

As illustrated above, the change in consumption basket due to change in the price of consumer goods is called 'price effect'. Price-effect combines two effects: (i) income-effect and (ii) substitution-.effect. Income-effect results from the increase in real income due to a decrease in the price of a commodity. Substitution-effect arises due to the consumer's inherent tendency to substitute cheaper goods for the relatively expensive ones. Income-effect arises due to change in real income caused by the change in price of the goods consumed by the consumer. Income effect is reflected by the movement along the income-consumption-curve which has a positive slope. Substitution-effect, on the other hand, causes a movement along the price-consumption-curve which generally has a negative slope. There are two approaches: (i) Hicksian approach, and (ii) Slutsky s approach, which may explore the total price-effect into income and substitution-effects.

The Hicksian method of separating income and substitution effects of a price change is illustrated in Figure 6.12. Let the consumer be in equilibrium initially at point P on indifference curve IC_1 and budget line MN, where he consumes PX_1 of Y and OX_1 of X. Now let the price of X falls, price of Y remaining the same, therefore the new budget line is MN''. The new budget line (MN'' is tangent to IC_2 at point Q. At this point, the consumer buys an additional quantity (X_1X_3) of X. That is, total price effect = X_1X_3.

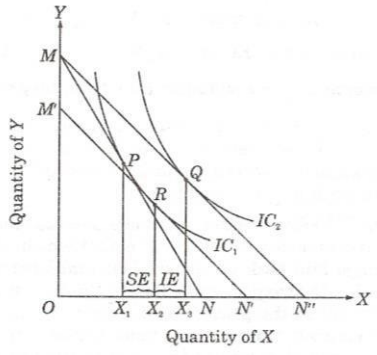


Figure 6.12: Income and substitution effects: Hicksian approach.

Now the problem is how to split the price-effect (X_1 X_3) into income and substitution effects. We know that X_1X_3 = IE + SE. Given this equation, if either of the two effects is known, the other can be easily measured. The general practice is to first measure income-effect of the price-effect and then deducts it from the price effect to find the substitution-effect. The Hicksian method of eliminating income-effect is to reduce the consumer's income (by way of taxation) so that he returns to his original indifference curve IC_1, to equilibrium point conforming to the new price ratio. This has been done by drawing an imaginary budget line (M'N') parallel to MN" and tangent to indifference curve ICI. The budget line M'N' is tangent to indifference curve IC_1 at point R. Point R is thus the income-adjusted equilibrium of the consumer at the new price ratio of X and Y, after the elimination of the real income-effect caused by the fall in the price of X. The shift in equilibrium from Q to R means that the consumer cuts his consumption of X by X_2X_3 due to fall in his income. This gives, by implication, the measure of income-effect (X_2X_3) caused by

the increase in real income of the consumer due to fall in price of X. The income effect of a change in the price of a commodity may thus be defined as the change in quantity demanded of the commodity resulting exclusively from a change in the real income, all other things remaining the same. With income effect measured at X_2X_3 the substitution effect (SE) can be easily obtained as SE = PE - IE or, by substitutions as $X_1X_2 = X_1X_3 - X_2X_3$. In Figure 6.12, the movement of the consumer from P to R shows his response to the change in relative price ratio, his real income being held constant at its original level. The consumer's movement from point P to R means an increase in quantity demanded of X by X_1X_2. This change in quantity demanded is called substitution-effect. The substitution effect may thus be defined as the change in quantity demanded; resulting from a change in relative price after real income-effect of price change is eliminated. The outcome of the above exercise may be summarized as follows:

$$\text{Price Effect} = X_2X_3$$

$$\text{Income effect} = X_1X_3 - X_1X_2 = X_2X_3$$

$$\text{Substitution Effect} = X_1X_3 - X_2X_2 = X_1X_2$$

According to Slutsky's method, the real income-effect of a fall in the price of a commodity must equal only that amount which if taken away from the consumer leaves with him an adequate income to buy the original combination of two goods after the change in price ratio. That is, Slutsky's method brings the consumer back not only to the original indifference curve but also to the original point of equilibrium. In simple words, under Hicksian method consumer's income has to be so reduced that he moves back to his original IC curve whereas, under Slutsky's method consumer's income has to be so reduced that he moves back not only to the original indifference curve but also to his original equilibrium point (P). The Slutskian method of splitting the total price effect into income and substitutioneffects is depicted in Figure 6.

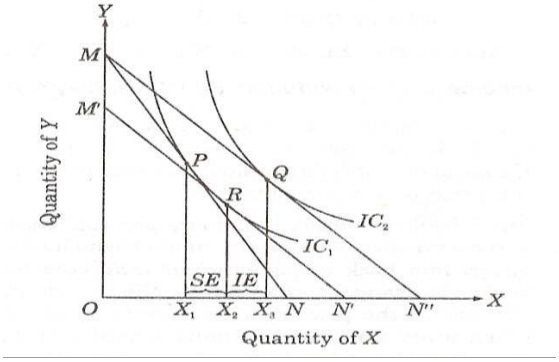


Figure 6.13: Income and Substitution effects: Slutsky's approach

The consumer is shown to be in equilibrium at point P on indifference curve IC_1. When price of X falls, other things remaining the same, the consumer moves to another equilibrium point Q on indifference curve IC_3. The movement from point P to Q increases the consumer's purchase of X Quantity of X by X_1X_3. This is the total price-effect caused by the fall in the price of X in Slutsky's method is the same as in Hicksian method.

To measure the substitution-effect, the income-effect has to be eliminated first. According to the Slutskian approach, a consumer's real income is so reduced that he is still able to purchase his original combination of the two goods (i.e., OX of X and PX_1 of Y) at the new price ratio. This is accomplished by drawing an imaginary budget line, M'N' through the point P. Since the whole commodity space is full of indifference curves, one of the indifference curves (IC_2) is tangent to the imaginary budget M'N' at point R. The movement from point Q to R shows a fall in the consumption of X by X_2 X_3. This is the income effect. We may now easily find out the substitution effect (IE) by subtracting the income effect (IE) from the total price effect (PE), as given below.

$$\text{Substitution Effect: PE - IE} = \text{SE}$$

$$= X_1X_3 - X_2\ X_3 = X_1\ X_2$$

In Figure 6.13, the movement form P to R and the consequent increase in the quantity purchased of X (i.e., X_1X_2) is the substitution effect. Similarly, the

consumer's movement from R to Q and the consequent increase in the quantity purchased of X is the income-effect.

Comparison of Hicksian Approach and Slutskian Approach

The comparison of Hicksian and Slutskian approaches is depicted in Figure 6.14. The Slutskian approach attempts to hold only apparent real income constant which is obtained by adjusting the consumer's real income by the amount of cost-difference so that the consumer is left with an income just sufficient to buy the original combination of the goods. The Hicksian approach, however, holds constant the real income expressed in terms of the original level of satisfaction so that the consumer is able to stay on the original indifference curve. To express the difference graphically, Hicksian method puts the consumer .on the original indifference curve whereas Slutskian method makes the consumer move to an upper indifference curve. Let us compare the two methods in Figure 6.14. Let the consumer be in equilibrium at point P on indifference curve IC_1. When the price of X falls the consumer moves to point Q. The movement from P to Q is the total price-effect which equals X_1X_4 of commodity X. Upto this point, there is no difference between Slutsky and Hicks. Beyond this point, they differ. According to the Slutskian approach, the movement from P to T is the substitution effect and the movement from T to Q is the income effect. According to the Hicksian approach, the movement from P to R is the substitution effect and movement from R to Q is the income effect. The substitution and income effects of Slutskian and Hicksian approaches are summed up in quantitative terms in the following table.

Method	Price-effect	Substitution effect	Income effect
Hicksian	X_1X_4	X_1X_2	X_2X_4
Slutskian	X_1Y_4	X_1X_3	X_3X_4

Figure 6.14 shows; there is a good deal of difference between Hicksian and Slutskian measures of income and substitution effects. But it can be shown that if

the change in price is small the difference between the Slutskian and Hicksian measures would be small and if the change in price tends to be zero, the difference would also be zero.

In addition to above, while the Hicksian approach is considered as a Highly persuasive solution to the problem of splitting price-effect into substitution and income effects, the Slutskian approach is intuitively perhaps less satisfying,. But the merit of the Slutskian approach is that substitution and income effects can be directly computed from the observed facts, whereas the Hicksian measure of these effects cannot be obtained without the knowledge of a consumer's indifference map. Both the methods, have however, their own merits. The merit of the Slutskian method, which Hicks calls the 'cost-difference' method, lies in its property that it makes income effect easy to handle. Hicks himself recognised this merit of the Slutskian method. The merit of Hicksian method or 'compensating variation method' is that it is a more convenient method of measuring the substitution effect. In Hicks own words, "The merit of the cost-difference method is confined to [its] property... that its income effect is peculiarly easy to handle. The compensating variation method [i.e., his own method] does not share in this particular advantage; but it makes up for its clumsiness in relation to income-effect by its convenience with relation to the substitution effect.

6.3.2 CARDINAL APPROACH VERSUS ORDINAL UTILITY APPROACH

Similarity:

1. Both cardinal' and ordinal approaches assume rationality and utility maximizing behaviour of the consumer.
2. The diminishing marginal utility assumption of the cardinal utility approach is implicit in the diminishing marginal rate of substitution assumption of the ordinal utility approach.
3. Both cardinal and ordinal utility approaches arrive at an identical equilibrium condition. The necessary (or the first order) equilibrium condition of the

cardinal utility approach i.e.,

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

and the first order (or necessary) equilibrium condition of the ordinal utility approach given as

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

are in fact, one and the same because $MU_x/MU_y = MRS_{x,y}$.

The second order equilibrium condition of the cardinal utility approach is that the total expenditure must not exceed the consumer's total income, This is similar to the second order condition of the ordinal utility) approach, i.e., the first order equilibrium condition must be fulfilled at the highest possible indifference curve on his indifference map.

Thus, in spite of the fact that cardinal and ordinal approaches are based on different assumptions regarding measurability of utility, both arrive at the same conclusion with respect to consumer behaviour.

Superiority of Indifference Curve Approach:

In spite of their similarity in some respects, indifference curve analysis is in many respects superior to the cardinal utility approach. The indifference curve analysis has made major advances in the theory of consumer analysis at least in the following respects. First, the assumptions of the indifference curve approach are less restrictive than those of the cardinal utility approach. While cardinal utility approach assumes cardinal measurability of utility, the ordinal approach assumes only ordinal expression of utility. Besides, unlike the cardinal utility approach, the ordinal utility approach does not assume stability of utility of money. The Marshallian assumption of constancy of marginal utility of money is incompatible with demand functions involving more than one good. Second, indifference curve approach provides a better criterion for the classification of goods into substitutes and complements. This

is considered it as one of the most important contributions of the ordinal utility approach. The cardinal utility approach uses the sign of cross-elasticity for the purpose of classifying goods into substitutes and complements. The cross-elasticity between two goods, X and Y, is given by

$$e_{x,y}=\Delta Q_y.P_x/\Delta P_x.Q_y$$

If cross-elasticity has a positive sign, it means X and Yare substitutes for each 'other and if elasticity has a negative sign, it means they are complements. This method of classifying goods into substitutes and compliments is somewhat misleading. For, as shown in the above measure of cross-elasticity, it uses the total effect of a price change (ΔP_x) on quantity demanded (ΔQ_y) without compensating for the change in real income caused by the change in the price of the commodity (i. e., ΔP_x). On the contrary, the indifference curve analysis suggests measuring cross elasticity after compensating for the changes in real income resulting from the change in P_x According to Hicks, goods X and Yare substitutes for each other if cross-elasticity measured after eliminating the income effect is positive. Although the Hicksian criterion for classifying goods into substitutes and complements is theoretically superior to the cross-elasticity method (unadjusted for real income-effect) and provides greater insight into the price-effect, it is impracticable, The reason is estimating income and substitution effects of a price-change is an extremely difficult task In the absence of an empirical indifference curve, On the other hand, the usual cross-elasticity method is feasible because it requires only the knowledge of the market demand function which is empirically estimable. Third, indifference curve analysis provides a more realistic measure of non-consumer’s surplus compared to one provided by Marshall. The Marshallian concept of Consumer’s surplus is based on the assumptions that utility cardinally measurable in terms of money and that utility of money remaining constant, Nether of' these two assumptions is realistic, Indifference curve analysis measures consumer’s surplus in terms of ordinal utility. The Hicksian measure of consumer's surplus is of great importance in welfare

economics and in the formulation and assessment of government policy.

6.4 CHECK YOUR PROGRESS

Answer the following True/False on the basis of your knowledge regarding this chapter:

1- An indifference curve shows combinations of two goods yielding the same level of satisfaction. (T/F)

2- Any combination of goods that lie above a given indifference curve will provide the individual with a greater level of satisfaction. (T/F)

3- A 'budget line' shows combinations of two goods that can be purchased with a given income and prices of those goods. (T/F)

4- If income were to rise and prices fall then the budget line referred to in question 7 above will shift inwards towards the origin. (T/F)

5- When the indifference curve with 'good y' on the vertical axis and 'good x' on the horizontal is tangential to the budget line then at that point the marginal rate of substitution of 'good x' for 'good y' is equal to the ratio of the price of 'good x' to 'good y' (Px/Py). (T/F)

6.5 SUMMARY

According the classical economists, the concept of cardinal utility and have instead employed the concept of ordinal utility for analysing consumer behaviour. The concept of ordinal utility is based on the fact that it may not be possible for consumers to express the utility of a commodity in absolute terms, but it is always possible for a consumer to tell introspectively whether a commodity is more or less or equally useful as compared to another. While neo-classical economists maintained that cardinal measurement of utility is practically possible and is meaningful in consumer analysis, modem economists maintain that utility being a psychological phenomenon is inherently immeasurable, theoretically or conceptually

and quantitatively as well. They also maintain that the concept of ordinal utility is a practical concept and it meets the conceptual requirement of analysing the consumer behaviour in the absence of any cardinal measures of utility. In real life, both concepts may not be implemented; because the consumer is in hurry to purchase as well as he is not so economist so that he/she may compare the equilibrium of consumer behaviour in terms consumption of goods and services.

6.6 KEYWORDS

Ordinal Utility- Ordinal utility refers to the utility which can be presented into absolute terms.

Consumer Equilibrium- A consumer attains his equilibrium when he maximizes his total utility, given his income and market prices of the goods and services that he consumes.

Law of Diminishing Marginal Utility- Law of Diminishing Marginal Utility states that all else equal as consumption increases the marginal utility derived from each additional unit declines.

Indifference Curve- An indifference curve may be defined as the locus of points. Each point represents a different combination of two substitute goods, which yield the same utility or level of satisfaction to the consumer.

Marginal Rate of Substitution- The marginal rate of substitution is the rate at which a consumer is willing to substitute one commodity (X) for another (Y) so that his total satisfaction remains the same.

6.7 SELF ASSESSMENT TEST

1. What do you mean by utility and the concept of ordinal utility?
2. Define the law of diminishing marginal utility.
3. What is the meaning of consumer equilibrium with reference to ordinal approach?
4. What is an indifference curve? What are its properties or characteristics? What role does it play in consumer analysis?

5. Define the marginal rate of substitution. What is the law behind the diminishing marginal rate of substitution?

COST CONCEPTS

Structure

7.0 LEARNING OBJECTIVES

After reading this chapter you will be able to understand the concept of cost and its different types. This chapter also provides you knowledge regarding behaviour of cost in short run and long run. Further, economies and diseconomies of scale are also described to you in this chapter and break even analysis is discussed in the last section of this chapter.

7.1 INTRODUCTION TO CONCEPT OF COST

The term cost has different meanings, so it becomes pertinent to define the term precisely. In the traditional approach, the explicit and historical dimension of cost is considered, whereas contrast the economic approach to cost emphasizes opportunity cost rather than historical cost and includes both explicit and implicit costs.

7.1.1 Opportunity Cost

It is major component of decision making in economic. The best measure of cost of a consumer product or a factor of production is what must be given up to obtain that product for factor. For example the resources needed to build 10 houses can also be used to build one office building, and then opportunity cost of the decision to build office building is equal to the 10 houses that have to be forgone. With fixed quantity of resources available to the organization, input used in the production of one good cannot be used in the production of other goods. In general, opportunity cost is the value of a resource in its next best alternate use. Opportunity cost represents the return or compensation that must forgo as a result of the decision to employ the resources in a given activity.

7.1.2 Accounting Cost

Accounts have been primarily concerned with measuring cost for financial reporting purposes. So an accountant considers only the explicit costs as costs those which involve cash payment by the entrepreneur of the firm. Accountants define and measure the cost by the historical outlays of funds that take place in the exchange or transformation of a resource.

In case of economists, they are mainly concerned with measuring costs for decision making purposes. The objectives are to determine the present and future costs of resources associated with various alternative courses of action. Such an objective requires a consideration of the opportunities forgave whenever a resource is used in a given cause of action. An economist would include, in addition to accounting costs, all other implicit costs as well that are typically not reflected in the cost figures appearing in the financial reports of the firm. Both the accounting cost and economic cost of a product will include such explicit cost as labour, raw material, rent etc. Economists also include several implicit costs. The implicit cost consists of the opportunity costs of time and capital that the owner manager has invested in producing the given quantity of output.

7.1.3 Explicit and Implicit Costs

Explicit costs are those which fall under actual or business costs entered in the books of accounts. The payments for wages and salaries, materials, license fee, insurance etc. are the examples of explicit costs. These costs involve cash payments and are recorded in normal accounting practices. In contrast, there are certain other costs which do not take the form of cash outlays, nor do they appear in the accounting systems. Such costs are known as implicit or imputed costs. An Opportunity cost is an important example of implicit cost. For example, suppose an entrepreneur does not utilize his services in his own business and works as a manager in some other firm on a salary business. If he sets up his own business, he forgoes his salary as a manager. The loss of salary is the opportunity costs of doing his own business. This is on implicit cost of his own business. Thus implicit wages, rent, and implicit interest are the wages of rents and interest which the owners, labour, building and capital respectively can earn from these second best use.

7.1.4 Social Costs and Private Cost of Production

The social cost of using a bundle of resources for the production of a unit of commodity X is the number of units of commodity Y that must be sacrificed in the process. The social cost of producing gun is the amount of butter forgone. It is also called the alternative or opportunity cost of production. Private costs of production refer to individual firms and include explicit costs as well as monetary estimates of implicit costs. Implicit costs consist of the amounts of income the entrepreneur could earn in the best alternative use of his time and money.

7.1.5 Marginal, Incremental and Sink Costs

Sink costs are the expenditure that have been made in the past or that must be paid in future as part of a contractual agreement. The cost of inventory and future rental payments on a warehouse that must be paid as part of a long-term lease are examples. In general such costs are irrelevant in making decision.

Marginal costs refer to the change in total cost associated with a unit of change in output. This concept is integral to short run decision about profit maximizing rates of output. For example, in an automobile manufacturing plant the marginal cost of making one additional car per production period would be labour, materials and every cost directly associated with that extra car. In contrast, the long run incremental cost refers to the total additional cost of implementing a managerial decision. The cost associated with adding a new product line, acquiring a major competitor to fall into the broader class of incremental costs. In a sense, marginal cost so that subcategory of incremental cost that refers to the additional cost associated with the decision to make marginal variation in the rate of output.

The cost function belongs to both in the short run and the long run. The short-run costs are those costs of production at which the firm operate in one given period when one or more factors of production are fixed in quantity. Therefore, the firm has some fixed costs and some variable costs. On the other hand, ‘the long-run costs are

planning costs or ex ante costs, in that they present the optimal possibilities for expansion of the output and thus help the entrepreneur to plan his future activities. In the long run, there are no fixed factors of production and hence no fixed costs. In the long run, all factors being variable, all costs are also variable. Therefore, the firm plans for the future, given its fixed capital equipment. But it operates on the short-run cost curves relating to each plant.

7.1.6 The Behaviour of Cost Function

The traditional theory of costs analyses the behaviour of cost curves in the short run and the long run and arrives at the conclusion that both the short run and the long run cost curves are U-shaped but the long-run cost curves are flatter than the short-run cost curves.

7.1.6.1 Firm's Short-Run Cost Curves

The short run is a period in which the firm cannot change its plant, equipment and the scale of organisation. To meet the increased demand, it can raise output by hiring more labour and raw materials or asking the existing labour force to work overtime. The scale of organisation being fixed, the short-run total costs are divided into total fixed costs and total variable costs:

$$TC = TFC + TVC$$

Total costs or TC: Total costs are the total expenses incurred by a firm in producing a given quantity or a commodity. They include payments for rent, interest, wages, taxes and expenses on raw materials, electricity, water, advertising, etc.

Total fixed costs or TFC is those costs of production that do not change with output. They are independent of the level of output. In fact, they have to be incurred even when the firm stops production temporarily. They include payments for renting land and buildings, interest on borrowed money, insurance charges, property tax, depreciation, maintenance expenditures, wages and salaries of the permanent staff, etc. They are also called overhead costs.

Total variable costs or TVC is those costs of production that change directly with output. They rise when output increases, and fall when output declines. They include expenses on raw materials, power, water, taxes, hiring of labour, advertising etc. They are also known as direct costs.

The curves relating to these three total costs are shown diagrammatically in Figure-1 the TC curve is a continuous curve which shows that with increasing output total costs also increases. This curve cuts the vertical axis at a point above the origin and rises continuously from left to right. This is because even when no output is produced, the firm has to incur fixed costs. The TFC curve is shown as parallel to the output axis because total fixed costs are the same whatever the level of output.

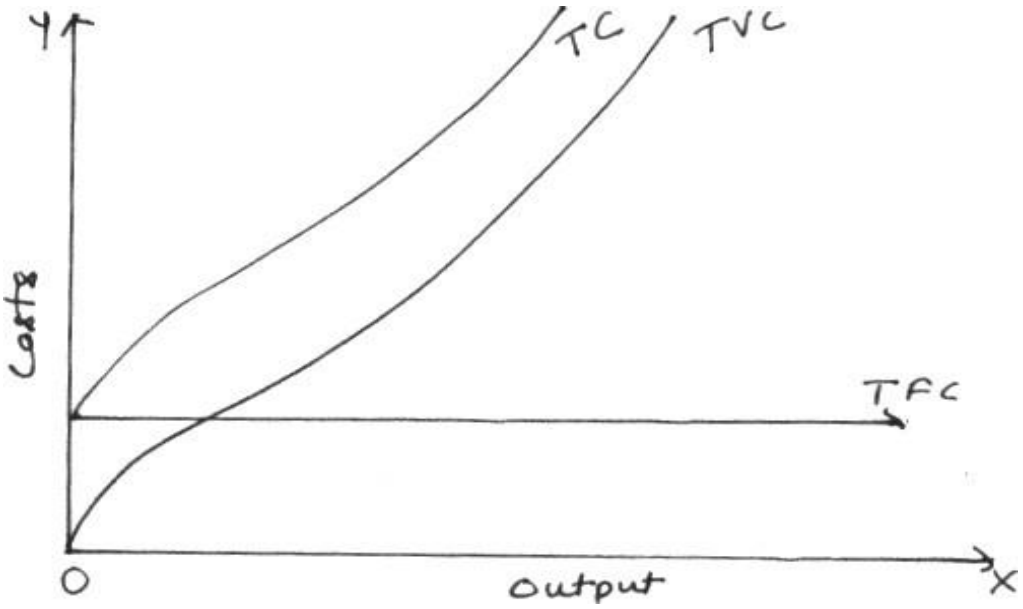


Fig.-(i)

The TVC curve has an inverted-S shape and starts from the origin O because when output is zero, the TVC are also zero. They increase as output increases. So long as the firm is using less variable factors in proportion to the fixed factors, the total variable costs rise at a diminishing rate. But after a point, with the use of more

variable factors in proportion to the fixed factors, they rise steeply because of the application of the law of variable proportions. Since the TFC curve is a horizontal straight line, the TC curve follows the TVC curve at an equal vertical distance.

Short-run average costs: In the short run analysis of the firm, average costs are more important than total costs. The units of output that a firm produces do not cost the same amount to the firm. But they must be sold at the same price. Therefore, the firm must know the per unit cost or the average cost. The short-run average costs of a firm are the average fixed costs, the average variable costs, and the average total costs.

Average fixed costs or AFC equal total fixed costs at each level of output divided by the number of units produced:

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

The average fixed costs diminish continuously as output increases. This is natural because when a constant figure, total fixed costs, are divided by a continuously increasing unit of output; the result is continuously diminishing average fixed costs. Thus the AFC curve is a downward sloping curve which approaches the quantity axis without touching it, as shown in Fig.-(ii). It is a rectangular hyperbola.

Short-run average variable costs **(or SAVC)** equal total variable costs at each level of output divided by the number of units produced:

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

The average variable costs first decline with the rise in output as larger quantities of variable factors is applied to fixed plant and equipment. But eventually they begin to rise due to the law of diminishing returns. Thus the SAVC curve is U-shaped, as shown in Fig.-(ii).

Short-run average total costs (or SATC or SAC) are the average costs of producing any given output. They are arrived at by dividing the total costs at each level of output by the number of units produced:

$$\text{SAC or SATC} = \frac{TC}{Q} = \frac{TFC}{Q} + \frac{TVC}{Q} = AFC + AVC$$

Average total costs reflect the influence of both the average fixed costs and average variable costs. At first average total costs are high at low levels of output because both average fixed costs and average variable costs are large. But as output increases, the average total costs fall sharply because of the steady decline of both average fixed costs and average variable costs till they reach the minimum point. This results from the internal economies, from better utilisation of existing plant, labour, etc. the minimum point E in the figure represents optimal capacity. As production is increased after this point, the average total costs rise quickly because the fall in average fixed costs is negligible in relation to the rising average variable costs. The rising portion of the SAC curve results from producing above capacity and the appearance of internal diseconomies of management, labour, etc. Thus the SAC curve is U-shaped, as shown in Figure-(ii).

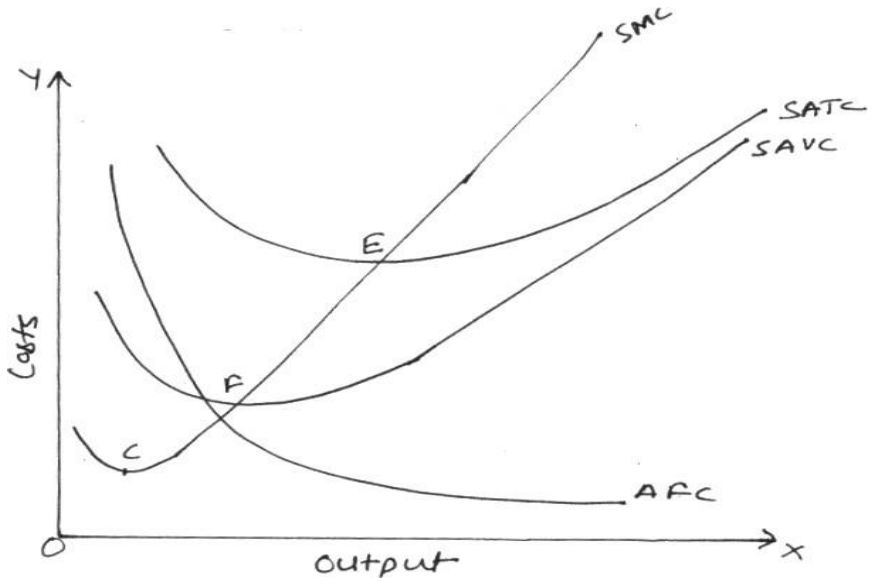


Fig.-(ii)

The U-shape of the SAC curve can also be explained in terms of the law of variable proportions. This law tells that when the quantity of one variable factor is changed while keeping the quantities of other factors fixed, the total output increases but after some time it starts declining. Machines, equipment and scale of production are the fixed factors of a firm that do not change in the short run. On the other hand, factors like labour and raw materials are variable. When increasing quantities of variable factors are applied on the fixed factors the law of variable proportions operates. When, say the quantities of a variable factor like labour are increased in equal quantities, production rises till fixed factors like machines, equipment, etc. are used to their maximum capacity. In this stage, the average costs of the firm continue to fall as output increases because it operates under increasing returns. Due to the operation of the law of increasing returns when the variable factors are increased further, the firm is able to work the machines to their optimum capacity. It produces the optimum output and its average costs of production will be the minimum which is revealed by the minimum point of the SAC curve, point E. If the firm tries to raise output after this point by increasing the quantities of the variable factors, the fixed factors like machines would be worked beyond their capacity. This would lead to diminishing returns. The average costs will start rising rapidly. Hence due to the working of the law of variable proportions the short-run AC curve is U-shaped.

Marginal cost- A fundamental concept for the determination of the exact level of output of a firm is the marginal cost. Marginal cost is the addition to total cost by producing an additional unit of output:

$$MC = \frac{DTC}{DQ}$$

Algebraically, it is the total cost of n+1 units minus the total cost of n unit of output $MC_n = TC_{n+1} - TC_n$. Since total fixed costs do not change with output, therefore, marginal fixed cost is zero. So marginal cost can be calculated either from total variable costs or total costs. The result would be the same in both the cases. As total

variable costs or total costs first fall and then rise, marginal cost also behaves in the same way. The SMC curve is also U-shaped, as shown in Figure-2.

Relationship of Short-run Cost Curves

The relationships of short-run curves are explained in terms of Figure -2.

(i) The AFC curve declines continuously and is asymptotic to both axes. It means that the AFC curve approaches both axes but never touches either X-axis or Y-axis. Thus the AFC curve is a rectangular hyperbola.

(ii) The SAVC curve first declines, reaches a minimum at point F, and rises thereafter. When the SAVC curve reaches its minimum point F, the SMC curve equals the SAVC curve.

(iii) The SAC curve first declines, reaches a minimum at point E, and rises thereafter, when the SAC curve reaches its minimum point E, the SMC curve equals the SAC curve. Since SAC = AFC + AVC, the vertical distance between the SAC and the SAVC curves gives the AFC curve. So there is no need to draw a separate AFC curve. As output expands, the vertical distance between the SAC curve and the SAVC curve declines because of the falling AFC curve.

(iv) Relation between AC and MC curves: There is a direct relationship between AC and MC curves as shown in the Figure-3. Both the AC curve and the MC curve are U-shaped. When AC falls, MC is less than AC. This is because the fall in MC is related to one unit of output while in the case of AC the same decline is spread over all units of output. That is why the fall in AC is less and that in MC is more. This also explains the fact that MC reaches its minimum point F before the minimum point A of AC is reached. So when MC starts rising. AC is still declining, as shown in Figure-(iii).

When AC is minimum, MC equals AC. The MC curve cuts the AC curve from below at its minimum point A in the figure.

When AC rises, MC is greater than AC. MC is above AC when AC is rising but the rise in MC is greater than AC. This is because the rise in MC is the result of the

increase in one unit of output while in the case of AC the same increases are spread over all units of output.

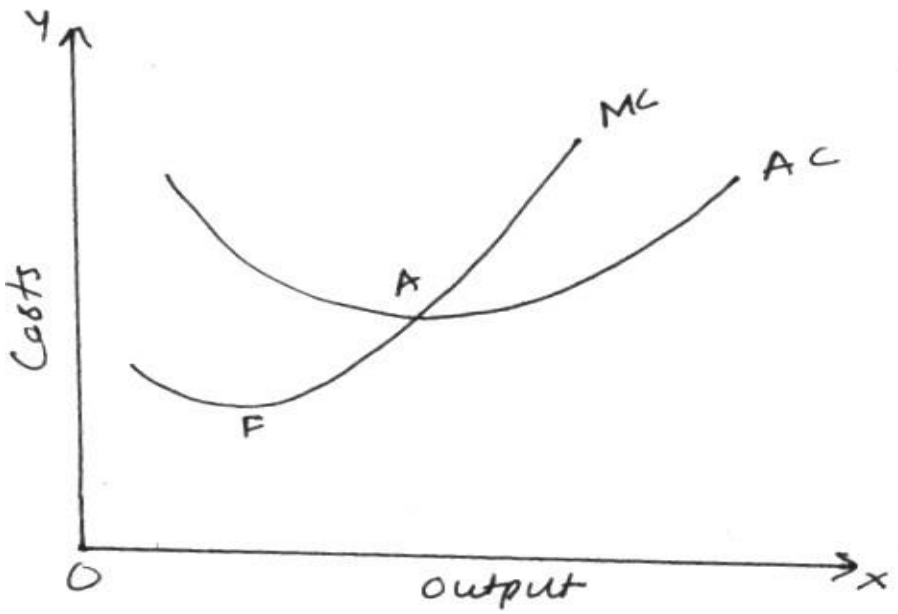


Fig.-(iii)

It should be noted that we cannot say anything about the direction of MC, when AC rises or falls. When AC is falling, it is not essential that MC must fall. MC can increase or fall but it is definite that MC will be less than AC. Similarly, when AC is increasing, it is not essential that MC must rise. MC can fall or rise but it is definite that MC will be larger than AC. But if AC is constant, MC must be constant.

Relation between SMC and AVC curves

The SMC curve bears a close relationship to the SAVC curve along with the SAC curve. So long as the SMC curve lies below the SAVC and SAC curves, it continues to fall and its rate of fall is greater than that of SAC and AVC curves. But the AVC and SAC curves start rising from the points E_1 and E_2 respectively where the SMC curve touches them, as shown in Figure –(iv). The SMC curve passes through the minimum point of the SAVC curve to the left of the minimum point of the SAC curve.

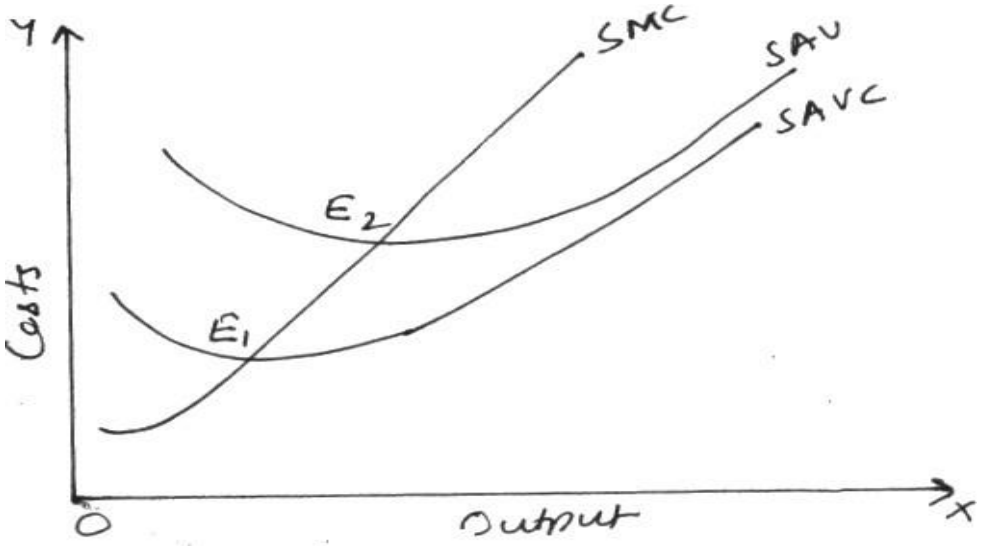


Fig.-(iv)

Since AC is the sum total of ACV + AFC, therefore when SAVC is at its minimum point, AFC is falling and it takes time for SAC to reach its minimum point. E_1 and E_2 are thus the respective minimum points of the SAVC and SAC curves. After these points the SMC curve rises sharply and is above the SAVC and SAC curves.

7.1.6.2 Firm's Long Run Cost Curves

In the long run, there are no fixed factors of production and hence no fixed costs. The firm can change its size or scale of plant and employ more or less inputs. Thus in the long run all factors are variable and hence all costs are variable.

The long run average total cost or LAC curve of the firm shows the minimum average cost of producing various levels of output from all possible short-run average cost curves (SAC). Thus the LAC curve is derived from the SAC curves. The LAC curve can be viewed as a series of alternative short-run situations into any one of which the firm can move. Each SAC curve represents a plant of a particular size which is suitable for a particular range of output. The firm will, therefore, make use of the various plants up to that level where the short-run average costs fall with

increase in output. It will not produce beyond the minimum short-run average cost of producing various outputs from all the plants used together.

Let there be three plants represented by their short-run average cost curves SAC_1, SAC_2 and SAC_3 in Figure-(v).

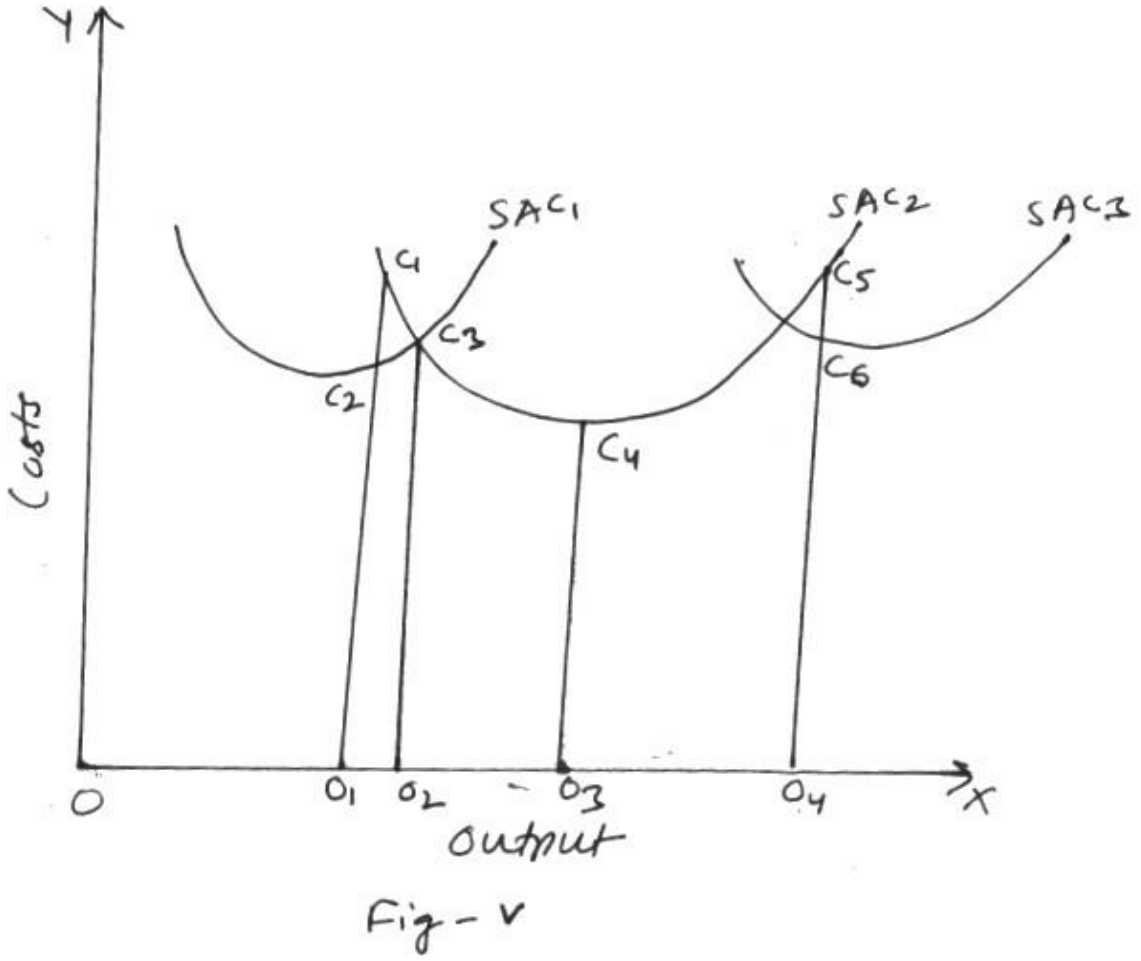


Fig - v

Each curve represents the scale of the firm. SAC_1 depicts a lower scale while the movement from SAC_2 to SAC_3 shows the firm to be of a larger size. Given this scale of the firm, it will produce up to the least cost per unit of output. For producing OO_1 output, the firm can use SAC_1 or SAC_2 plant. The firm will, however, use the scale of plant represented by SAC_1 since the average cost of producing OO_1 output is O_1C_2 which is less than O_1C_1, the cost of producing this output on the SAC_2 plant. If

the firm is to produce OO_2 output, it can produce at either of the two plants. But it would be advantageous for the firm to use the plant SAC_2 for the OO_2 level of output because the larger output OO_3 can be obtained at the lowest average cost O_3C_4 from this plant. However, for output OO_4, the firm would use the SAC_3 plant where the average cost O_4C_5 is lower than O_4C_6 of the SAC_2 plant. Thus in the long-run in order to produce any level of output the firm will use that plant which has the minimum unit cost.

If the firm expands its scale by the three stages represented by SAC_1, SAC_2 and SAC_3 curves, the thick wave-like portions of these curves from the long-run average cost curve. The dotted portions of these SAC curves are of no consideration during the long run because the firm would change the scale of plant rather than operate on them.

But the long-run average cost curve LAC is usually shown as a smooth curve fitted to the SAC curves so that it is tangent to each of them at some point, as shown in Figure-6 where SAC_1, SAC_2, SAC_3, SAC_4 and SAC_5 are the short-run cost curves. It is tangent to all the SAC curves but only to one at its minimum point. The LAC is tangent to the lowest point E of the curve SAC_4 in Figure-(vi) at OO_1 optimum output, the plant SAC_3 which produces this OQ optimum output at the minimum cost EO_1 is the optimum plant, and the firm producing this optimum output at the minimum cost with this optimum plant is the optimum firm. If the firm produces less than the optimum output OO_1, it is not working its plant to full capacity and if it produces beyond OO_1, it is overworking its plants. In both the cases, the plants SAC_2 and SAC_4 have higher average costs of production than the plant SAC_3.

The LAC curve is known as an ‘envelope’ curve because it envelopes all the SAC curves. Every point on an envelope long-run cost curve is also a point on one of the short-run cost curves which it envelopes. Some economists consider it as a planning curve because it is composed of plant curves and the firm plans to expand its scale of production over the long run.

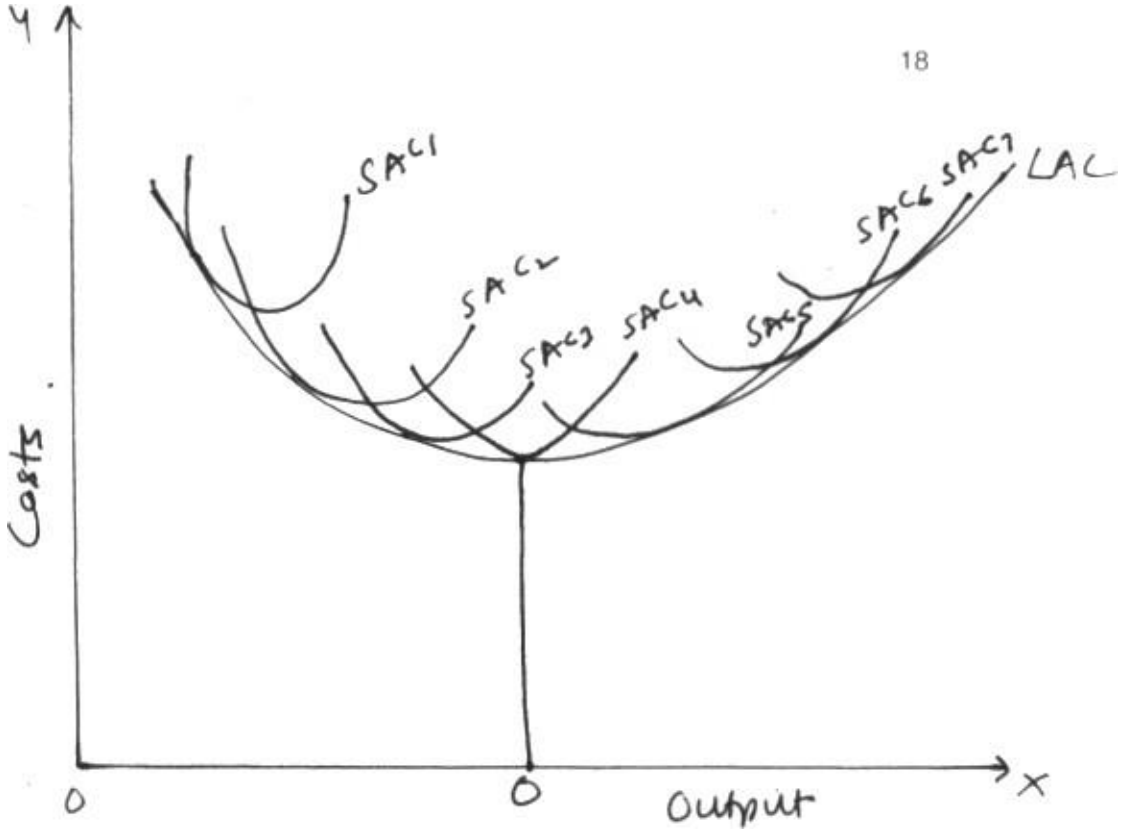


Fig.-(vi)

The long-run marginal cost (LMC) curve of the firm is derived from the SAC curves, as illustrated in Figure-(vii) where the SAC_1, SAC_2 and SAC_3 curves are enveloped by the LAC curve at points C_2, C_3 and C_4 respectively. Draw perpendiculars C_2O_1, C_3O_2 and C_4O_3 from these Respective points on the X-axis. When the points C_1, C_3 and C_5 where the curves SMC_1, SMC_2 and SMC_3 cut these vertical lines, are joined, they trace out the LMC curve. The LMC curve intersects the curves SAC_2 and LAC at the minimum point C_3 so that LMC=LAC= SAC_2 = SMC_2. Thus there exists the usual relation between marginal and average cost curves. To the left of point C_3, LAC > LMC and to its right LMC > LAC.

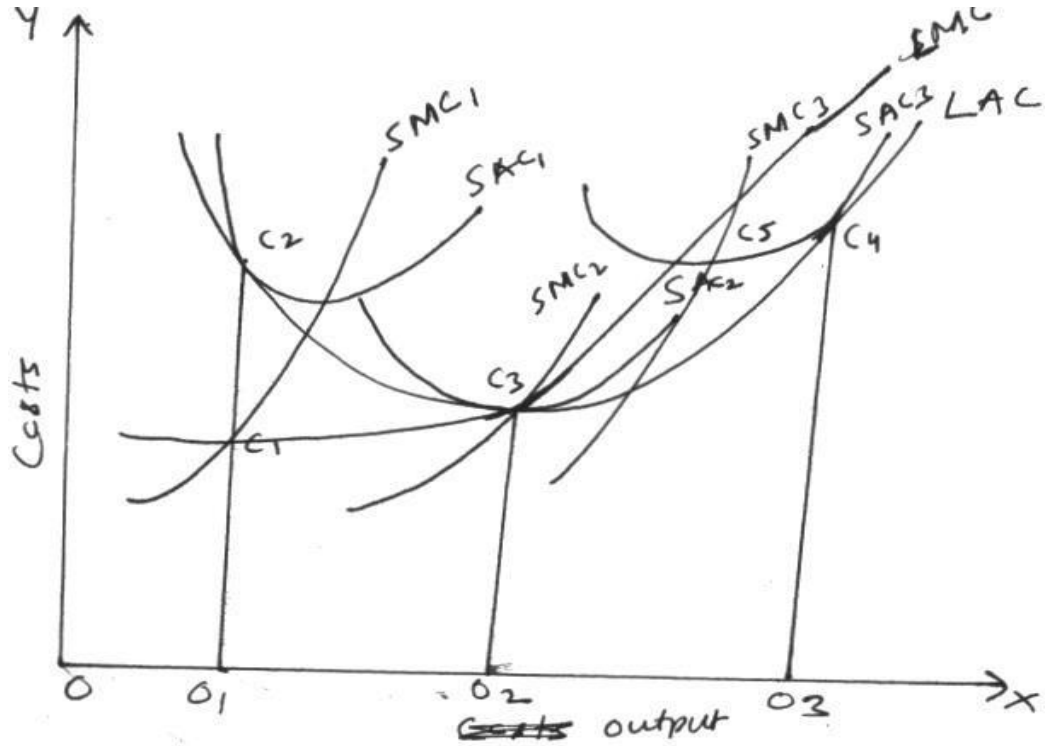


Fig VII

7.2 Economies and Diseconomies of Scale

The long run average cost function of economic theory is hypothesized to be U-shaped- Long run average costs decline over lower range of output and rise over higher ranges of output.

Economies of scale: Declining long run average cost over the lower part of the range of possible output is usually attributed to economies of scale. The sources of economies of scale can be classified into two categories- one is real economies and second is pecuniary economies of scale. Pecuniary economies are realised from paying lower prices for the factors used in the production and distribution of the product, due to bulk buying by the firm as its size increases. Such economies of scale do not imply reduction in the inputs used in production process. Real economies are those associated with a reduction in physical quantity of inputs, raw

materials, various types of labour and various types of capital. These economies of scale can be explained as under:

7.2.1 Real Economies of Scale

These economies of scale can be attributed to the following factors:

1. Production Economies of Scale: Production economies may arise from product specific economies and plant specific economies.

Product Specific Economies: A number of different sources of scale economies are associated with producing large volume of a single product. Expansion of output may lead to greater specialisation in the use of labour and capital. Large scale allows division of labour and specialisation of labour force with the result of an improvement of the skills and hence productivity of the various types of labour. As the scale of production is increased, the production process can be broken into a series of small tasks and the workers can be assigned to the tasks for which they are most qualified workers are then able to acquire additional proficiency through repetition of the tasks to which they are assigned. It is also observed a learning curve effect in producing multiple units of a product that is the amount of inputs such as labour and associated costs required to produce each unit of output decrease for successive increases in the cumulative output of the enterprise. Similarly the higher scale of production may lead to technical economies which are result of (i) specialisation and indivisibilities of capital (ii) set up costs (iii) initial fixed costs (iv) reserve capacity requirements. Modern technology generally involves a higher degree of mechanisation for large scales output. That is the production methods become more mechanised as scale increases. Mechanisation often implies more specialised capital equipment as well as more investment. Such method may lead to higher overhead costs but there methods have lower variable costs which may affect the overhead cost at higher output level.

Firm's Specific Economies: These economies are related to the overall size of the firm. The major sources of these economies arise from sales and distribution, raising funds and; transport and storage.

Economies in Marketing: Economies in marketing arise from large scale from the large scale purchase of inputs and large scale selling of the firm's own products. As to get the economies in purchase of inputs the large size firms normally make bulk purchases of their inputs. The large scale purchase entices the firm for certain discounts which are not available on small purchases. Large scale of firm may also lead to economies in marketing and sales promotion. These scale economies can take such forms as quantity discounts in securing advertising media space and time and ability of the large firm to spread the fixed costs of advertising preparation over a greater output volumes. In addition, the large firm may be able to achieve a relatively greater degree of brand recognition and brand loyalty from its higher level of sales promotion expenditure over an extended period of time. Purchasing financial funds for larger firm is also easy, because securities of larger firm are generally less risky than those of smaller firm. Most investors are averse to risk, so they are often willing to pay a higher price for less risky securities of larger firm.

Managerial Economies: Managerial economies are attributed to (i) specialisation in management and (ii) mechanisation of managerial functions. For a large size firm, it becomes possible to divide its management into specialized departments under specialised personnel such as production manager, sales manager, and finance manager. Such a framework in modern organisation lead to quick decision making, help in saving valuable time of management and thereby the management efficiency.

Economies of Transport and Storage: The large size firms may acquire their own mean of transport and they can thereby reduce the unit cost of transportation compared to market rate and also prevents delay in transporting goods. Similarly large scale firm can generate their own god owns in the various centre of product distribution and can save cost of storage.

7.2.2 Diseconomies of Scale

Rising long run average costs at higher level of output are usually attributed to diseconomies of scale. These diseconomies are disadvantage that arise due to the higher scale of production and lead to rise in cost of production. These economies may be classified into two categories- (i) Internal diseconomies (ii) External diseconomies.

These diseconomies are exclusive and internal to a firm. When a firm becomes very large a limit of economies of scale may reached. This limit is reached when the advantage of division of labour and managerial staff have been fully exploited, excess capacity of plant, storage, transport and communication system is fully used. These diseconomies may also appear in the form of problems of co-ordination and control encountered by management as the scale of operation is increased. These coordination and control problems may impose rising cost on the firm in a number of different ways. These costs may be associated with the increase in costs of salary and perks, and losses arising from delayed or faulty decision and weakened or distorted management incentives.

7.3 BREAK-EVEN ANALYSIS

Many of the planning activities that take place within a firm are based on anticipated level of output. The study of the interrelationship among firm's sales, costs and operating profits at various level of output levels is known as cost-volume profit analysis or break even analysis. This analysis is often used by business executive to determine the sales volume required to break even and total profits and losses at different output levels. For illustrating the breakeven analysis. It is assumed that the cost and revenue curves are non-linear as shown in Fig-(viii) Total revenue is equal to the number of units of output sold multiplied by the price per unit. The concave form of revenue curve implies that the firm can sell additional units of output only

by lowering the price. The total cost curve is based on traditional approach of relationship between cost and output in short run;

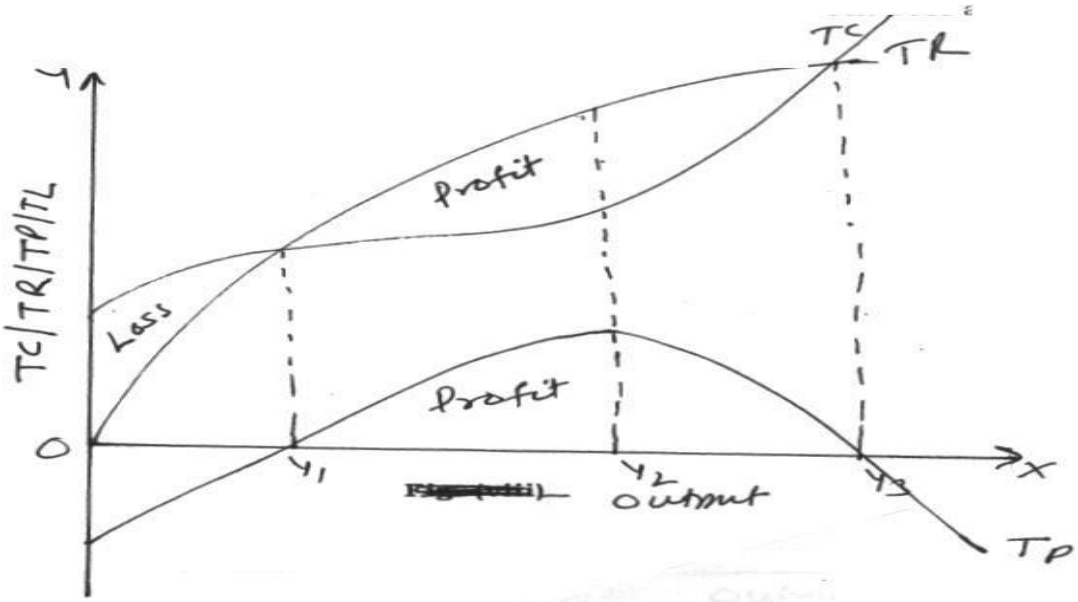


Fig (viii)

The difference between total revenue and total cost at any level of output represents the total profit or loss that will be realised. The total profit (TP) at any level of output is given by vertical distance between the total revenue (TR) and total cost (TC) curves. A breakeven situation (zero profit) occurs whenever total revenue equals total cost. In Fig. not that a breakeven condition occurs at two different output level- Y_1 and Y_3. Below an output level Y_1 losses will incurred because TR < TC. Between Y_1 and Y_3 profits will be obtained because TR > TC. An output level above Y_3, losses will occur again because TR < TC. Total profit are maximized within the range of Y_1 to Y_3, where the vertical distance between the TR and TC curves is greatest, that is at an output level of Y_2.

For practical decision making the non-linear revenue output and cost output relationship of economic theory are generally replaced by linear functions. The breakeven analysis based on linear function is shown in Fig-(ix)

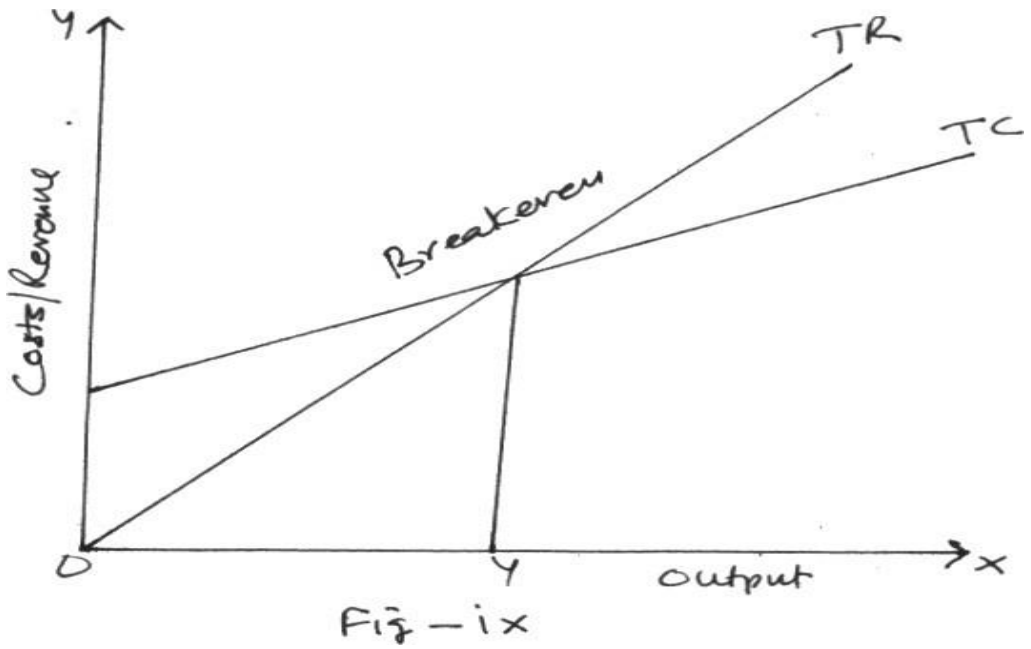


Fig – ix

Here TR is a straight line assuming that firms change a constant selling price P per unit of output. In case of cost curve, total cost is taken as sum of fixed cost which are independent of the output level plus the variable costs which increases at a constant rate per unit of output. In this case the breakeven analysis occurs at point Y_b in Fig-(ix) where TR and TC intersect. If a firm's output level is below this breakeven point that is If TR < TC, it incurs operating losses. If firm's output level is above this breakeven point that is if TR > TC it realises operating profits. Algebraically it can be defined as:

Total revenue is equal to the selling price per unit times the output level.

$TR = P \times Y$

Total cost is equal to fixed cost plus variable cost, where the variable cost is the product of the variable cost per unit times the output level.

$TC = TFC + AVC \times QY$

Now break-even output level is that level where profit is zero.

$$TR = TC.$$

$$P \times Y = TFC + AVC \times Y$$

$$P \times Y - AVC \times Y = TFC$$

$$Y\,(P - AVC) = TFC$$

$$Y = \frac{TFC}{P - AVC}$$

7.4 CHECK YOUR PROGRESS

After reading this chapter, you have to answer the following True/False so that you can check your progress.

1- With increase in level of output, AFC goes on falling till reaches zero.
2- AVC falls even when MC is rising.
3- The difference between TC and TVC falls with increase in output.
4- As output is increased, the difference between ATC and AVC falls and ultimately becomes zero.
5- The difference between ATC and AVC is constant.

7.5 SUMMARY

The information of production costs provides an important input for decision making at management level in a firm. Decisions such as resource allocation, expansion, and diversification are made through cost analysis. For the profit maximizing firm, decision on capital investment in the form of new machinery or a warehouse are made by comparing the rate of return on investment with the opportunity cost of funds used to make the capital acquisitions. Further, the traditional theory of costs analyses the behaviour of cost curves in the short run and the long run and arrives at the conclusion that both the short run and the long run cost curves are U-shaped but the long-run cost curves are flatter than the short-run cost curves. At the end, many of the planning activities that take place within a firm are based on anticipated level of output. The study of the interrelationship among firm's sales, costs and operating profits at various levels of output levels is known as cost-volume profit analysis or break even analysis. This analysis is often used by

business executive to determine the sales volume required to break even and total profits and losses at different output levels.

7.6 KEYWORDS

Opportunity cost is the value of a resource in its next best alternate use. Opportunity cost represents the return or compensation that must be forgone as a result of the decision to employ the resources in a given activity.

Accounting cost: *a*ccountants define and measure the cost by the historical outlays of funds that take place in the exchange or transformation of a resource.

Explicit costs are those which fall under actual or business costs entered in the books of accounts. The payments for wages and salaries, materials, license fee, insurance etc. are the examples of explicit costs.

Implicit Cost: there are not certain other costs which don't take the form of cash outlays, nor do they appear in the accounting systems. Such costs are known as implicit or imputed costs.

Sink costs are the expenditure that have been made in the past or that must be paid in future as part of a contractual agreement.

Marginal costs refer to the change in total cost associated with a unit of change in output.

In the long run, there are no fixed factors of production and hence no fixed costs. The firm can change its size or scale of plant and employ more or less inputs. Thus in the long run all factors are variable and hence all costs are variable.

Economies of scale*:* declining long run average cost over the lower part of the range of possible output is usually attributed to economies of scale.

Diseconomies of Scale*:* Rising long run average costs at higher level of output are usually attributed to diseconomies of scale.

7.7 SELF- ASSESSMENT TEST

1. Discuss the nature of the short-run and long-run average cost curves. Why is the long-fun cost curve flatter than the short-run cost curve?
2. Explain and illustrate the traditional cost curves of a firm in the short run and the long run.
3. How do economies and diseconomies of scale affect the LAC curve?
4. Derive geometrically long-run average and marginal cost curves from a long-run total cost curve.
5. What is opportunity cost? Give some examples of opportunity cost. How are these costs relevant for managerial decisions?

PRODUCTION FUNCTION

Structure

8.0 Learning Objectives

One of the important elements in the economic theory of the firm is the production transformation process or processes which enables it to convert same finite number of inputs into a finite number of different outputs. The basic purpose of studying the production transformation process of a firm is to examine the conditions of supply for a commodity. The response of supply of a commodity to its price depends upon (i) the physical relationship between inputs and output and (ii) the prices of inputs. These two together determine the costs of production of commodity. Thus costs influence supply which together with demand determines the price.

8.1 INTRODUCTION TO PRODUCTION PROCESS

Production refers to the transformation of resources into output of goods and services. For example, a farm takes fertilizer, seed, land and labour and turns them into wheat or corn. Modern factories like Maruti hire workers who use machinery in factories to transform steel, plastic, glass, rubber and so on into automobiles. The output of a firm can either be a final commodity such as automobiles or an intermediate product such as steel. The output can also be a service rather than a good. An airlines takes airplanes, fuel, labour and computer systems and provides passengers with the ability to travel quickly through its network of routes. An accounting firm takes pencils, computers, papers, office space and labour and produce audits or tax return for its clients.

Major portion of goods and services consumed in a modern economy are produced by firms. A firm is an organization that combines and organizes resources for the purpose of producing goods and services for sale at a profit. The most important reason for a firm or business enterprises exist is that firms are specialized organization devoted to manage the process of production.

Production is organized in firm because efficiency generally requires large scale production, the raising of significant financial resources and careful management and monitoring of ongoing activities. In microeconomic theory our focus is to know

what the firm does. Just consumers seek to maximize utility or satisfaction; firms generally seek to maximize profits. Both consumer and firms can be regarded as maximizing entities. For maximizing the profit in a given circumstances, firm always strive to produce efficiently, that is at lowest cost. In other words, they always attempt to produce the maximum level of output for a given does of inputs, avoiding waste wherever possible.

8.1.1 Inputs

Firms convert the inputs into outputs. Inputs also refer resources, or factors of production are the means of producing the goods and services demanded by society. Inputs can be classified broadly into labour or human resources, capital or investment goods, and land or natural resources. All these variables are flow variables, since they are measured per unit of time. Inputs may be further classified on the basis of availability as fixed and variable inputs. Fixed factor is one that remains fixed (or constant) for a certain level of output e.g. plant size etc. A variable input is defined as one that changes with the change in output e.g. raw material, labour etc.

8.1.2 Production Function

The term production function refers to the physical relationship between a firm's input of resources and its output of goods or services per unit of time, leaving prices asides. In other words production function is a purely technical relation which connects factor inputs and output. It means it is defined for a given state of engineering and technical knowledge. There may be enormous of different production functions – one for each and every product or service. In areas of the economy where technology is changing rapidly like computer software and biotechnology production function may become obsolete soon after they are used and of range of techniques available the firm uses those that are economically most efficient, that is those provides the greatest value of output for a given value of

input. An improvement in the state of technology will in general increase the output per unit of input.

A production function can be represented by a table, a graph or an equation and shows the maximum output for a commodity that can be produced per unit of time with each set of inputs. Both inputs and outputs are measured in terms of physical rather than monetary units. Graphically, the production function is usually presented as a curve on two dimensional graphs. Changes in relevant variables are shown either by movements along the curve that depicts the production function or by shift this curve. The most commonly used diagrams for production function of a single commodity are show in fig.1

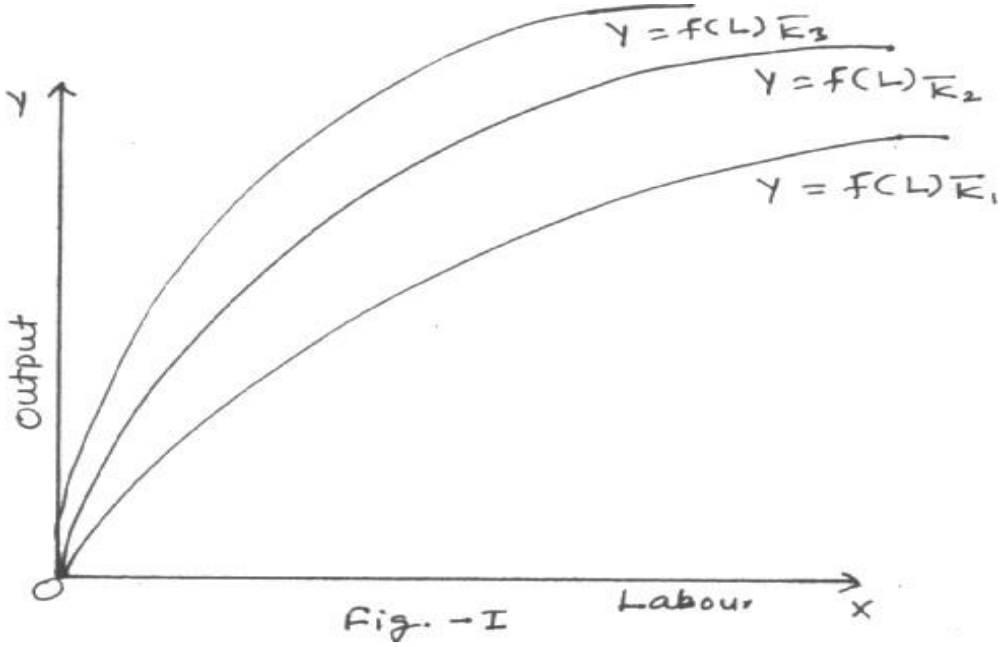


Fig. – I

Assuming that production Y commodity depends upon the two inputs capital (K) and labour (L). As labour increases, while keeping capital constant, output measures we move along the curve depicting the production function. If capital (K) increases, the production function Y = f (L) shifts upwards.

The general form of production function can be expressed as

$$Y = f(I_1, I_2 \_\_\_\_\_ I_n) \text{ ---------- (i)}$$

Where Y is the quantity of output for a production unit and inputs are represented as I_1, I_2 -------- I_n. In economic theory very often labour (L) and capital (K) are taken as variable. In agricultural economics, land is taken constant and other factors as variable. Production functions involve concepts which are useful tools in all fields of economics. The main concepts are:

8.1.3 The Marginal Productivity of Factors of Production:

It is defined as change in output resulting from a change in a factor of production, keeping all other factors constant. Mathematically, the marginal product of each factor is the partial derivative of the production function with respect to this factor. Thus,

$$MP_L = \frac{\partial Y}{\partial L} \quad \text{and} \quad MP_K = \frac{\partial Y}{\partial K} \quad \text{----------(ii)}$$

In principle, the marginal product of a factor may assume any value, positive, zero or negative. However basic production theory concentrates only on the efficient part of the production function, that is, on the range output over which the marginal products of the factors are positive. Ranges of output over which the marginal products of factors would be negative imply irrational behavior of the firm and are not considered by the theory of production.

8.1.4 The Marginal Rate of Substitution and the Elasticity of Substitution.

The marginal rate of substitution measures the how one factor of production is substituted for another while keeping the output constant. Suppose in simple care output (Y) depends upon capital (k) and labour (L) so

$$Y = f(K,L) \text{ ----------(iii)}$$

The marginal rate of sustained of labour for capital K can be determined as

$$MRS_{LK} = -\frac{\partial K}{\partial L} = \frac{\partial Y / \partial L}{\partial Y / \partial K} = \frac{MP_L}{MP_K} \text{ ----------(iv)}$$

Where MP_L and MP_K are marginal productivity of labour and capital respectively.
The marginal rate of substitution as a measure of the degree of substitutability of factors has a serious defect it depends on the units of measurement of the factors. A better measure of the ease of factor substitution is provided by the elasticity of substitution. The elasticity of substitution is defined as the percentage change in capital labour ratio divided by the percentage change in the rate of technical substitution

$$\sigma = \frac{\text{Percentage change in K/L}}{\text{Percentage change in MRS}} \text{ ------ (iv)}$$

or

$$\sigma = \frac{d(K/L)/(K/L)}{d(MRS)/(MRS)} \text{ ----------(v)}$$

The elasticity of substitution is a pure number independent of the units of measurement of K and L, since both the numerator and denominator are measured in the same units.

8.1.5 Behavior of Production Function

To illustrate the behaviour of production function, let us assume that output (Y) of a firm is based on two inputs capital (K) and labour (L)

$$Y = f(K\ L)$$

For changing the output the firm can change K and L or only L depends upon the time period whether the firm considers a short run or a long run. The short run behaviour of production process is subject to three general restrictions: the time period should (i) short enough so that firm is unable to alter the levels of its fixed inputs (ii) sufficiently short so that the shape of the production function is not changed through technological improvements and (iii) sufficiently long to allow the completion of the necessary technical processes. In long run expansion of output may be achieved by varying all inputs. In the long run all factors of production are variable so the major difference between a short run and long run production analysis lies in the number of variable inputs. A variable input is defined as one where supply in short run is elastic e.g. labour and raw material etc. In short run output may be expanded by using more of variable factors where factors like capital are kept constant. In the long run, however the firm can employ more of both capital and labour because of capital becomes elastic overtime. It is to be noted that both types of inputs variable as well as fixed are necessary for production, only short run production function is characterized by variable or non proportional return to a variable factor ratio and may be expressed for instance as.

$$Y = f(L/K) \text{ ---------- (vi)}$$

Where only labour (L) is variable, while capital (K) is constant. The rate of increase in output in response to an increase in the variable input is not a question of logic and mathematics but of actual observation of real world and of the experience of producers.

8.2 LAW OF VARIABLE PROPORTIONS- BEHAVIOUR OF SHORT RUN PRODUCTION FUNCTION

Some factors of production are elastic in supply in short period and the production units can employ an unlimited quantity of such factors also called variable factors. For production, the firms can employ in 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 relationship between varying factor proportions and output is known as law of diminishing returns. According to this law as equal increments of one input are added, the input of other productive services being held constant, beyond a certain point the resulting increments of product will decrease – that is marginal product will diminish. This law is subject to three conditions (i) there are other inputs whose quantities are held constant (ii) the state of technical knowledge is given and (iii) the proportions in which inputs can be effectively combined are variable due to this it is also called law of variable proportions.

This law is illustrated with the help of table -1. In this table it is assumed that a firm is using different amount of labour for given amount of capital.

Table-I

Unit of Capital	No. of Labourers	Capital Labour Ratio	Total Output	APl	MPl
1	1	1	3	3	3
1	2	½	8	4	5
1	3	1/3	12	4	4
1	4	¼	14	3.5	2
1	5	1/5	14	2.8	0
1	6	1/6	12	2	-2

We can see from the table that if we combine increasing inputs of labour with constant amount of capital total output increases at an increasing rate in the beginning (from 3 to 8 i. e. more than double whereas the labour input just doubles, hence increasing marginal returns) and then increases at a diminishing rate. By employing fifth unit of labour, the total product becomes constant so the marginal product becomes zero and further employing of the labour with constant amount of capital, leads to ultimately decline in the total production and so negative marginal productivity. Here in our case total product is a function of both factors K and L : Y = f (L/K) and marginal productivity of labour in $MP_L = \frac{\Delta Y}{\Delta L}$ and average productivity of labour is

$$AP_L = \frac{Y}{L} = \frac{f(L/K)}{L}. \text{----------(vii)}$$

The input level K is treated as a parameter and Y becomes a function of L along.

If we see the relationship between the capital labour ratio and output it is observed that as the ratio of capital labour decreases initially the output increases at increasing rate and then intimately with declining rate. The reason for decline in production is that as more and more labour is employed the optimum combination of capital and labour lost and labourers get into each other's way and actually disturb the production where sixth worker is employed.

The short run behaviour of production function can also be explored through diagram as shown in fig.(ii).

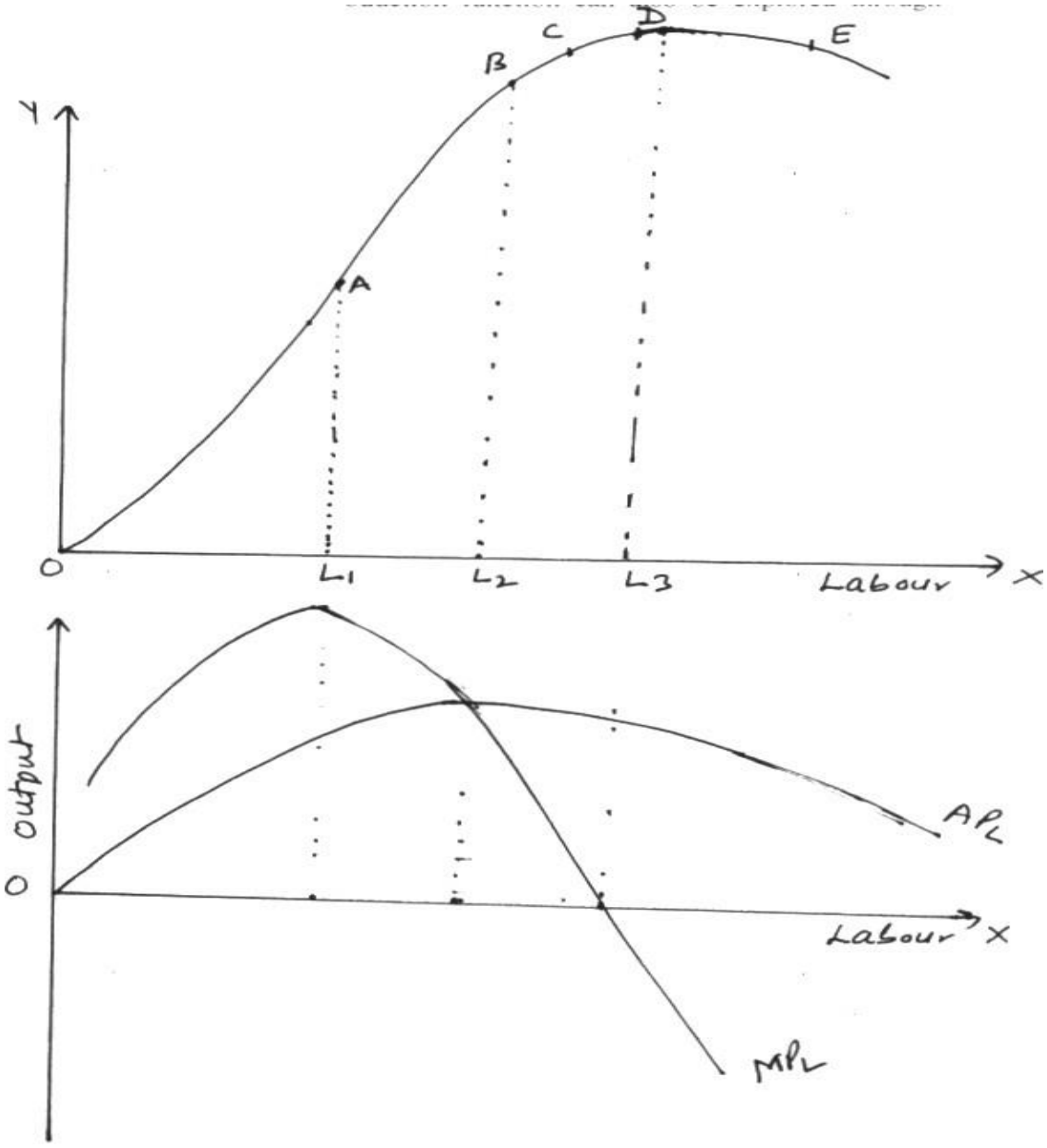


Fig -(ii)

It shows that total product increases at an increasing rate up to the point of inflexion A on total product curve and both AP_L and MP_L products consequently increase. At the point B on the TP curve average product of labour becomes equal to marginal

product of labour ($AP_L = MP_L$) and at point B the AP_L is highest meanwhile MP_L has already started declining and three workers are employed at this point. This is known as the first stage of production.

In the second stage, total output continue to increase and reaches the highest point D, but this increase is at further decline rate, with the result that the MP_L curve continues to decline and yields zero output at the end of the stage when total output is the highest. The average output now starts declining though continues to be positive so long as the total output is positive.

In the third stage the total output declines, the marginal output is negative and the average output is negative and the average output continues to decline though positive.

8.2.1 The law of Diminishing Returns

The decline in marginal productivity of labour in figure (i) is a reflection of the law of diminishing returns. This is an empirical generalization or a physical law, not a proposition of economics. It postulates that as more units of a variable input are used with a fixed amount of other inputs, after a point, a smaller and smaller return will accrue to each additional unit of the variable unit. In other words, the marginal product of the variable input eventually declines. This occurs because each additional unit of the variable input has less and less of the fixed inputs with which to work. It is to be noted that to observe the law of diminishing returns at least one input must be held constant. Technology is also assumed to remain unchanged.

8.2.2 Important of the stage of Production

From above, it is observed that the variations in output are a function not of labour alone but of the proportion in which the two factors are combined. During the process of production capital's efficiency is constant and similarly all the labourers are equally efficient. Unless we know the prices of inputs and the output, we cannot

decide about the optimal combination of the two factors. Even then the physical law itself throws light on the nature of the problem.

In the first state the capital labour ratio is favourable to efficient production. As labour or more capital (more machines) is increased, the average productivity continuously increases. It is profitable to employ more labour. The marginal productivity also increases, though it starts declining before the end of the first stage.

In the second stage, though total product continues to increase, both the AP_L and MP_L decline. Some decision has to be taken this stage, because at the end of 2^{nd} stage, TP is highest and the MP_L becomes zero. The law of diminishing marginal returns to labour has to operate as labour is a very important imperfect substitute for capital. The point of zero MP_L of labour is its intensive margin.

No wise producer will consciously enter the 3^{rd} stage even when both the factors are free, when for the TP declines and the MP is negative, though it is not uncommon for lacking perfect knowledge to a producers actually produce in this region.

The second stage is therefore crucial for decision making. But maximum total product need not coincide with the point of the most profitable employment of labour. If the inputs are paid in terms of their own output, the employment of the variable input labour is carried up to the point where its marginal physical product equals its market rate of remuneration.

8.3 CHECK YOUR PROCESS

On the basis of your knowledge about production function, answer the followings:

1- Which of the following is not a factor of production?

A) Capital B) Material C) Money D) Labour

2- A production function tells the firm

A) The maximum it can expect to produce with a given mx of inputs.

B) The minimum it can expect to produce with a given mx of inputs.

C) The average it can expect to produce with a given mx of inputs.

D) The average level of production for other firms in the industry.

3- Which of the following statement is TRUE in short term?

A) The ratio of output to the number of workers used to produce the output.

B) Whether or not an input is considered fixed is dependent on the paid for the input.

C) Generally, labour is a variable input.

D) Generally, capital is a variable input.

4- The marginal product of labour is

A) The ratio of output to the number of workers used to produce that output.

B) The change in total product resulting from an extra unit of labour, holding other factors constant.

C) Equal to the marginal product of labour when average product is increasing

D) The amount of output that can be produced by a given amount of labour.

5- Given the production function q= 4L+K, formula for MP of labour

A) 4+K

B) 4

C) 4K

D) Cannot be determined.

8.4 SUMMARY

Production is a process by which goods and services are made available to the consumer. In theory of demand, individual consumer is considered as economic unit .Similar to that, in the theory of production, individual firm or industry is regarded as economic unit. Product refers to the volume of goods produced by a firm or industry during that specified period of time. Product has reference to physical volume, whereas productivity is a ratio and has reference to output per unit of input. Production function can be short run production function or long run production function. This chapter presents the traditional production theory by explaining three

different laws of production applicable in short period. Production function shows the physical relation between firm input and output of goods and services per unit of time. It means the nature of production function is an economic but technological. Production function depends upon technique of production. The relationship of input and output not only depends upon combination of input and output but affected by technology also. Short period production function shows the physical relationship between input and output when some factors are fixed whereas others are variable or changing. Short period production function is also known as Laws of Returns. As per classical economist in short period three different laws are applicable. These are Law of Increasing Returns to Scale, Law of Constant Returns to Scale and Law of Diminishing Returns to Scale. In case of manufacturing industries role of man increases when we employee more and more variable factors of production with some fixed factors. As a result of this marginal productivity will increase .At the same time average cost will fall and law of increasing returns to scale will be applicable. Law of constant returns to scale as per classical economists applies in the short period .It applies after the application of law of increasing returns to scale. This law is applicable when advantages from increased scale of production become equal to disadvantages. Constant returns to scale means the stage where input and output increases in the same proportion. It means when more and more doses of labour and capital are employed with some fixed factor then output increases in the same proportion in which the factors of production are employed. Law of diminishing returns to scale is also known as law of Increasing Cost .This law states that when with some fixed factors ,units of variable factors like labour and capital are increased without making any improvement in the technology of production then marginal return will be diminishing .On the other hand average cost will be increasing.

8.5 KEYWORDS

Production refers to the transformation of resources into output of goods and services.

Inputs also refer resources, or factors of production are the means of producing the goods and services demanded by society.

Production Function refers to the physical relationship between a firm's input of resources and its output of goods or services per unit of time, leaving prices asides. It is a purely technical relation which connects factor inputs and output.

The Marginal Productivity of Factors of Production is change in output resulting from a change in a factor of production, keeping all other factors constant. Mathematically, the marginal product of each factor is the partial derivative of the production function with respect to this factor

The Marginal Rate of Substitution and the Elasticity of Substitution measures the how one factor of production is substituted for another while keeping the output constant. The marginal rate of substitution as a measure of the degree of substitutability of factors has a serious defect it depends on the units of measurement of the factors. A better measure of the ease of factor substitution is provided by the elasticity of substitution. The elasticity of substitution is defined as the percentage change in capital labour ratio divided by the percentage change in the rate of technical substitution.

Law of Variable Proportions & Diminishing Return Some factors of production are elastic in supply in short period and the production units can employ an unlimited quantity of such factors also called variable factors. For production, the firms can employ in 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 relationship between varying factor proportions and output is known as law of diminishing returns. According to this law as equal increments of one input are added, the input of other productive services being held

constant, beyond a certain point the resulting increments of product will decrease – that is marginal product will diminish.

8.6 SELF–ASSESSMENT TEST

1. What is meant by production? Define production function and describe the underlying assumptions.

2. "As we add more and more of variable input to a fixed input the amount of extra product will fall off." (Samuelson). Explain the conditions under which this law operates and discuss if it will also operate with several variable inputs

3. What do you mean by production function? What is the difference between a short run and a long-run production function?

4.(a) What is the marginal rate of technical substitution?

(b) What is elasticity of technical substitution?

5. What is meant by production? Explain the different stages Define production function and describe the underlying assumptions.

PRICE DETERMINATION: PERFECT COMPETITION AND MONOPOLY

Structure

9.0 LEARNING OBJECTIVE

After reading this chapter you will be able to understand the market and its structure. Then, you will be provided knowledge regarding types of market and price determination in different types of market. Further, equilibrium in short run and long run is also described. One important topic i.e. price discrimination is also discussed at the end of this chapter.

9.1 INTRODUCTION TO MARKET

Markets are focal point for economic activity as it plays important role in pricing and allocating resources in a competitive economy. A market is a group of economic agents (individuals/or firms) that interact with each other in a buyer-seller relationship. This interaction results in transactions between the demand (buyer) side of the market and the supply side of the market. The determination of output and the price of a commodity in a market depend upon the number of buyers, sellers and the characteristics of the product which are also the determinants of market structure.

9.2 Market and Types of Market:

The determination of output and the price of a commodity in a market depend upon the number of buyers, sellers and the characteristics of the product which are also the determinants of market structure. On the basis of the characteristics of market structure the market can be classified as given under.

1. Perfect competitive market
2. Monopoly
3. Monopolistic competition
   (i) Duopoly
   (ii) Oligopoly

Firm: Basically there are two types of actors in an economy.

(1) Households (2) Firms.

Households are the consumers of the goods and services while firms are the producers of such goods and services. Firm is an economic entity which works for profit motive.

9.2.1 Perfect Competitive Market

Perfect competitive market is that market where large numbers of are many sellers and buyers producing homogeneous product but the size of the sellers and buyers is so small that they can not change the demand and supply of the product. In this market the price of the commodity is determined by the industry and the firm is merely a price taker.

Characteristics of the Perfect Competitive Market:

1. Larger number of buyers and sellers and their size is small.
2. Homogenous product.
3. Perfect knowledge.
4. Perfect mobility.
5. There is no entry ban on the firms.
6. There is no transport and selling costs in this market.
7. Equal cost throughout the market.

9.2.1.1 Price Determination in the Perfect Competitive Market

In this market the price of the commodity is determined by the industry. The industry determines the price of the commodity at the point where the market

demand and supply of the commodity becomes equal to each other. We can show it with the help of following schedule and Fig-1:

Price of the commodity	Demand	Supply
1	10	2
2	8	4
3	6	6
4	4	8
5	2	10

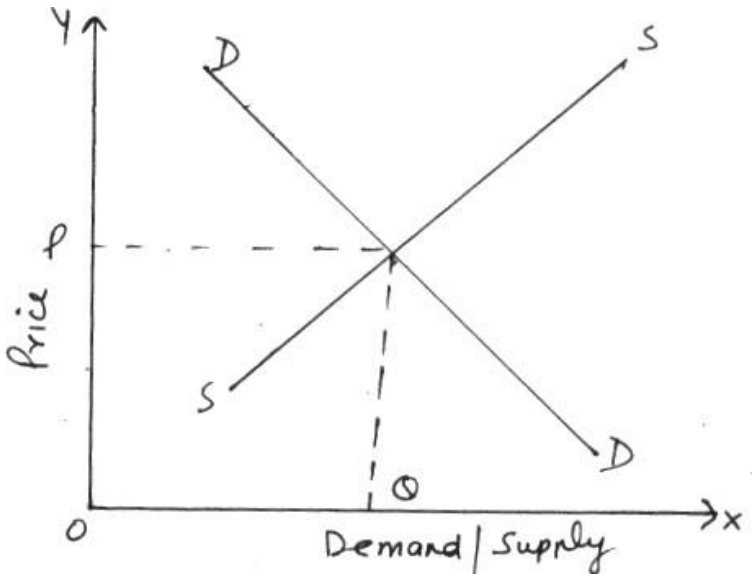
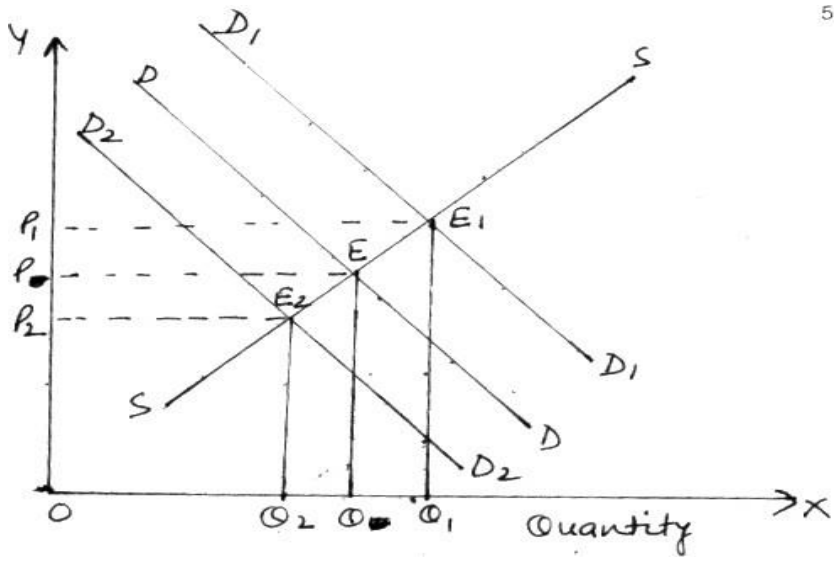


Fig.-I

9.2.1.2 Effect of Change in Demand on the Price

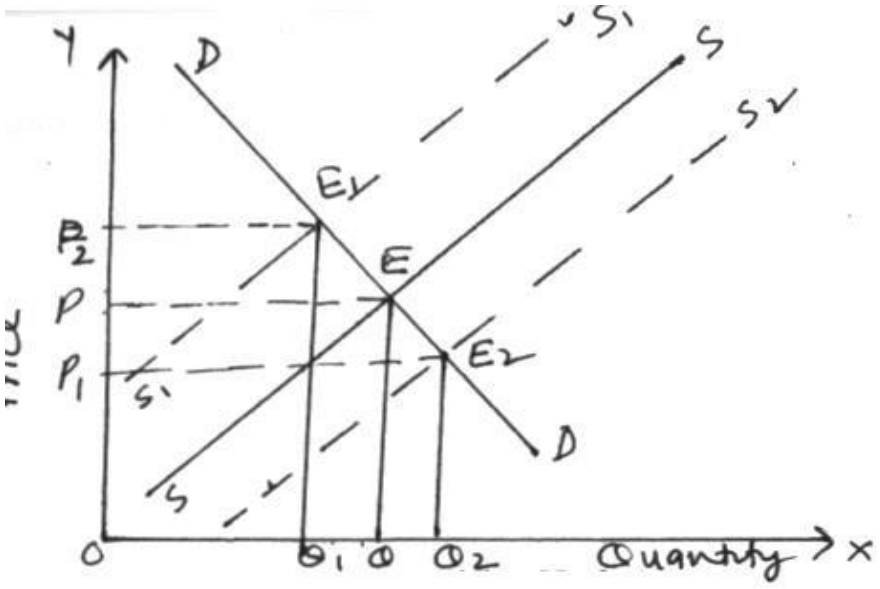
If the supply of the commodity remains constant and its demand increases the price of the commodity increases in the same way if the demand decreases supply being the constant than price decreases we can show it as



In the above diagram SS and the supply curve and DD is the first demand curve. Point E is the first equilibrium-point where price is OP and the equilibrium quantity is OQ. If the demand curve shifts upward i.e. it becomes D_1D_1 after increasing the demand. Now the new equilibrium point is E_1, where the new price is OP_1 which is more than OP. and in the same way after decreasing the demand the demand curve shifts backward i.e. it becomes D_2D_2 and the new equilibrium point is E_2 where new price is OP_2 which is less than OP.

9.2.1.3 Effect of the Change of the Supply on the Price

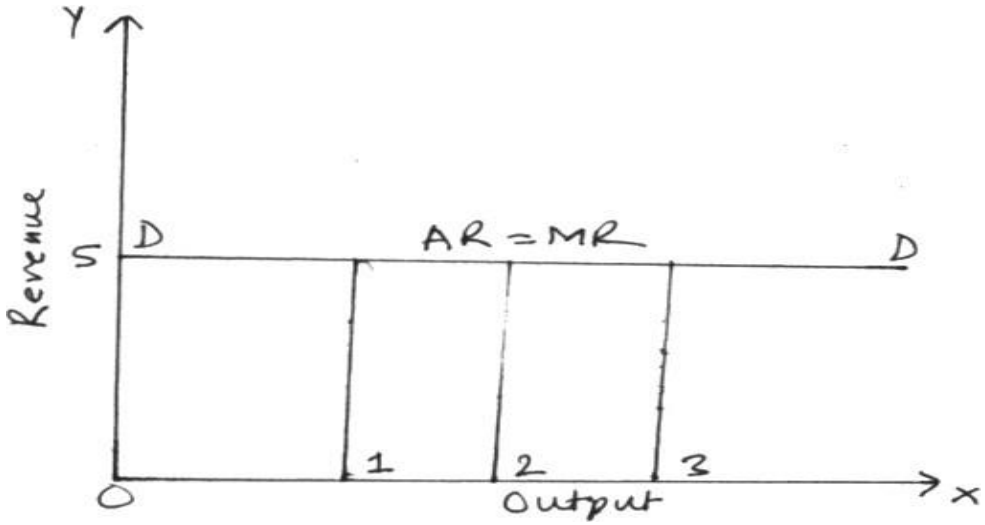
When the supply of the commodity increases when its demand remains constant its price decreases and vice-versa also. We can show it as



Revenue Curve of the Perfect Competitive Market

In the perfect competitive market the demand curve i.e. the price curve and the marginal revenue curves are the same.

In the above diagram it is shown that if the one unit of the commodity is sold than AR i.e. price is 5 Rs. If the demand increases and two or three units of the commodity are sold than also the price of the commodity



Remains same i.e. of 5 Rs. /unit. So the marginal revenue also remains the same i.e. 5 Rs. /unit. The demand/revenue curve in this market remains parallel to X-axis.

9.2.2 Equilibrium of the Firm and Industry in the Perfect Competitive Market

A firm is a business or economic entity which produces goods and services for sale. Its motive is to maximise its profit.

Industry: In the perfect competitive market there are so many firms which produce homogeneous product. The group of these firms is known as industry.

In the perfect competitive market the equilibrium of the firm and industry are shown less than two time periods.

(1) Short run equilibrium.

(2) Long run equilibrium.

1. Short run equilibrium

Meaning of the Firms Equilibrium

A firm is in equilibrium when it is satisfy with its present production quantity. At its equilibrium point the firm is getting either maximum profit or minimum loss. For a firm, equilibrium is a position when to increase and decrease in production is not profitable for it.

Firm's equilibrium can be explained in two ways-

1. On the basis of total revenue and total cost.
2. On the basis of marginal revenue and marginal cost.

Firm's Equilibrium on the Basis of Total Revenue and Total Cost:

On the basis of total revenue and total cost a firm is in equilibrium when the difference between total revenue and total cost is maximum i.e. at the point where the firm's total profit is maximum.

$\pi = TR - TC = Maximum.$

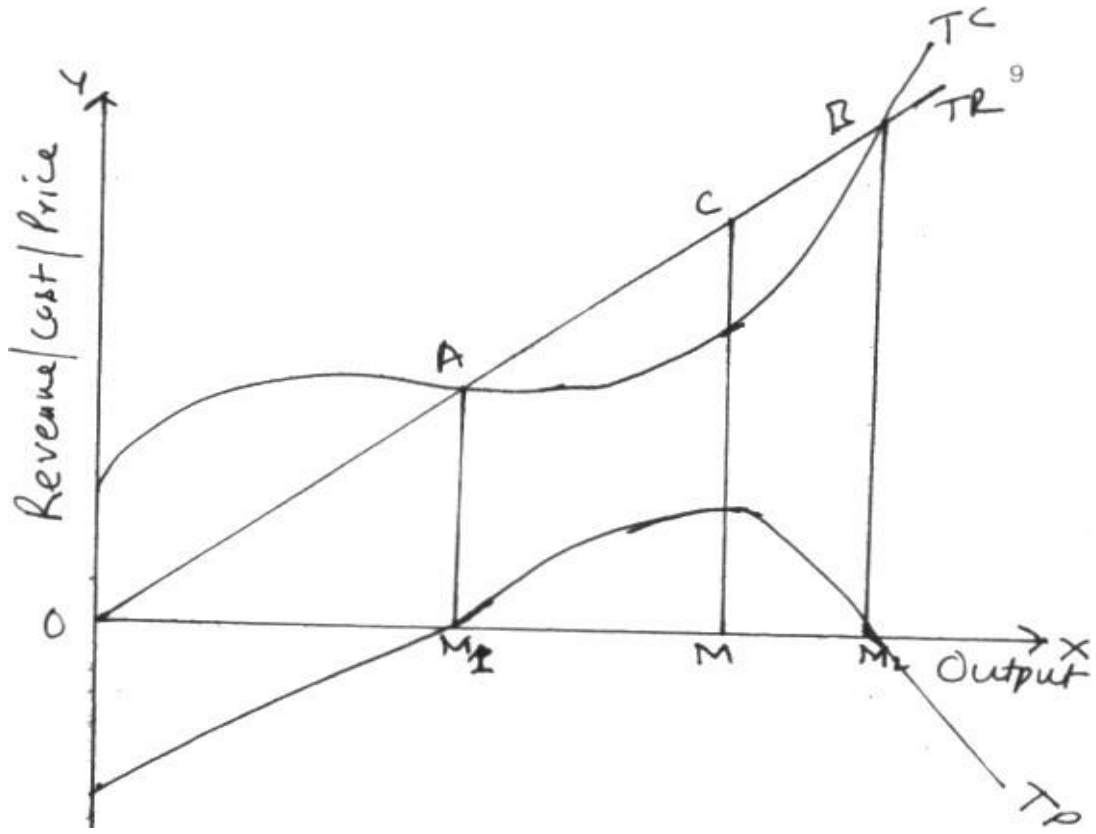
π = Total profit

TR = Total revenue

TC = Total cost.

In perfect competitive market, we can show it as,

TR is the total revenue curve in the diagram given which remains increasing with a same rate because in this market the price of the good is determined by the industry and the firms have to sell their whole production on this price. So in this market marginal and average revenue remains constant and equal to each other's is the total cost curve which becomes equal to TR at point A and remains decreasing till point B and then starts increasing and cuts the total revenue curve at point C. the reasons of this is that at first the returns to scale are increasing and after some time decreasing returns to a scale are required.



TP is the total profit curve which is negative before point A because before this point total cost is more than total revenue. Total profit is maximum at the output M

where the difference between total revenue and total cost is maximum. After that total profit starts decreasing and it becomes equal to zero at output M_2, OM is the firm's equilibrium production because at this production the firm is acquiring maximum profit.

2. Firms Equilibrium on the Basis of Marginal Revenue (MR) and Marginal Cost (MC) Method:

Another and most popular method to know the firms equilibrium position is the marginal revenue and marginal cost method.

Marginal Revenue: The change in total revenue due to addition of revenue by selling one more unit by a firm is known as the marginal revenue.

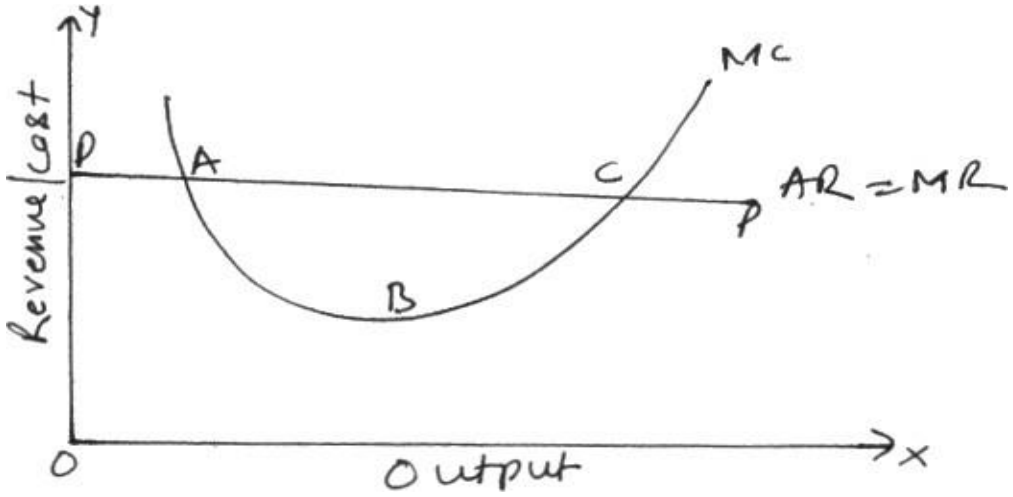
Marginal Cost: The change in total cost due to addition of cost by producing one more unit is known as marginal cost.

To determine the equilibrium position a firm has to compare its marginal revenue and marginal cost. A firm increases its production till its marginal revenue is more than its marginal cost i.e. till MR > MC. A firm wants to decrease its production when its marginal revenue MR is less than its marginal cost i.e. when MR < MC. A firm does not want to change its production when its MR = MC. This position will be the firm's equilibrium position.

Marginal revenue should be equal to marginal cost is the necessary condition for a firms equilibrium but not the sufficient condition. So the second condition of the firm's equilibrium is that the marginal cost (MC) curve should cut the marginal revenue (MR) curve from below. Because it may be possible that at the point where MR = MC firm is not acquiring maximum profit. So according to marginal analysis the above two conditions are necessary for the firms equilibrium. i.e.

1. MC = MR
2. Marginal cost curve should cut the marginal revenue curve from below.

In perfect competitive market the equilibrium position of the firm can be shown as under:



In the above diagram PP curve is the average (AR) and marginal (MR) revenue curve, which is parallel to X-axis. MC is the firms marginal cost curve which slops downward first and after point B it starts increasing. The marginal cost curve cuts the marginal revenue curve at point A and C. Point A is not equal equilibrium point because at this point the equilibrium's first condition i.e. MC = MR is satisfied but the second condition i.e. MC cuts the MR from below is not satisfied. Point C is the equilibrium point because at this point both the conditions of equilibrium are satisfied.

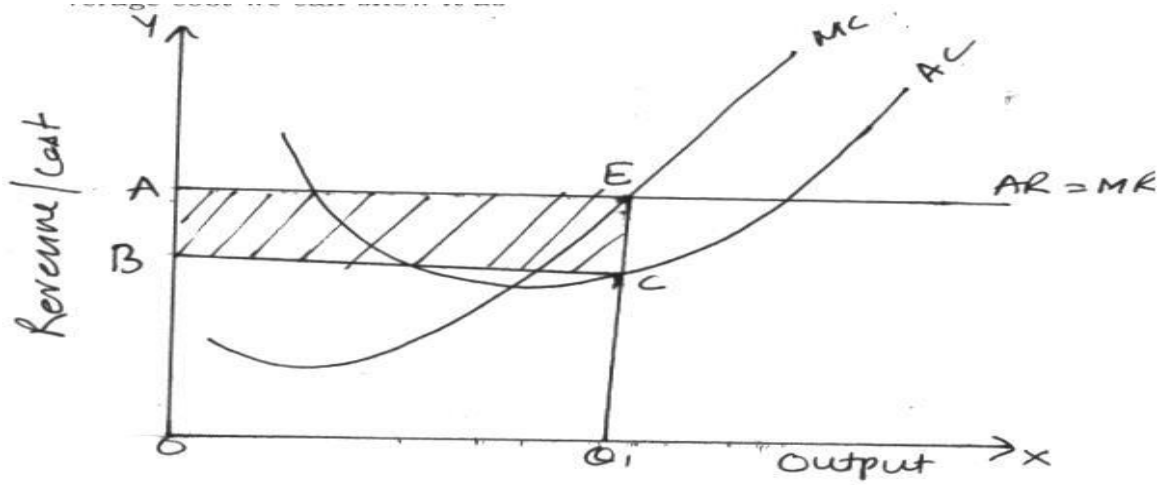
9.2.2.1 Equilibrium of the Firm in the Short Run

Short run is the time period in which the firm can increase its production by increasing its variable factor only. So in the short run the scale of the production remains constant i.e. in the short run no firm can enter or leave the industry. In the short run equilibrium position a firm may be in three positions.

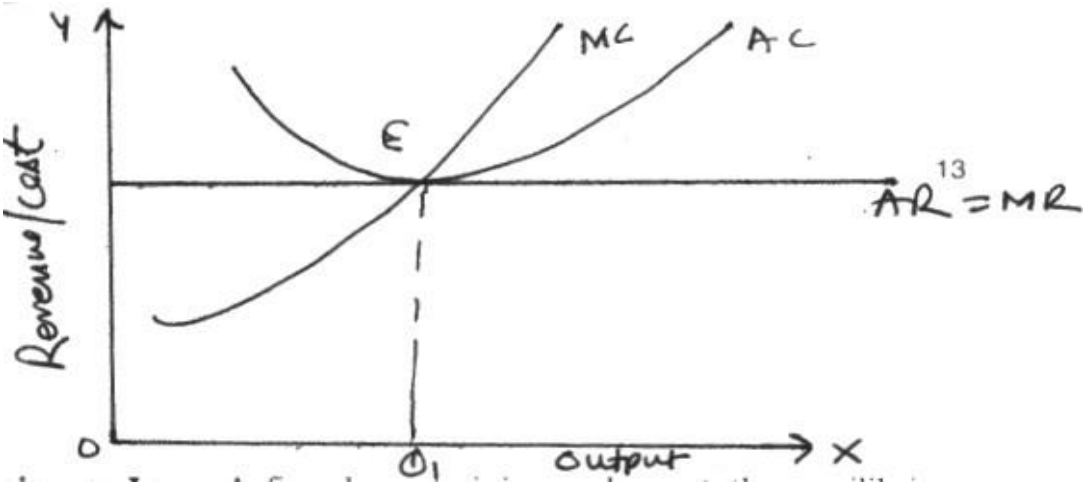
1. Abnormal profit
2. Normal profit
3. Minimum loss

1. Abnormal Profit: A firm is in equilibrium when it produces so much amount of a commodity at which its marginal revenue (MR) will be equal to its marginal cost i.e. (MC) and its (MC) curve cuts its (MR) curve from below. A firm requires abnormal

profit in its equilibrium position when the average revenue determined by the industry is more than the firms average cost we can show it as



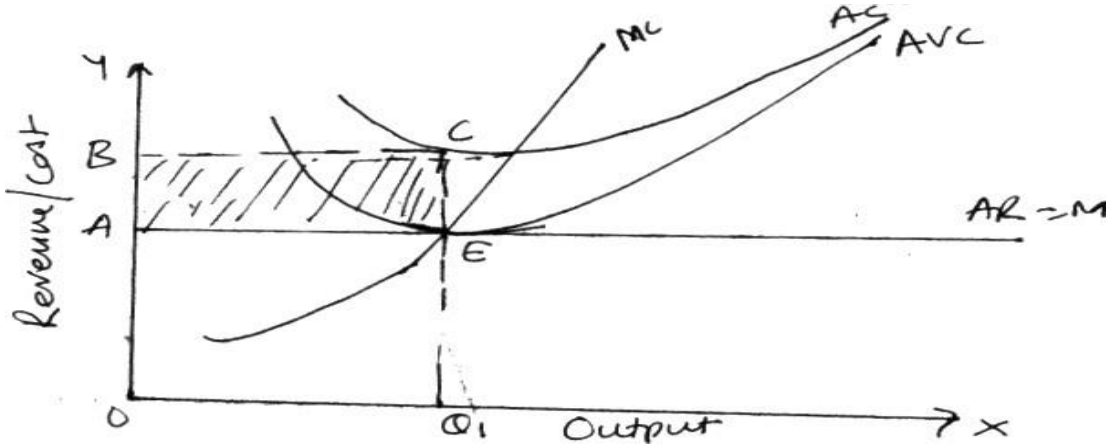
2. Normal Profit: A firm acquire normal profit at the equilibrium position when the average cost at the equilibrium production will be equal to the price determined by the industry it can be shown as.



3. Minimum Loss: A firm bears minimum loss at the equilibrium position when the difference between AC and AR at equilibrium output is equal to fixed cost of the firm i.e.

When AC – AR = FC

It means that in the short run a firm continue its production till it acquires revenue equal to its marginal variable costs. Because in the short run if it drops production it will have to bear the fixed costs. We can show it as



In the above diagram E is the firm's equilibrium point and the firm bears minimum loss which is equal to its fixed cost at equilibrium point. Because at equilibrium point the industry has determined the price of the output equal to average variable cost. If the industry decreases price less than this than the firm will stop production.

9.2.2.2 Long Run Equilibrium of the Firm in Perfect Competition Market

Long run is the time period in which supply can be changed according to demand. The new firms can enter or the existing firms can leave the industry. The existing firms can also change their scale of production according to their necessity.

Conditions of Long Run Equilibrium of the Firm:

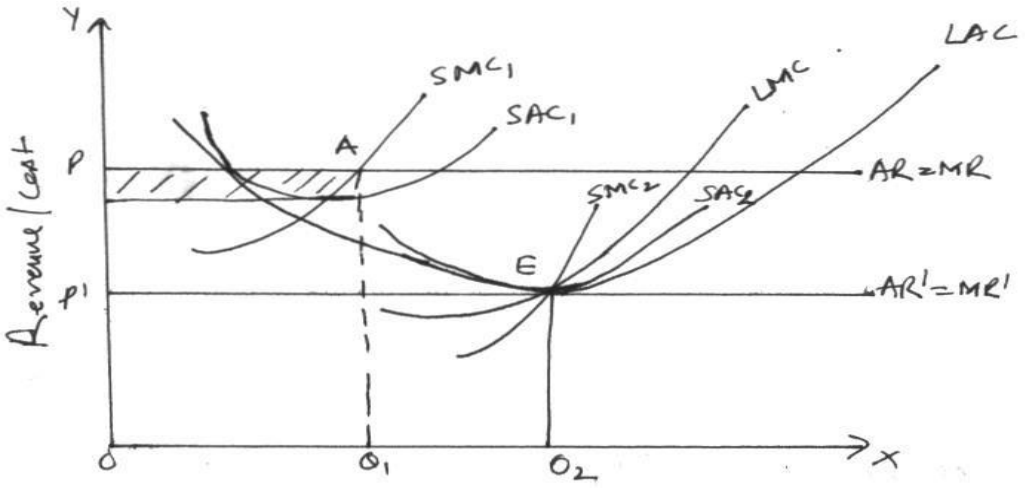
A firm will be in equilibrium in the long run when

1. Firm's long run marginal cost and long run marginal revenue will be equal to each other.

   i.e. LMC = LMR

2. Long run marginal cost curve should cut the long run marginal revenue curve from below.

In the long run all firms get only normal profit when they are in equilibrium. Because in the long run, if firms will get abnormal profit then the old firms will increase their production and the new firms will enter the industry. So the supply of the commodity will increase and price will decrease. On the other hand if the firms are in loss than some firms will leave the industry and the supply decreases and the price will increase. In the long run the firm will produce at minimum average cost in equilibrium position. This production is also known as optimum production.



In the above diagram point A is showing the short-run equilibrium of the firm where a firm is earning supernormal profit. The long run equilibrium of the firm will be at point E. where the firm is acquiring normal profit, here its LMC = SMC = MR = AR = SAC = LAC.

9.2.2.3 Equilibrium of the Industry

An industry will be in equilibrium when there will be no tendency of change in it. It means that in equilibrium position no firm can enter or leave the industry.

New firms will not enter the industry when the existing firms are acquiring normal profit. In the same way the older firm will not leave the industry because due to fear of loss. So when the existing firm will not want to leave and the new firms will not want to enter the industry. There will be no tendency of contraction or extension of the industry. This position is known as the industries equilibrium.

Conditions of the Industry Equilibrium

An industry can contract or expand in two ways-

1. When the existing firms of the industry make contraction or expansion in their production.
2. Either new firms enter or the older firms leave the industry.

The industry will be in equilibrium when there will be no tendency of above two changes. So there are two conditions of industry's equilibrium.

1. Constant number of firms.
2. Existing firms should be in equilibrium.

9.2.2.4 Short Run Equilibrium of the Industry

In the short run an industry will be in equilibrium at the price at which the industry's demand and supply are equal to each other. In the short run industry can not acquire perfect equilibrium, because to acquire perfect equilibrium all the firms should acquire normal profit but in the short run there is a possibility that some firms are in a position of abnormal profit and some are in loss. We can show it as

Diagram A is showing the industry as equilibrium E is the equilibrium point where demand and supply curves of the industry cut each other. Diagram B, is showing that at the equilibrium price firms are acquiring abnormal profit so these will be a tendency that they will increase there supply in the long run.

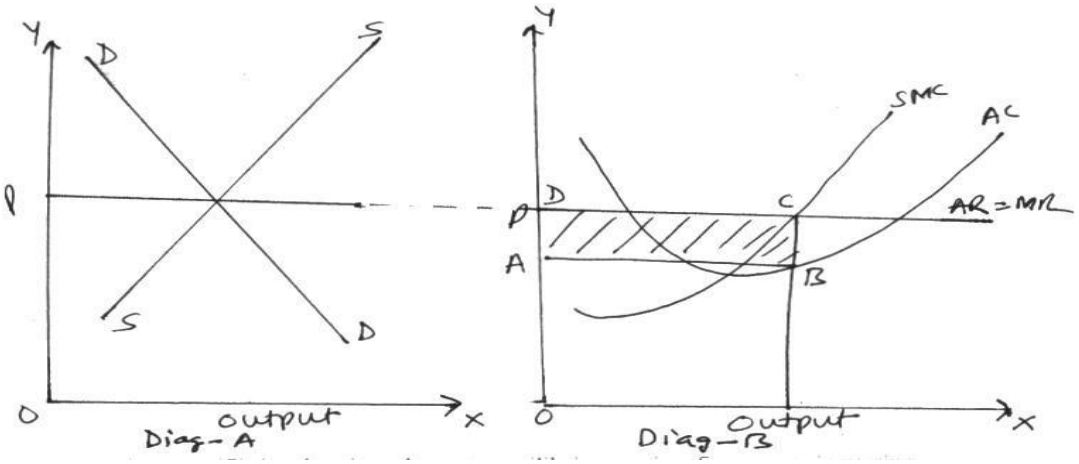
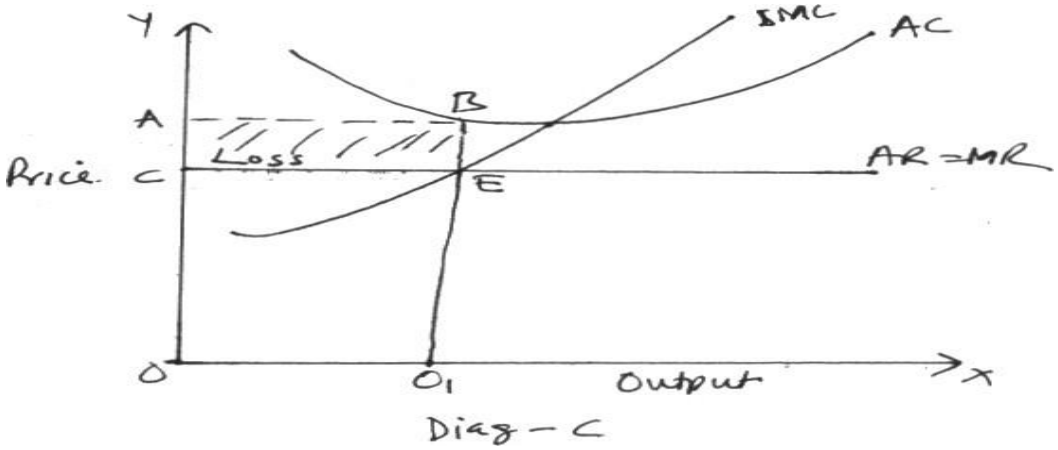
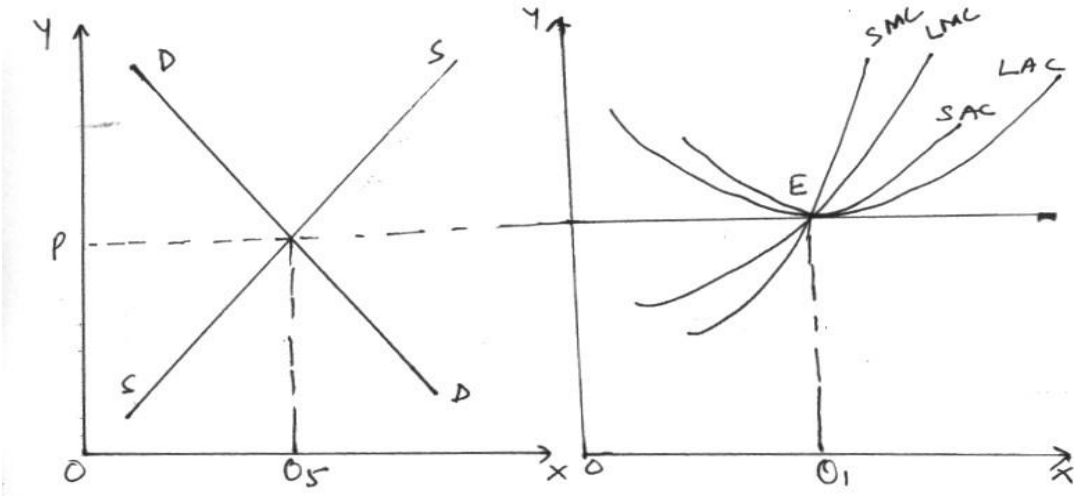


Diagram (C) is showing that at equilibrium price firms are incurring losses so there will be a tendency to decrease the supply in the long run. So the industry will be in perfect equilibrium only in the long run.



9.2.2.5 Long Run Equilibrium of the Industry

In the long run the industry will be in equilibrium when it testifies these conditions.



1. Each form of the industry should be in equilibrium individually i.e. their MC = MR and their MC should cut MR from below.
2. The number of firms should remain constant i.e. LAC = LAR.

9.3 Monopoly

Monopoly is a market where there is only one producer of a good or services. There is also no substitute of the good or service.

Conditions of Monopoly Market

1. Single seller and large number of buyers.
2. There is no substitute in the market.
3. Entry ban.
4. Controlled supply.
5. Independent price policy.
6. There is no difference between firm and industry.
7. Price discrimination.
8. Abnormal profit.

9. There are no selling costs.

10. Different average and marginal revenue curve.

9.3.1 Price and Equilibrium Determination under Monopoly

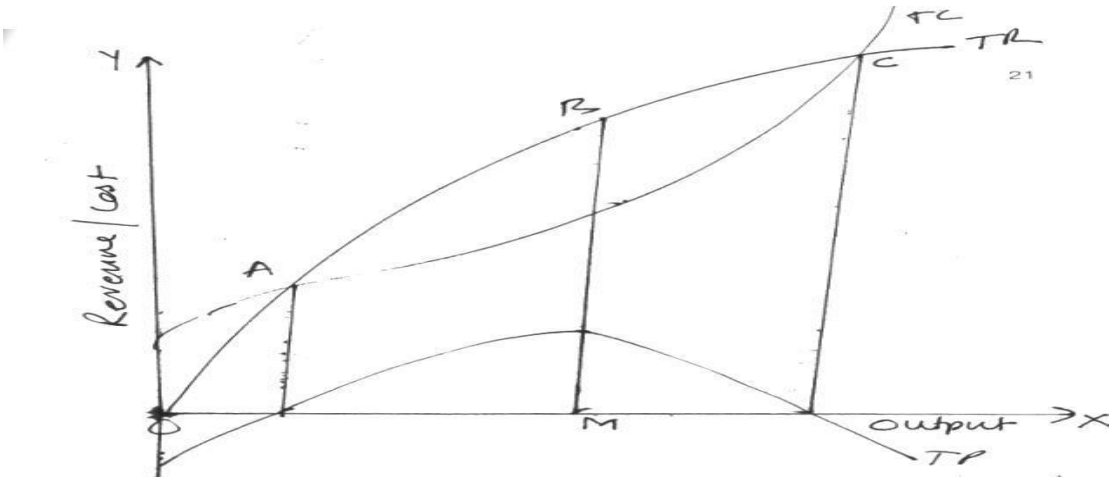
A monopolist determines that price of his product at which he will get maximum profit. He will be in equilibrium when he produces that amount of his product at which his total profit will be maximum. In the short run the monopolist may get minimum loss at the equilibrium position.

In monopoly also price and equilibrium determines by two ways-

1. Total revenue and total cost method.
2. Marginal revenue and marginal cost method.

Total Revenue and Total Cost Method:

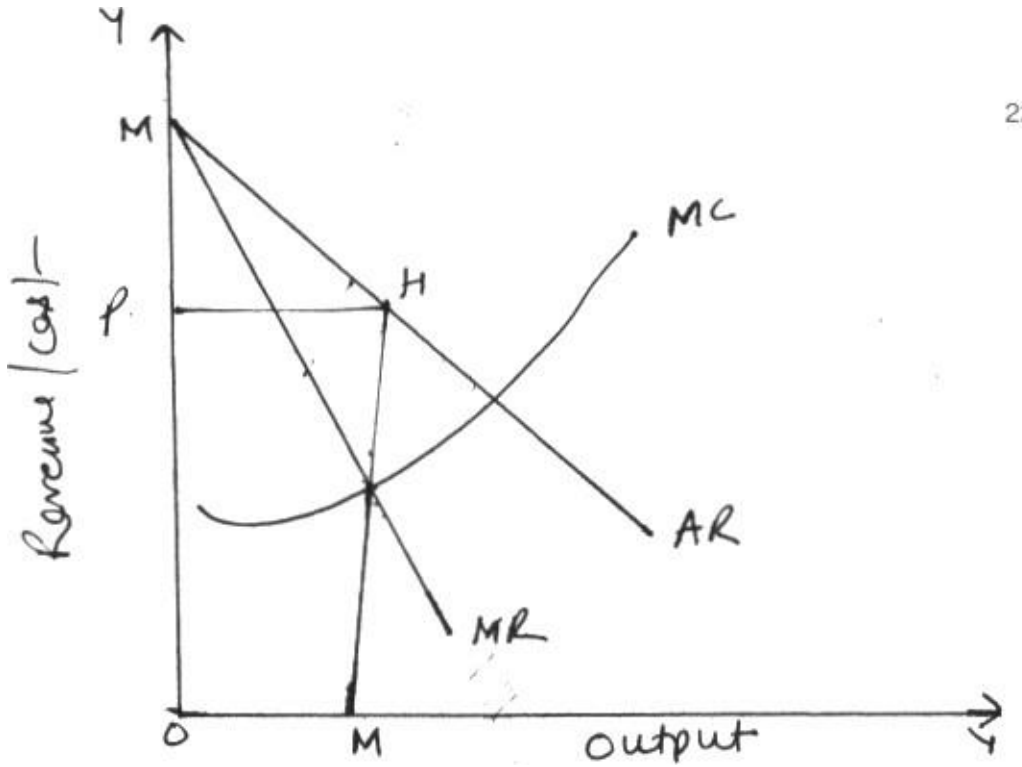
According to this method a monopolist will be in equilibrium when he is acquiring maximum profit i.e. where the difference between total revenue and total cost will be maximum. π = TR - TC = maximum; π = Total profit, TR = Total revenue, TC = Total cost. This can be shown as under:



TC is the total cost curve in the above diagram and TR is the total revenue curve. TC starts from OP it means that if the firm stops production than also it has to bear fixed costs. TP is the total profit curve. The firm is in equilibrium when it produces OM quantity of its product because of this production the firm is getting maximum profit.

2. Marginal Revenue and Marginal Cost Analysis-

According to this method a monopolist is in equilibrium when (a) its MR is equal to MC (b) MC cuts MR from below. This can be shown as



E is the equilibrium point in the above diagram where MC = MR and MC cuts MR from below.

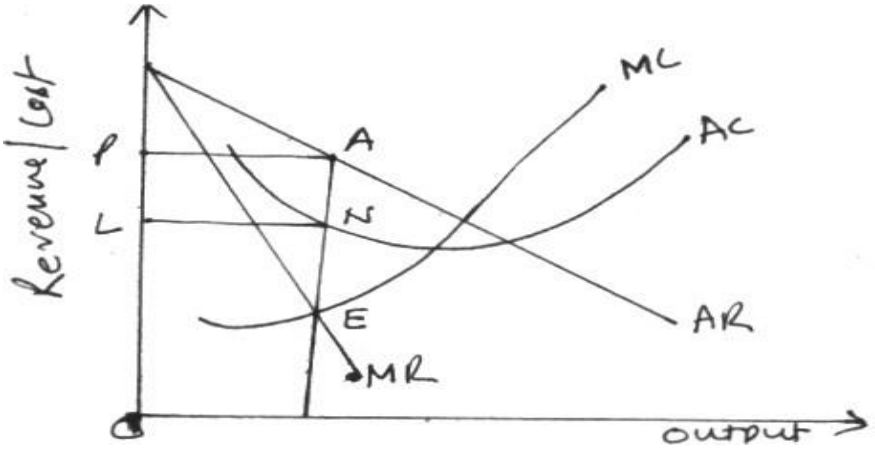
9.3.1.1 Short Run Equilibrium of the Monopolist

In the short run the monopolist can increase or decrease its production only by increasing or decreasing its variable factors. He will be in equilibrium.

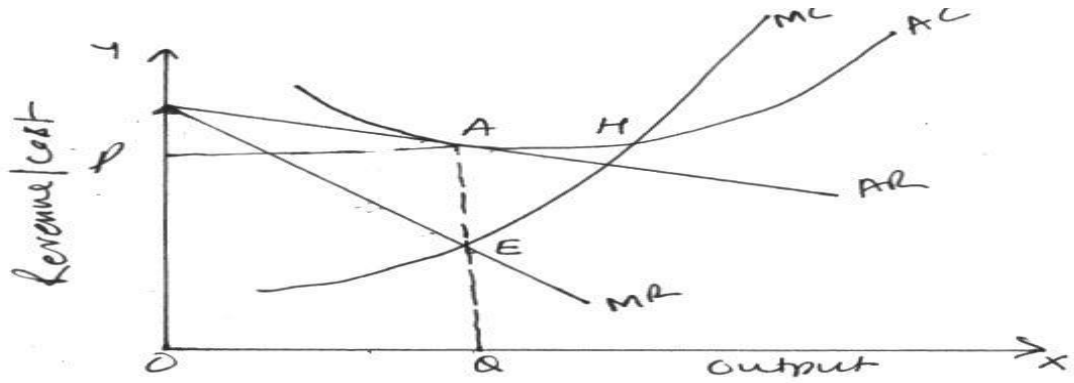
When MC = MR and MC cuts MR from below. In short-run the monopolist may be in three positions during equilibrium

1. Abnormal profit.
2. Normal profit
3. Minimum loss

Abnormal Profit: At equilibrium point if the price determined by the monopolist i.e. (AR) is more than average cost i.e. (AC) of production, the monopolist will get abnormal profit. The monopolist will control its production till as MC = MR. It will be known as equilibrium profit.

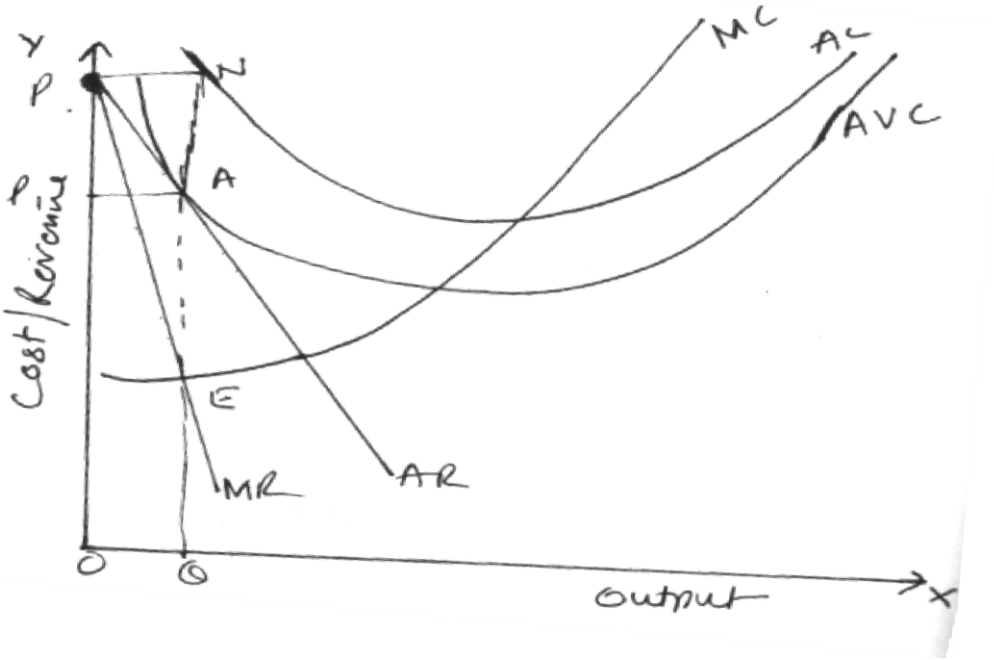


Normal Profit: The price determined by monopolist at equilibrium position is equal to the average cost i.e. AR = AC then the monopolist will get only normal profit. This can be shown as-



E is the equilibrium point of the monopolist because at this point MR = MC. Equilibrium production is OQ. At this production average cost curve AC is touches average revenue curve AR. It means that at point A both the prices of the commodity and its average cost are equal. So the monopolist is getting normal profit.

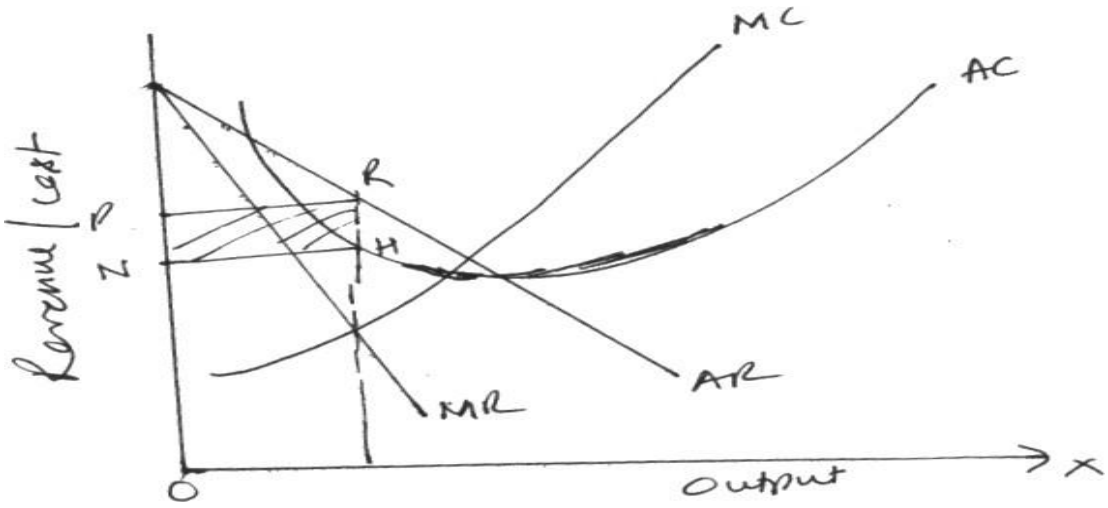
3. Minimum Loss- In the short run the monopolist will have to continue its production even at losses. In the short run if the demand of the commodity decreases then price a will also decrease and the monopolist will continue its production if he is getting price equal to (AVC) i.e. equal to average variable cost. This can be shown diagrammatically as under



A monopolist is in equilibrium at point E in the above diagram. The equilibrium production of it is OQ and the price is OP_1. At this price AVC curve touches AR curve at point A. It means that the firm is acquiring price equal to its average variable cost. The firm is bearing total loss equal to $ANPP_1$ which is its minimum at production of OQ quantity, then any other amount of quantity of production. If the price will decrease than OP_1 then the monopolist stop the production.

9.3.1.2 Long Run Equilibrium of the Monopolist

In the long run the monopolist will be in equilibrium at the point where its LMR will be equal to its LMC. The short run price of a monopolist may be less, more or equal to average cost but in the long run his price will be more than its long run average cost i.e. he acquires abnormal profit in the long run. In the long run the monopolist determines the price at which he gets abnormal profit.



The monopolist is in equilibrium at point E after producing OQ production. At equilibrium point its average revenue is QR which is more than its average cost

which is equal to QH. It means that he is getting total abnormal profit equivalent to NHRP.

9.3.2 Monopoly Power

The monopolist can decide its production quantity or the price of its product. This decision power of the monopolist is known as monopoly power. This power depends on many factors.

The entire monopolist is not equal in this matter.

The economists have developed many methods to measure the monopoly power the two main methods of them are as,

9.3.3 Lerner's Method

According to Lerner monopoly power depends upon the difference between price and marginal cost. The monopoly power increases as this difference increases. He used this method to measure the monopoly power.

$$\text{Monopoly power} = \frac{P - MC}{P}$$

P = AR (Price) ,MC = Marginal cost

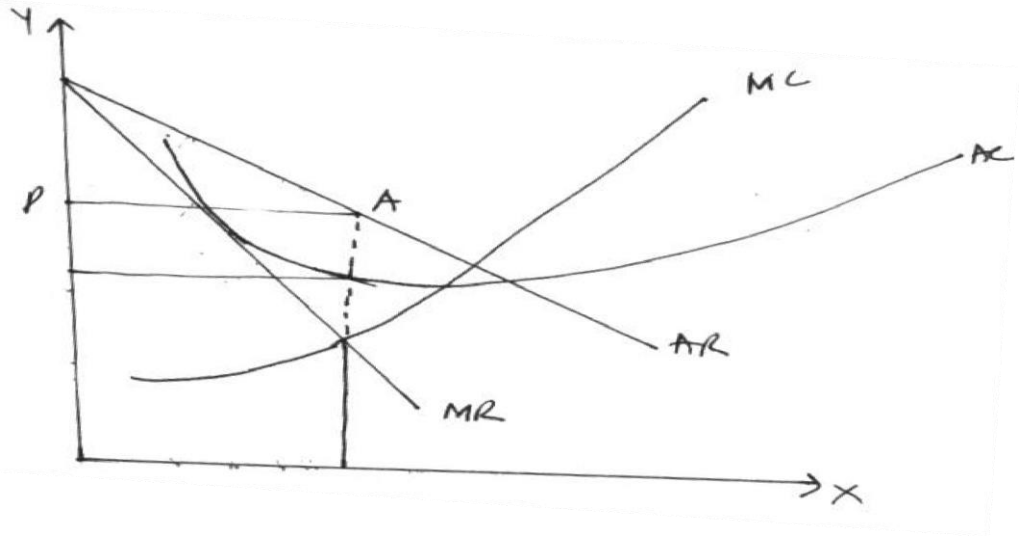
In perfect competitive market the difference between price and marginal cost at equilibrium point is zero. So the monopoly power is also zero, but in monopoly price may be more than marginal cost at equilibrium point. As the price determined by the monopolist is more than the marginal cost as more is his monopoly power.

Elasticity of demand of a commodity is also determined the monopoly power of a monopolist. There is an inverse relationship between monopoly power and elasticity of demand of a good.

$$\text{Monopoly power} = \frac{P - MC}{P}$$

P = AR at equilibrium point

MC will be equal to MR i.e. MC = MR



Monopoly power = $\frac{AR - MR}{AR}$

$E_p = \frac{AR}{AR-MR}$

$E_p (AR – MR) = AR$

$E_pAR-AR = E_pMR$

$AR (E_p-1) = E_pMR$

$MR = \frac{AR (E_p-1)}{E_p}$

Now monopoly power = $\frac{AR - MR}{AR}$

After putting the value of MR

$M_p = \frac{AR - AR \frac{(E_p - 1)}{E_p}}{AR}$

$M_p = \frac{E_pAR - E_pAR + AR}{\frac{E_p}{AR}}$

$M_p = \frac{1}{E_p}$

9.3.4 Bain's Method to Measure the Monopoly Power

Prof. Bain measured monopoly power on the basis of difference between price and average cost. The difference between price and average cost is known as abnormal profit. More will be this difference more will be the abnormal profit and more will be the monopoly power.

In brief we can say that there is no appropriate method to measure the monopoly power. It is based on many factors as elasticity of demand, possibility of competition or the possibility of substitutions etc.

9.3.5 Monopoly and Price Discrimination

When a monopolist charges different prices from different consumers of the same product. Such a situation is described as a discriminating monopoly situation. For example Barbers who do hair cutting charges different prices from different clients. In the same way electricity department also charges different prices from industrialist and households.

9.3.5.1 Types of Price Discrimination

Price discrimination is of three types mainly-

1. **Discrimination of First Degree-** It is said to exist when the monopolist or the monopoly firm charges a separate price for each separate unit of the commodity from the same consumers of the product. Consumers are charged according to their demand functions. The maximum price they are willing to pay for each unit rather than doing without it. There is no consumer surplus here according to Joan Robinson this type of price discrimination is known as perfect price discrimination.

2. **Second Degree Price Discrimination**

In this discrimination consumption of a good is divided into various blocks, a separate price is charged from each separate block but for each block a uniform price is charged. This type of pricing rule is adopted by public utility concerns like electricity, telephones, waterworks, gas supplies etc.

3. Third Degree Discrimination- This is the most commonly observed discrimination. In this discrimination consumers are divided into various groups. According to their price elasticities and different prices are charged from different consumer groups. The market for a good is split into submarkets with differential prices charged from sub-markets.

9.3.5.2 Conditions of Price Discrimination

Price discrimination means to charge different prices from different consumers. But this is possible only when there prevail these conditions in the market.

1. There should be monopoly in the market.

2. Different markets.

For price discrimination it is necessary for the monopolist that he can differentiate the markets from each other. It is possible only when the commodities can not transferred from cheap market to costly market nor the buyers can go from cheap to costlier market.

3. Difference in Price Elasticity of Demand-

Price discrimination is possible only when the price elasticity of demand is different in different submarkets.

4. The expenditure on division and sub-division of markets should be minimum.

5. Recognition by law.

6. Commodity differentiation

7. Behaviour of the consumers.

9.3.5.3 When the Price Discrimination is Beneficial

Price discrimination is beneficial only when the price elasticity of demand is different in one market from other. If the price elasticity is equal in both the markets than the marginal revenue acquired from the commodity unit in both the markets will be same. So there will be no benefit to the monopolist. On the other hand if the price elasticity is different in two markets than the marginal revenue acquired from these two markets will be different than the monopolist will be profitable only when

he sells commodity in the market where he get more marginal revenue. We can explain it as-

$$MR = \frac{AR\ (E_p\text{-}1)}{E_p}$$

There are two markets i.e. market (A) and market (B). The AR in both the markets is equal to 10 E_p is 2 in market (A) and 5 in market B. Now the MR acquired by the monopolist in these two markets will be as-

Market (A)

$$MR = \frac{10\ (2 - 1)}{2} = 5/-$$

Market (B)

$$MR = \frac{10\ (5\text{-}1)}{5} = 8/-$$

The monopolist will be beneficial if he sells his products in market B. He should do it till the (MR) in both the markets does not become equal.

Determination of Price and Output under Price Discrimination

A monopolist adopts price discrimination so that he can increase his total revenue or profit. In this situation to maximise his profit a monopolist will continue its production till his MC = MR.

Let a monopolist sell his production in two different markets, where the price elasticity of demand is different. Now the monopolist will have to decide

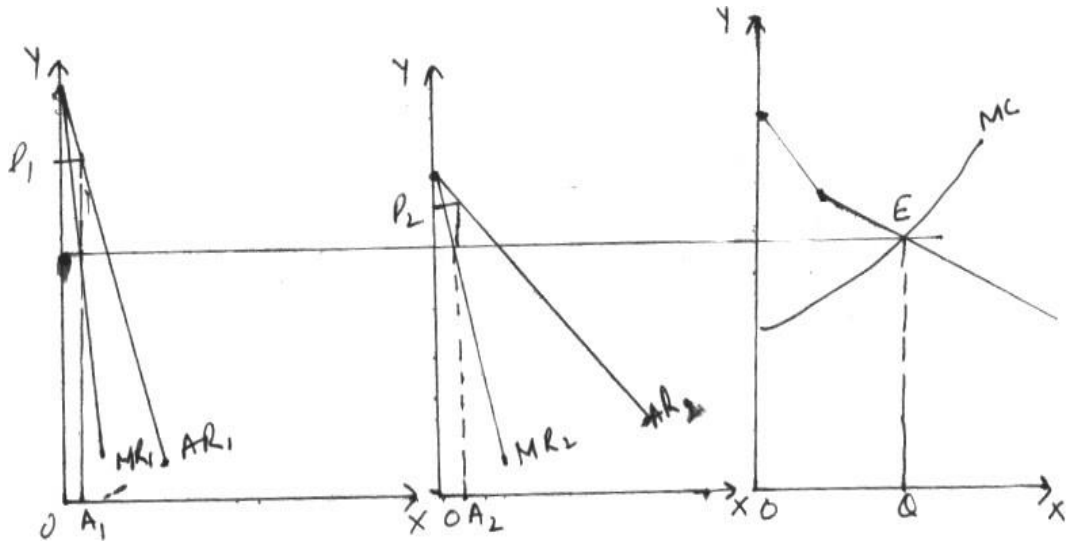
1. What will be his total production?
2. How many production will be sold in each market?
3. What will be the price at which he will get maximum profit?

To acquire maximum profit the monopolist has to follow following two conditions.

1. The marginal revenue of the commodity should be equal in both the markets. i.e. $MR_1 = MR_2$.
2. The marginal revenue acquired from each market should be equal to MC of total revenue.

i.e. $MR_1 = MR_2 = MC$

We can show it as under



In the above diagram it is seen that the revenue curves of market A are less elastic than the revenue curves of the market B. Point N is the equilibrium point of the monopolist at this point the marginal cost of the total production is equal to MR. The total production of the monopolist is equal to OQ. The monopolist will divide this production into two markets. He will divide this production on the basis of equality of MR of each market to the marginal cost of the total production. The monopolist will get maximum profit if he sells OQ_1 amount of production in market A at price OP_1 and OQ_2 amount of production in market B at price OP_2 and the total output is

$OQ = OQ_1 + OQ_2$

9.3.5.4 Social Effects of Price Discrimination

Price discrimination is both beneficial and harmful for society.

Beneficial Effects of Price Discrimination

1. Beneficial for the Backward Section of the Society- If the price of a commodity is decided low so that the backward section of the society can also

consume it and the losses which are beared so are be compensated by charging high price from the rich people than the price discrimination will be beneficial for the society.

2. Public Services- There are so many public services which can not be provided without price discrimination for example- Train services or electricity etc.

3. Total Utilization of the Factors of Production- With the help of price discrimination producers can sell their products in the foreign market and the factors of production of a country can be utilized perfectly in this way.

9.3.5.5 Harmful Effects of the Price Discrimination

1. Imperfect Utilization of the Sources of Production- In price discrimination factors of production are not fully utilized because the monopolist tempts to produce luxury goods as price discrimination is easily possible in luxury goods. The necessary goods are produced less and the poor people will have to face problem.

2. Low Production- The price discrimination is also harmful when the monopolist produces less to maximise its profit and to charge high price.

Dumping- Dumping is a special type of price discrimination here the monopolist sell its production on less price in the foreign market. In this situation these are two markets for the monopolist.

1. Home market
2. Foreign market

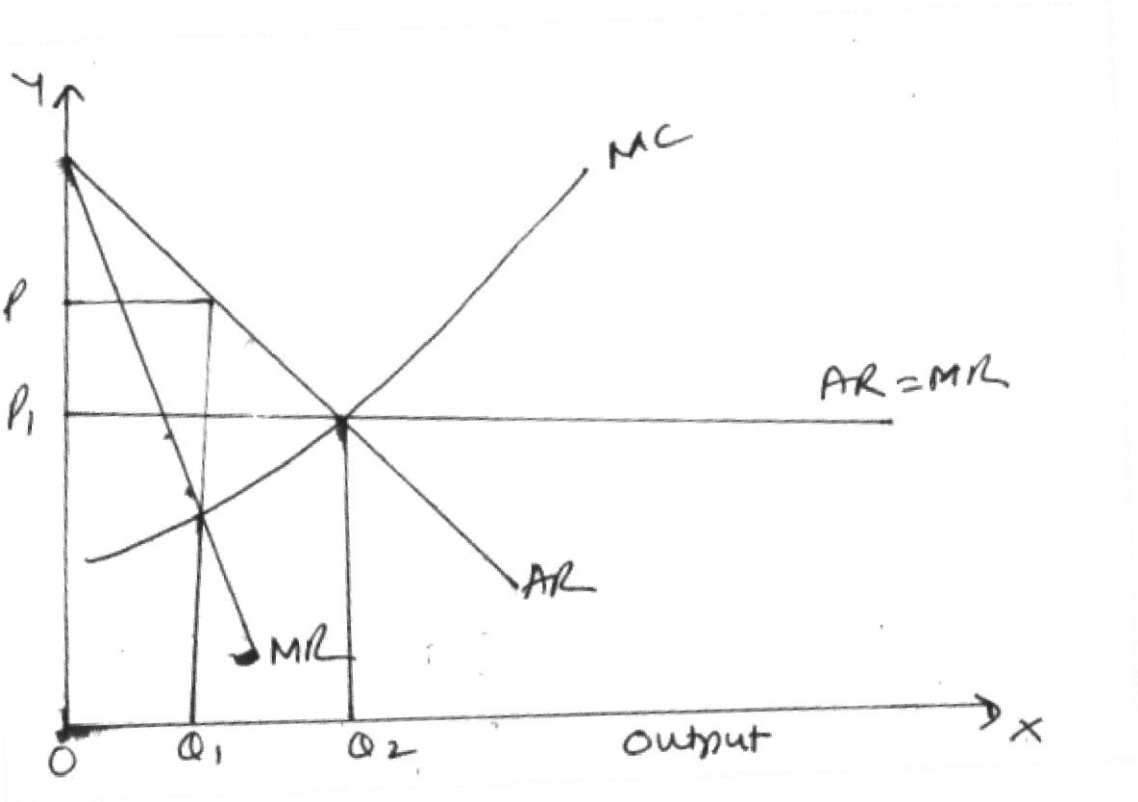
He will be perfect monopolist in the home market but in the foreign market he has to face perfect competition. So in the home market he charges high price and in foreign market he charges less price.

Motives of Dumping

1. To destroy the competitors in the foreign market.
2. To get benefits of increasing returns.
3. To increase the demand of the commodity in the foreign market.
4. To dispose the extra storage of the commodity.

5. To acquire the benefit of difference in elasticities in demand.

Determination of Price and Output during Dumping: In the foreign market there is perfect competition and the monopolist will sell OQ_1



Production on price P_1 and in the home market he is monopolist he is selling OQ production on price OP, which is more than OP_1.

9.4 CHECK YOUR PROGRESS

Answer the following questions on the basis of your knowledge regarding this chapter:

1- In which market form are there no close substitutes of the product?

2- Under which market form, a firm is a price-taker?

3- In which market form can a firm not influence the price of the product?
4- How many firms are there in a monopoly market?
5- In which market form, are there restrictions on the entry of new firms?

9.5 SUMMARY

Markets are focal point for economic activity as it plays important role in pricing and allocating resources in a competitive economy. A market is a group of economic agents (individuals/or firms) that interact with each other in a buyer-seller relationship. This interaction results in transactions between the demand (buyer) side of the market and the supply side of the market. The determination of output and the price of a commodity in a market depend upon the number of buyers, sellers and the characteristics of the product which are also the determinants of market structure. Further, equilibrium in market is also based on the large number of factors discussed in this chapter. This theoretical knowledge regarding market is necessary whether it is practically used or not. Like, we mostly observe perfect competition in the market but still knowledge regarding monopoly, monopolistic, dumping, transfer pricing, etc. is necessary.

9.6 KEYWORD

Industry: In the perfect competitive market there are so many firms which produce homogeneous product. The group of these firms is known as industry.

Marginal Revenue: The change in total revenue due to addition of revenue by selling one more unit by a firm is known as the marginal revenue.

Equilibrium conditions: Marginal revenue should be equal to marginal cost is the necessary condition for a firm's equilibrium but not the sufficient condition. So the second condition of the firm's equilibrium is that the marginal cost (MC) curve

should cut the marginal revenue (MR) curve from below. Because it may be possible that at the point where MR = MC firm is not acquiring maximum profit

Monopoly- It is a market where there is only one producer of a good or services. There is also no substitute of the good or service.

Discrimination of First Degree- It is said to exist when the monopolist or the monopoly firm charges a separate price for each separate unit of the commodity from the same consumers of the product.

Second Degree Price Discrimination: In this discrimination consumption of a good is divided into various blocks, a separate price is charged from each separate block but for each block a uniform price is charged.

Third Degree Discrimination- This is the most commonly observed discrimination. In this discrimination consumers are divided into various groups. According to their price elasticities and different prices are charged from different consumer groups.

9.7 SELF-ASSESSMENT TEST

1. State and show in diagrams the conditions of long-run equilibrium of the firm and industry under perfect competition.
2. "No producer can be in equilibrium unless his marginal revenue and marginal cost are equal". Comment on this.
3. Explain with the help of a diagram price is determined in a perfectly competitive market.
4. How does a monopolist fix the price of the product? Is it inevitable that the monopoly price is higher than the competitive price?
5. Explain discriminatory pricing under monopoly. Is price discrimination economically justifiable?
6. What conditions must be present for price discrimination to be possible under monopoly? Under what circumstances might price discrimination be possible, but not profitable?

7. What is meant by ‘the degree of monopoly power’? How is it sought to be measured?
8. State and appraise the various criteria to measure the ‘degree of monopoly power’.

: Managerial Economics, McGraw

PRICE DETERMINATION: MONOPOLISTIC COMPETITION AND OLIGOPOLY

Structure

10.0 LEARNING OBJECTIVES

After reading this chapter you will be able to understand the concept of monopolistic market and oligopoly market. We will discuss about price determination and equilibrium in both the markets. This chapter will provide you deep understanding of these markets and their characteristics.

10.1 INTRODUCTION MONOPOLISTIC COMPETITION

We have studied about perfect competitive and monopoly markets in previous chapters but these markets hardly exist in real world. In the economic world the firms are taking benefits of internal economies of scale. In the perfect competitive market it is not possible to achieve the benefits of internal economies of scale. So it is a great need to take the price theory close to the real world.

The monopolistic market is a market which prevails in between the both markets i.e. between perfect competitive and monopoly, and has the elements both the markets. In this market there are large numbers of firms which are selling close substitutes of each other. The individual revenue curves in this market are downward slopes like monopoly market but are more elastic than it. According to Prof. Chemberlin monopolistic competitive market is a blending of the elements of perfect competition and monopoly.

10.1.1 Characteristics of Monopolistic Competition

1. Large number of sellers.
2. Product differentiation.

3. No entry ban with product differentiation.
4. Importance of selling costs.
5. Group behaviour.
6. There is no difference in firm and industry in this market.

10.2 PRICE-OUTPUT EQUILIBRIUM OF A FIRM UNDER MONOPOLISTIC COMPETITION

A monopolistic firm faces more problems than a perfect competitive market. The equilibrium of a monopolistic firm depends upon three areas or we can say that in this market the firm has to take following three decisions.

1. Price decision.
2. about the production quantity.
3. Advertisement costs.

But here we are explaining the equilibrium of a monopolistic firm in relation of its price and output keeping its production costs and advertisement costs constant.

10.2.1 Short run Equilibrium of a Monopolistic Firm

The individual demands curve of a monopolistic firm slopes downward. Although different firms in this market produces close substitutes of each other. The position, level and elasticity of demand faced by a firm depends upon the availability of substitutes and their prices, so in this market the equilibrium of an individual firm can not be explained separately. But for convenience we suppose that the availability of substitutes and their prices are constant. If we take the types and prices of substitute's constant than the firms under monopolistic competition face an identical downward sloping demand curves. Although monopolistic competition is characteristically close to perfect competition, pricing and output decisions under this kind of market are similar to those under monopoly. The reason is that a firm under monopolistic competition, like a monopolist, faces a downward sloping demand curve. This kind of demand curve is the result of (i) a strong preference of a

section of consumers for the product and (ii) the quasi-monopoly of the seller over the supply. The strong preference or brand loyalty of the consumers gives the seller an opportunity to raise the price and yet retain some customers.

The conditions of equilibrium in this market are as under:

1. The marginal cost of the firm should be equal to its marginal revenue.
2. Marginal cost curve should cut marginal revenue curve from below.

The firm may be in three positions under equilibrium in the short-run.

Abnormal Profit- As shown in the figure-1 given the prices and types of the substitutes DD is the demand curve of an individual firm. AC is the average cost curve and MC is the marginal cost curve of it. E is the equilibrium point of the firm where MC cuts MR from below. OM is firms equilibrium output and its price cost is equal to OP at the equilibrium point firm is taking abnormal profit equal to PQRS. Because at equilibrium point the price determined by the firm is more than its average cost.

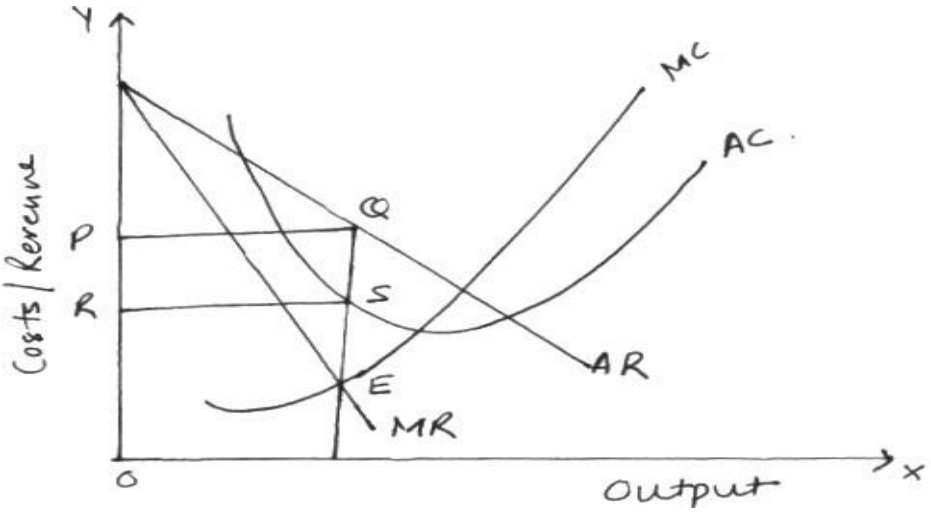
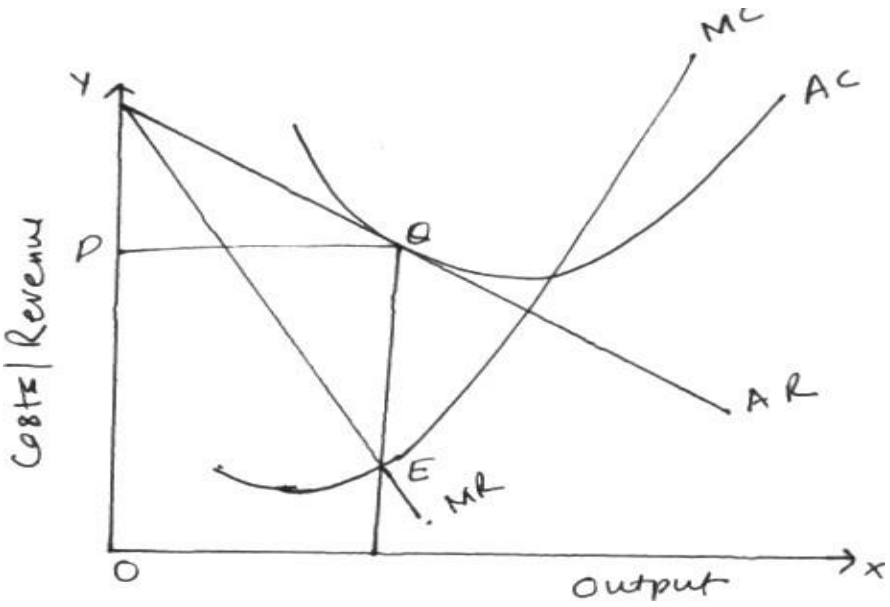


Fig.-1

(a) Normal profit- The firm will get normal profit in the short run when the equilibrium price determined by it is equal to its average cost as shown in the figure-2



(c) Minimum Losses- If the demand conditions of the firm are not good in comparison to cost conditions then in the short run the firm may have to bear losses also. But the firm will bear equal to its fixed costs only. If the price or average revenue which the firm gets is less than its AVC than the firm will stop production.

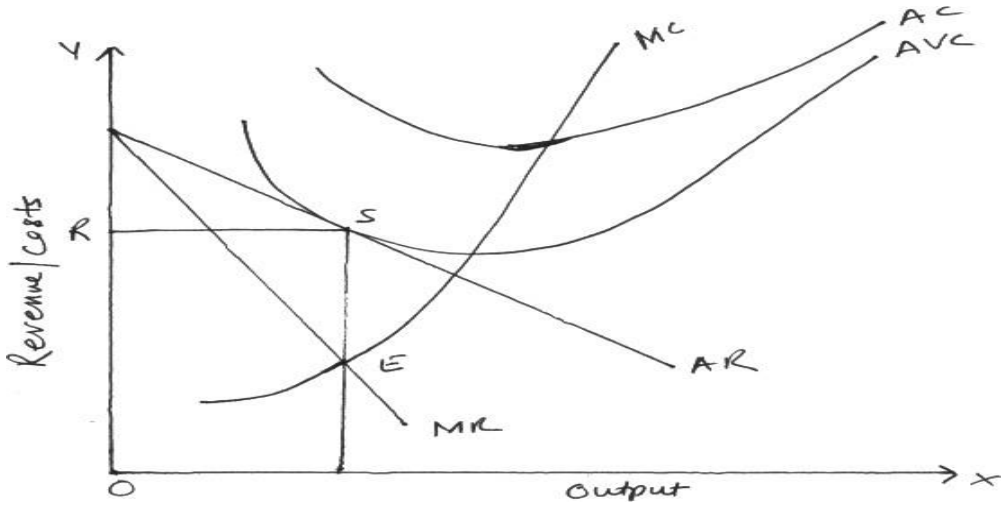


Fig.-3

In the above Fig.-3 E is the equilibrium point of the firm, where price is equal to AVC of the firm and the firm bears losses equal to RSPQ which are the minimum losses of the firm because below this price the firm will stop its production.

10.2.2 Long run Equilibrium under Monopolistic Competition

Interdependence is the main characteristic of the monopolistic competitive firms. Now the problem is to know the nature of interdependence and inter-relationships between the firms of a monopolistic group. In the long-run as the number of firms is very large and there is free entry abnormal profits cannot be earned by any firm, which is possible only when AR=AC, along with MR=MC. But the situation is not exactly the same as that under perfect competition. Let us first consider, and distinguish between two types of demand curves. In perfect competition we have the negatively sloped industry demand curve and the horizontal demand curve facing each seller. In the theory of monopolistic competition also there are two types of demand curves, as shown in the figure-4

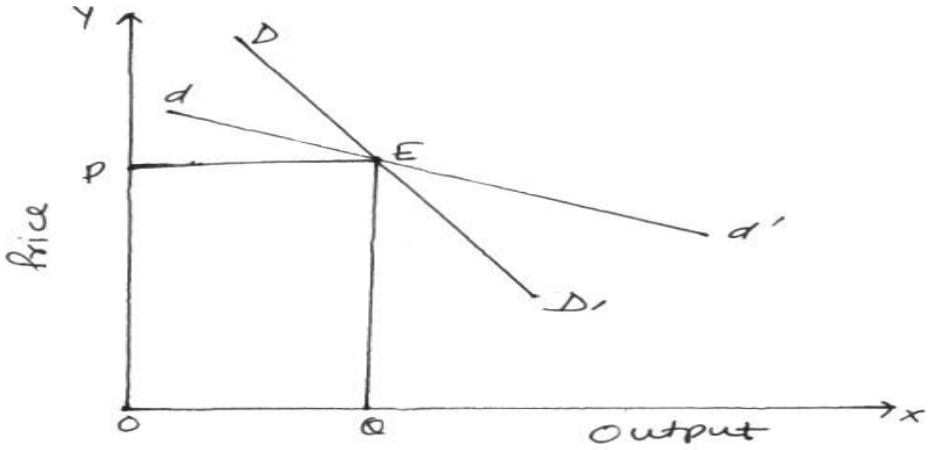


Fig.- 4

Initially the firm is at point E, with output OQ and price OP per unit. In case of large-group with differentiated product, if the producer wants to reduce price from OP, he will expect a substantial expansion in sales. First, sales to his existing customers will expand and, secondly, if his competitors do not react (do not reduce price), he will capture a part of their markets. On the other hand, if he increases his price he can expect a substantial loss in sales, as his competitors may not follow him (increase price). Consequently, assuming such a large number of sellers in the market that each expects his actions to go unnoticed by his rivals, every producer expect his demand curve to be very elastic. The producer's expected or anticipated demand curve is shown by the relatively elastic curve.

If every producer under monopolistic competition thinks individually this way and reduces his price (on the assumption that none of his rivals will react) and, therefore, if all the prices are reduced simultaneously, each producer will gain only that increment in sales attributable to the general price reduction. He will not be able to capture portions of his rivals' markets. Thus the "group-effect" or "group-behaviour" will give the actual, less elastic, demand curve DD' to the firm. The DD' curve shows the actual sales to be gained or lost when all firms change price simultaneously.

The long-run equilibrium of the firm in the context of the whole "group" of firms may be discussed under two sets of assumptions: (a) when fresh entry into the group is not necessary, and (b) when entry is permitted. Meanwhile, in order to make the analysis simple, some heroic assumptions have been made. We know that in monopolistic competition there is heterogeneity of prices and variations over a wide range in outputs and in profits. Many such variations are temporary, but many persist for a long time. It defies comprehensive description as a "group" problem. In other words, as Chamberlin says: "Imperfection of competition is not uniform. It is not imperfect knowledge or immobility of production factors here. But here, the differentiation of product is not uniformly spaced." He further observes: "We, therefore, proceed under the heroic assumption that both supply and demand curves for all the products are uniform throughout the group. The product is different. Only that consumers' preferences be evenly distributed among the different varieties, and that differences between them be not such as to give rise to differences in cost."

As the number of producers is very large, it is further assumed that any adjustment of price or of product by a single producer spreads its influence over so many of his competitors that the impact felt by any one is negligible and does not lead him to any readjustment of his own situation.

In the long-run due to external economies and diseconomies, costs of firms may decrease or increase. Chamberlin has assumed constant costs, for two reasons: (a) the theory in this form is widely applicable to facts, and (b) where it is not applicable, its extension to cover cases of increasing and decreasing costs for the group is easily made.

10.2.3 Long runs Equilibrium with Entry Closed

Figure-5 represents the long run equilibrium of the group under monopolistic competition on the assumption that no new firm can enter the group. Adjustment of long run equilibrium start from point A where dd and DD curves intersect each other

so that Q_1A is the short run

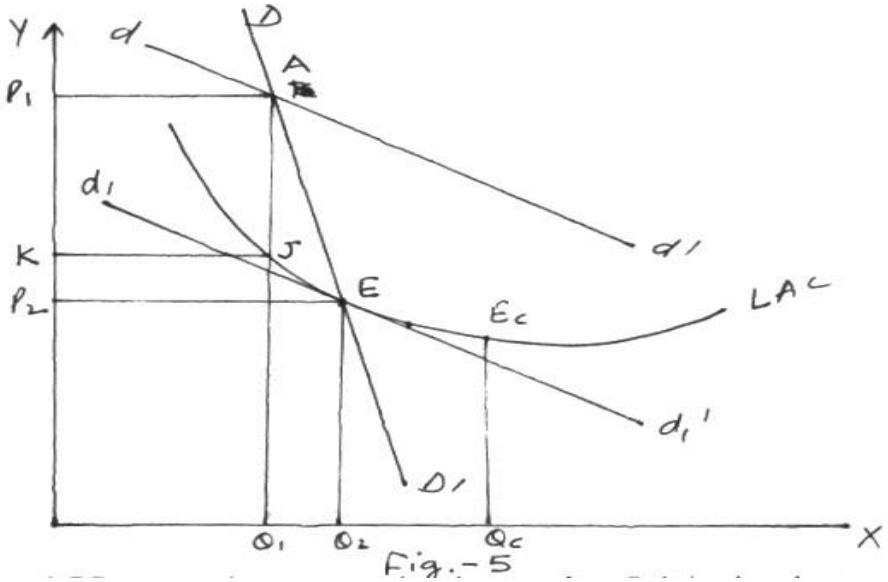


Fig.-5

equilibrium price level at which each firm sells OQ_1 quantities of the product and short-run total profit is represented by rectangle P_1AJK. Every producer, regarding dd' as his demand curve, believes he can increase his total profit by reducing price and expanding output. But when others also think and do the same, this producer instead of expanding along dd', actually moves along DD'. Ultimately he comes to the point E on LAC, below which only losses are incurred. At E his expected demand curve is d_1d_1'. The position of long-run equilibrium is E, where the d1d1' curve is tangent to LAC. At this point there are no abnormal profits.

The position of DD' depends upon the number of producer-sellers in the field. It will lie further to the left if there are more of them, since the share of each in the total will then be smaller; and further to the right if there are fewer of them. It is drawn through E, the point of tangency of dd' (dashed one) with LAC curve, since the number of producer-sellers is assumed to be that consistent with the final equilibrium adjustment.

10.2.4 Long-Run Equilibrium when Entry Permitted

It is given in Figure-6. In this case before the existence of profits induces the existing firms to expand, new firms selling slightly differentiated products enter this product group. The greater variety of available products causes the demand for each seller's product to contract. In the process DD' shifts to the left and becomes tangent to LAC at A through which passes the producer's expected dd' curve. Though at G (with output OQ_1 and price OP_1) all profits are eliminated, if one typical firm increases output along its dd' curve, it can make profits. But, as we have seen, when all the producers do the same, the dd' slides down the instantaneously existing DD'.

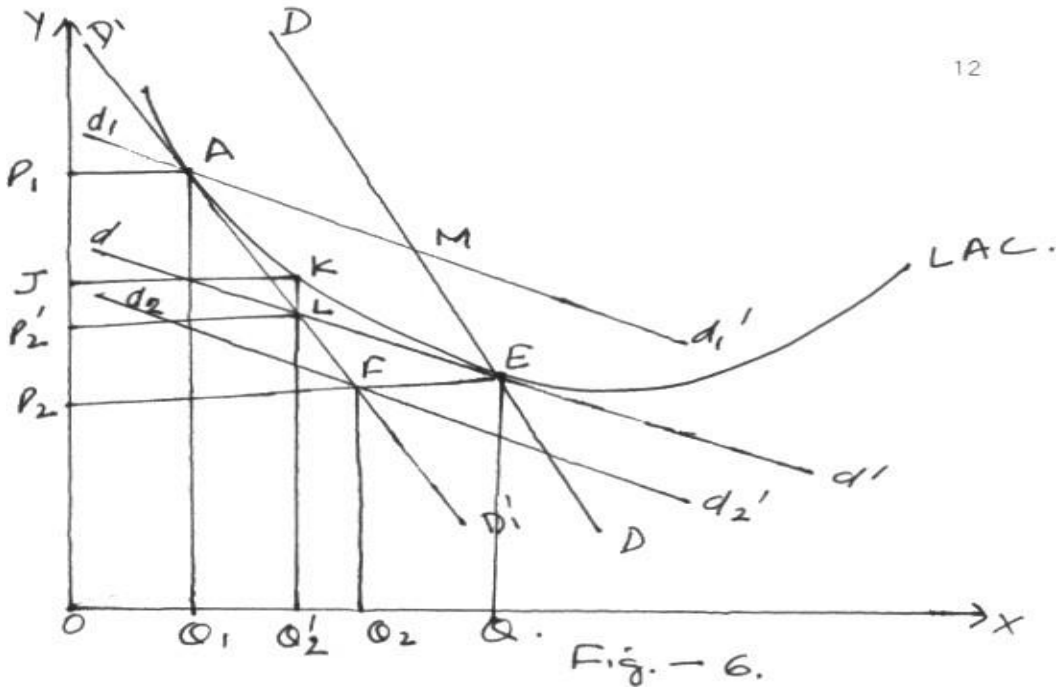


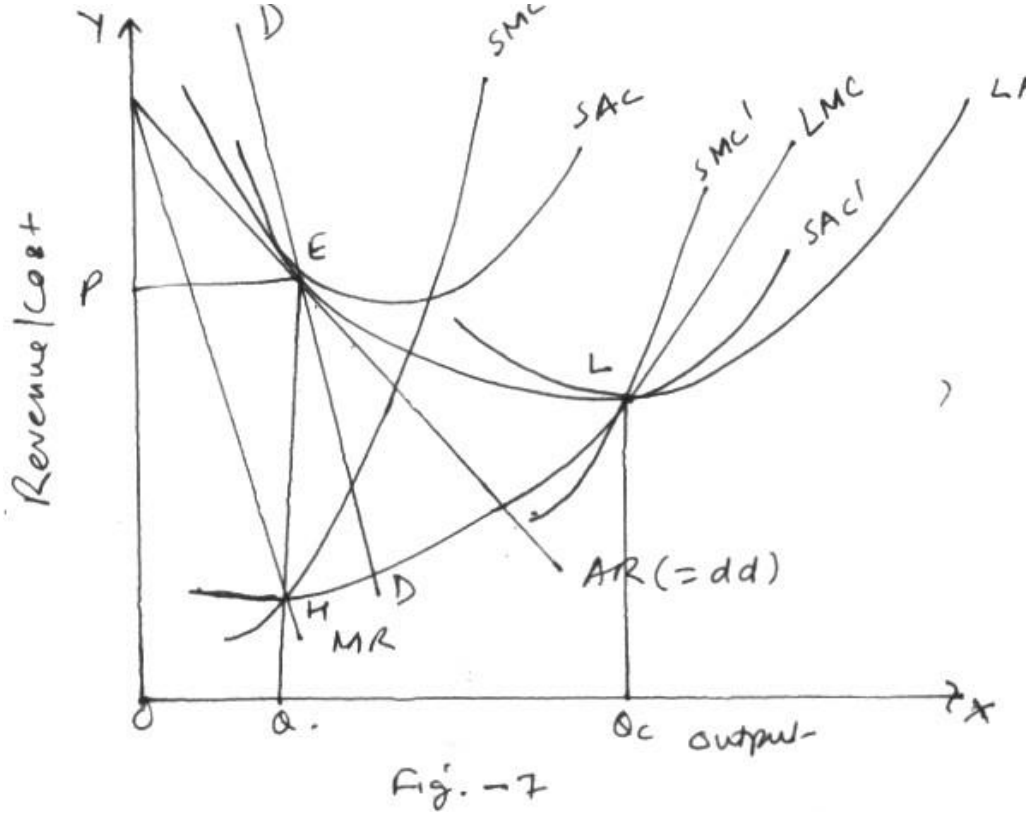
Fig. – 6.

The transition from the initial DD' to D_1D_1', as new firms enter, and finally to the ultimate long-run equilibrium point at E is long, and can come about in a number of ways. When the producer comes to point A on D_1 D_1' (with output $0Q_2$) the total loss is shown by rectangle $JKLP_2$. However, if he can still travel along its imagined dd' curve passing through M, he can hope to reach E on LAC and eliminate the losses altogether (with output OQ_E and price OP_2). But as his rivals also act in the

same fashion, he further stumbles down along D_1 D_1' to point F: here his output will be OQ_2 and price OP_2. But the situation is unstable.

Now, even when he can hope to travel along his expected demand curve $d_2d'_2$ passing through F, there are losses. Ultimately some firms must leave the group. As marginal firms leave the group the proportional demand curve DD shifts to the right, together with the anticipated individual demand curve. The exit of firms must continue until the DD curve is DD' and the anticipated curve dd'. The long-run equilibrium is attained at E.

Equilibrium, then, is defined, by two conditions: (a) dd' must be tangent to LAC, (b) DD' must intersect both dd' and LAC at the point of tangency. The final equilibrium point, with all the relevant curves, is shown as under



10.3 PRICE DETERMINATION UNDER OLIGOPOLY

Oligopoly is an important type of imperfect competition. Oligopoly is a market position where the producers or sellers of the good are few and having strong rivalry. So it is also called many times as competition among the few. Although the number of firms in the oligopoly is not certain but if the number of firms is more than two and equal to or less than ten than it is known as oligopoly. When all the firms in the oligopoly are producing homogenous product than it is known as oligopoly without product differentiation. If the product of the firms are different than it is known as oligopoly with product differentiation.

10.3.1 Characteristics of Oligopoly

1. **Interdependence-** Interdependence in decision making is the main characteristics of oligopoly. Because the number of firms in this market is small so the changes done by a firm in production and prices etc. will putt exert pressure on the price and production policies of the competitors.
2. **Importance of advertising and selling costs-** The main effect of interdependence in oligopoly is seen when the firms has to use market saving weapons to save their existing market share or to increase it. For this the different firms have to bear many selling costs as advertising cost.
3. **Group behaviour-** The oligopoly theory is not a theory of an individual and not a theory of large number of individuals but it is a group behaviour theory and the assumption that firms want to maximize their profit is not so fit for oligopoly market. The numbers of firms in a group are few and all of them are interdependent on each other. At present there is no general accepted theory to explain group behaviour. We have to face numbers of questions while understanding group behaviour such as whether the different members of the group cooperate to each other to achieve common benefits or otherwise they compete to each other for their personnel benefits? Is there

any leader of the group? If there is any leader then how he prepares others to follow him, etc.

10.3.2 Indeterminateness of Demand curve facing by an Oligopolistic

The demand curve which is faced by the oligopolist is not certain. The demand curve tells how many goods or commodities a firm can sell at different prices. The demand curve faced by the firm in perfect competition, monopoly and in monopolistic competition is certain but in the oligopoly market due to interdependence the position is different. An oligopolist firm can not assume that the rivals will not change their prices when the firm itself will change its price and production policy so his demand curve becomes uncertain because it depends upon the uncertain behaviour of the competitors under different circumstances.

10.3.3 Price and Output Determination under Oligopoly

There is no specific formula to determine the price and output in oligopoly market. The economist has developed various models on the basis of various assumptions to explain price and output determination under oligopoly. Some of them are as-

10.3.3.1 Price Leadership- It is impossible to decide price independently in oligopoly market. In specific industries the oligopolist takes collective decisions on the basis of written guidelines decided by them or either on the basis of their oral commitments. One example of their oral commitment is price leadership.

In price leaderships, firms take collective decisions without any specific agency to control the activities of the different firms. In this way they are also able to save them from the penalties they have to bear to break anti-trust laws which are imposed by the government. Price leadership may of many types-

Dominant Firm Price Leadership- In this leadership model a dominant firm captures a large share of the market and the other firms are so small that they can not change market conditions or environment by themselves. So the dominant firm decides the price of the good at which its profit becomes maximum according to its

demand curve and the other firms will have to accept this price and should decide their production according to that price.

To determine price and output we assume here that-

(a) The dominant firm has the full knowledge of the market demand of the commodity.

(b) The dominant firm also knows the marginal cost (MC) curves of the small firms by the lateral summation of which the demand of the small firms can be known at different prices.

On the basis of above assumptions the dominant firm can estimate about the quantity supplied by the small firms and also know about its own demands.

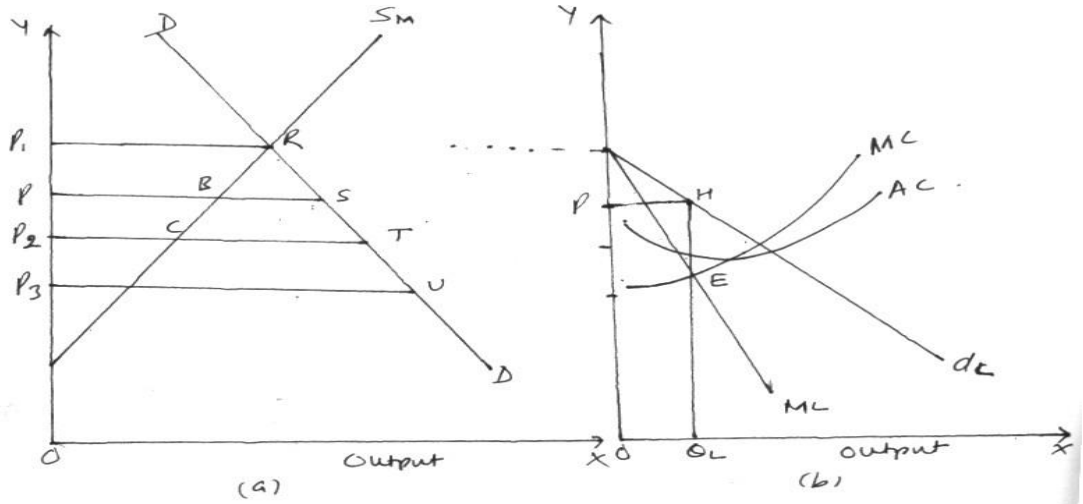


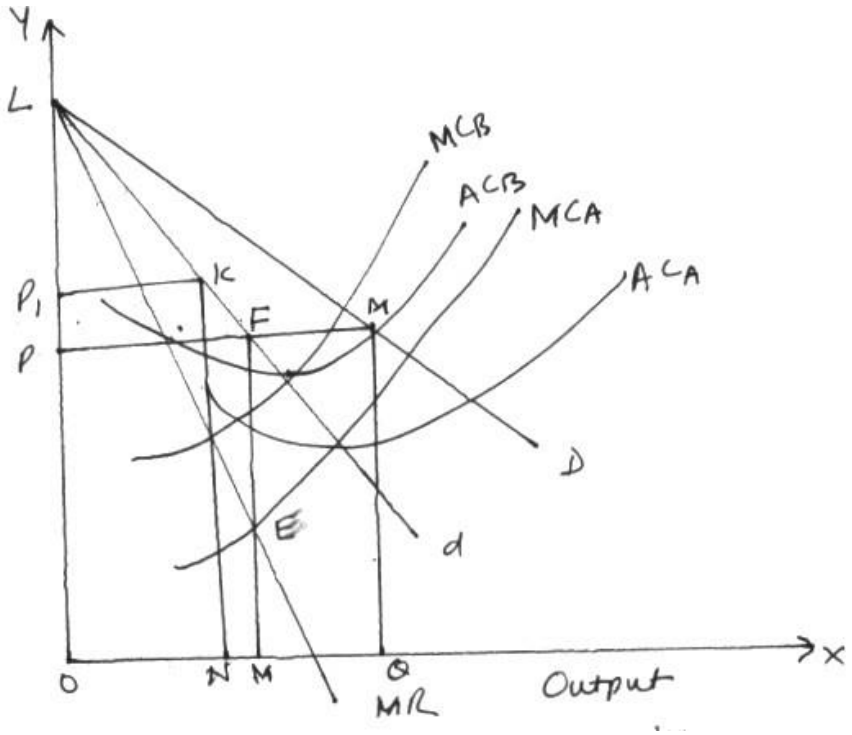
Fig.—8

Above fig-8 shows that at price P_1 the small firms are supplying P_1R amount of the commodity produced. So on price P_1 the demand of the dominant firm is zero. At price P the small firms are supplying equal to PB and the total demand of the market is equal to PS so the dominant firm can supply equal to BS amount at this price. At price P_2 the small firms will supply equal to P_2C and the dominant firm will supply equal to CT and at price P_3 the small firms will supply amount equal to (zero). With market demand (DD) of the commodity at different prices and the supply (S_M)

supplied by small firms the demand curve d_L of the dominant firm can be drawn as in fig-8(b).

In fig.-8(b) d_L is the average demand curve and M_L is the marginal demand curve of the dominant firm. AC and MC are its average and marginal cost curves. The dominant firm will produce OQ output at price OP because at this output the dominant firm is acquiring maximum profit. At this price all the small firms collectively will supply PB amount of the commodity.

10.3.3.2 Price Output Determination under Price Leadership to Lower Cost



It is given in figure -9 which is based on assumptions as under

1. There are two firms A and B. The production cost of firm A is less than firm B.

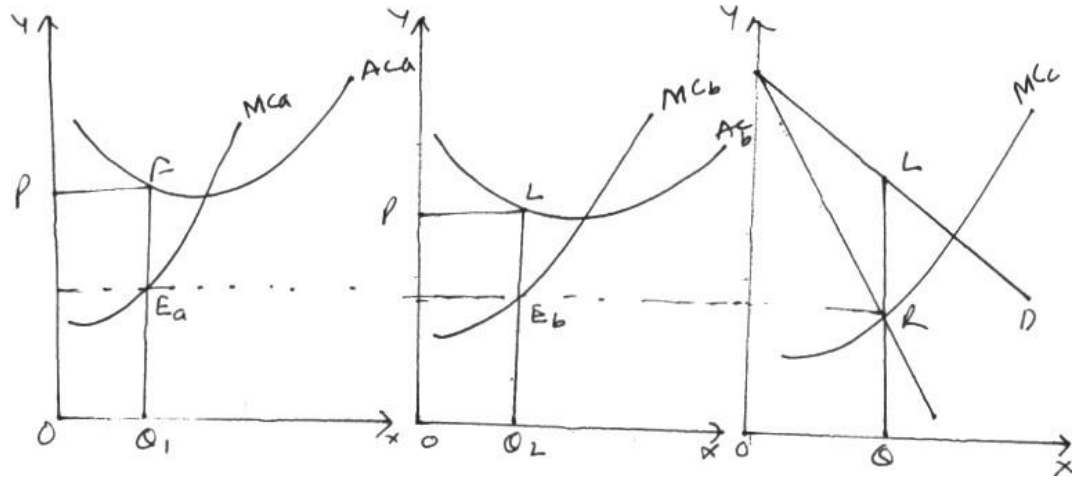
2. Goods produced by both the firms are same so there is no preference in the mind of consumers.
3. Both the firms have equal share in the market. So in the above diagram each firm has demand curve dd which is equal to half of the market demand curve i.e. LD. MR is the marginal revenue curve of each firm. In the equilibrium position firm A will produce OM quantity of the good and determines price equal to OP. But the firm B will be in equilibrium when it produces quantity equal to ON at this position the price will be equal to OH. From the diagram it is clear that the price (OP) on which the firm A is getting maximum profit is less than the price (OH) at which the firm B is getting maximum profit. Because both the firms are producing homogenous product so cannot charge different prices. So the firm B has to determine or fix its price equal to OP in the other words firm A will be the price leader and the firm B will be price follower.

10.3.4 Collusive Oligopoly- When all the oligopolists make a formal agreement about price and output then it is said that they have formed collusive oligopoly. At first the cartel word is used for those agreements where a common selling agency is elected to so the selling activities of all the firms. The chief motive of cartel is to stop competition among the firms. So in many countries rules are framed to stop these.

The collusive oligopoly can take many forms. But its highest position and where when all the partner firms give the wake of their all price and production decisions to a common administrative agency. This type of collusive oligopoly is known as perfect cartel.

In the perfect cartel the central officer decides about the different partners of the cartel. All the profits of the industry are divided among the partners on the basis of the pre-defined rules and not on the basis of their production shares.

To know how the cartel works it is assumed that two firms make a cartel on the basis of a formal agreement. It is also assumed that the motive of the cartel is to acquire the maximum joint profit for the firms. First of all the cartel estimates the demand curve of the industry. The demand curve which the cartel faces will be the total demand curve of the consumers. It is equal to DD in the figure-10. The marginal revenue curve which is equal to MR in the diagram is telling about the increase in the revenue of the cartel due to a small increase in the sale of the cartel. The marginal cost curve of the cartel (MC_{a+b}= MC_a+MC_b) is acquired by the horizontal summation of the marginal cost curves of both the firms.



To maximise the industries profit the cartel will fix the industries profit where the (MR) of the cartel will cut its (MC) in the above diagram both of these curves are cut to each other at point R at this point the top total production is equal to OQ and the price is equal to OP. After knowing the total production of the industry the cartel will have to divide this production among different forms of the industry. This can be done by stretching a straight line from point R towards Y-axis. From the above diagram it can be seen that when firm A produces OQ_1 and firm B produces OQ_2

quantity then the cost of both the firms is equal. So the production quota of the firm A and B will be equal to OQ_1 and OQ_2 and

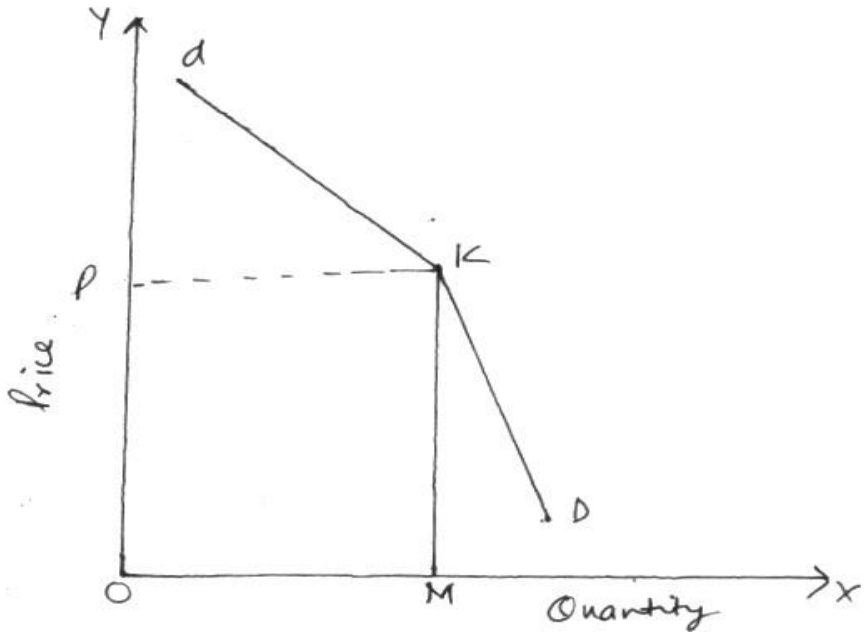
$OQ = OQ_1 + OQ_2$.

10.3.5 Kinked Demand Curve Oligopoly Theory and Price Rigidity

Generally it is observed that the oligopoly industries shows price rigidity i.e. oligopolist do not want to change their price even after the change in the economic conditions. The kinked demand curve theory is propounded by P.M. Sweezy and Hall and Hitch. This theory tells us only about the rigidity of the price in oligopoly markets after price determination, it does not tell us about the determination of price under these markets.

According to this theory there is a kink in the demand curve which is faced by the oligopolist at present price.

The kink in the demand curve is found at the present price because the part of the curve which is above the present price is more elastic and part of the curve which is below this price is less elastic or inelastic.



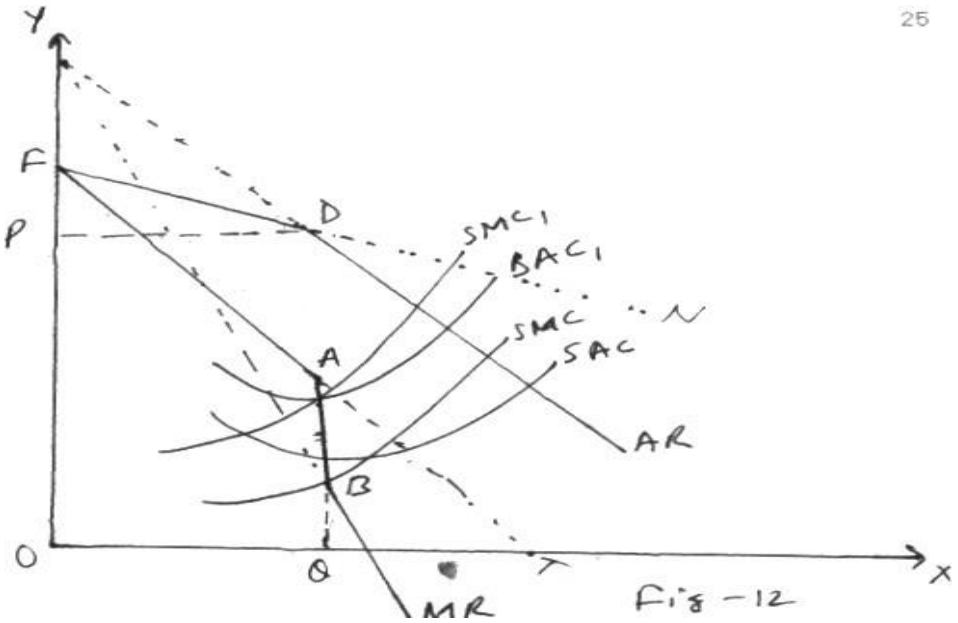
In the above diagram dD is the kinked demand curve. It is kinked at the point k. where firm is producing OM output at price OP. The upper part dk of the demand curve is more elastic than lower part kD. The reason of it is the special relation pattern assumed in this theory which is as-

Each oligopolist believes that if he lowers the price below the prevailing level, his competitors will follow him and will accordingly lower their prices, whereas if he raises the price above the prevailing level, his competitors will not follow his increase in price.

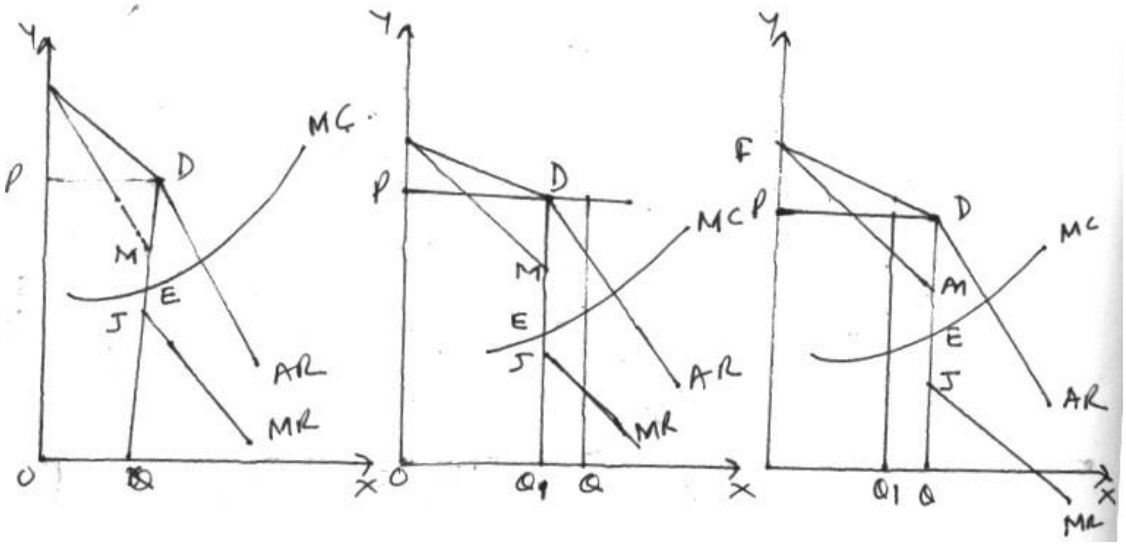
On the basis of above analysis it is easy to understand that why an oligopolist who is facing kinked demand curve is rigid about the change in price. Because in the same way after increasing the price above this level he can not increase his revenue due to so much fall of in his demand. On the basis of above analysis it is easy to understand that why an oligopolist who is facing kinked demand curve is rigid about the change in price.

The kinky demand curve has important implications for the MR curve of the firm; it is FABC and is discontinuous at the output OQ. This is due to a sudden change in the elasticity of AR curve at point D. As the MR==P (1-1/e), it drops sharply at output OQ.

One important reason for a fairly rigid price policy on the part of individual firms of the industry now becomes apparent. Even if the MC curve goes up or down, so long as it cuts the discontinuous MR curve, AB, the output and the price will not change. Thus, there is enough room for the cost curves to shift up or down without affecting the oligopolies' profit-maximizing price and output.



Even if the costs are constant, but demand conditions change, the price may be rigid at the price UP, though now output may vary. Such variations in output 'with a kink at price OP are shown in figure-13



10.4 CHECK YOUR PROGRESS

Answer the following questions on the basis of your knowledge regarding this chapter:

1. At which price demand and supply equate to each other?
2. A group of large number of firms which explicitly and openly agree to work together is called?
3. In which market form are products differentiated?
4. Where an attempt is made to persuade a consumer to buy products of the firm?
5. The minimum profit which a firm must earn to continue to remain in business.

10.5 SUMMARY

The *monopolistic market* is a market which prevails in between the both markets i.e. between perfect competitive and monopoly, and has the elements both the markets. In this market there are large numbers of firms which are selling close substitutes of each other. Monopolistic firm, like a monopolist, faces a *downward sloping demand curve*. This kind of demand curve is the result of (i) a strong preference of a section of consumers for the product and (ii) the quasi-monopoly of the seller over the supply. The strong preference or brand loyalty of the consumers gives the seller an opportunity to raise the price and yet retain some customers. *Oligopoly* is an important type of imperfect competition. Oligopoly is a market position where the producers or sellers of the good are few and having strong rivalry. An oligopolist firm can not assume that the rivals will not change their prices when the firm itself will change its price and production policy so *his demand curve becomes uncertain* because it depends upon the uncertain behaviour of the competitors under different circumstances. When all the oligopolists make a formal agreement about price and output then it is said that they have formed *collusive oligopoly*. Generally it is

observed that the oligopoly industries shows *price rigidity* i.e. oligopolist do not want to change their price even after the change in the economic conditions

10.6 KEYWORDS

Oligopoly - Oligopoly is a market position where the producers or sellers of the good are few and having strong rivalry. So it is also called many times as competition among the few.

Monopolistic Market- The monopolistic market is a market which prevails in between the both markets i.e. between perfect competitive and monopoly, and has the elements both the markets. In this market there are large numbers of firms which are selling close substitutes of each other.

Normal profit- The firm will get normal profit in the short run when the equilibrium price determined by it is equal to its average cost.

Collusive Oligopoly- When all the oligopolistic make a formal agreement about price and output then it is said that they have formed collusive oligopoly.

Dominant Firm Price Leadership- In this leadership model a dominant firm captures a large share of the market and the other firms are so small that they cannot change market conditions or environment by themselves.

10.7 SELF -ASSESSMENT TEST

1. Discuss and illustrate with diagrams the equilibrium of the firm and industry under monopolistic competition.
2. Evaluate critically Chamberlin's model of monopolistic competition.
3. Explain with diagrams the main characteristics of an oligopolistic market and equilibrium of a firm facing kinked demand curve.
4. Explain price and output determination under price leadership by a dominant firm.
5. Explain price determination under conditions of price leadership in an oligopolistic market.

nagerial Economics, McGraw

SALES MAXIMISATION

Structure

11.0 LEARNING OBJECTIVES

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

- Understand the sales maximisation aspect of oligopoly theory
- Differentiate sales maximisation theory from the previous theories of price and output determination
- Explain the Sales Maximisation model Without advertising
- Explain the Sales Maximisation Model with Advertising
- Explain the variation in the model due to changes in fixed cost and taxes
- Understand the significance and limitations of the model.

11.1 INTRODUCTION

Sales Maximisation model given by W.J.Bamoul an American Economist is another model of oligopoly. The model challenges the profit maximisation assumption regarding the business behaviour in the modern times. In corporate form of business organisation sales maximisation is more valid and realistic assumption than profit maximisation. This is more rational objective of any business organisation.Prof.Bamoul was of the opinion that business managers are more interested in maximising sales rather than profit.This chapter is related to explanation of above stated model.The chapter presents the price and output determination of firm as per assumptions of this model.

11.2 CONCEPT OF SALES MAXIMISATION MODEL

This model is based upon the objective of maximization of sales.Maximisation of sales does not mean maximization of physical volume of sales but it is maximisation of total revenue from sales,that is the rupee value of sales made.Therefore this model can be called as Revenue Maximisation Model.This model does not ignore profit motive altogether.The model states that there is always a minimum acceptable level of profits which must be earned by mnagement so as to finance the furture growth of the firm through retained profits and also to induce the potential shareholders for subscribinhg to share capital of the company.Thus as per this model management of oligopolistic firm

will always try to achieve maximum sales i.e. maximum total revenue subject to minimum profit constraint.

11.2.1 Sales Maximization Hypothesis

The sales maximization hypothesis or assumption as pronounced by Bamoul can be presented as below:

> *"My hypothesis then is that oligopolists typically seek to maximize their sales subject to minimum profit constraint. The determination of minimum just acceptable profit level is major analytical problem and I shall only suggest here that it is determined by long term long run considerations. Profits must be high enough to provide the retained earnings needed to finance current expansion plans and dividends sufficient to make future issue of stocks attractive to potential purchasers. In other words, the firm will aim for that stream of profits which allows for the financing of maximum long run sales. The business jargon for this is that management seeks to retain earnings in sufficient magnitude to take advantages of all reasonably safe opportunities for growth and to provide fair return to shareholders."*

ct to minimum profit constraint as the objective of business firms. By sales maximisation, Bamoul means maximisation of total revenue. It does not imply the sale of large quantities of output, but refers to the increase in money sales (in rupee, dollar, etc.). Sales can increase up to the point of profit maximisation where the marginal cost equals marginal revenue. If sales are increased beyond this point, money sales may increase at the expense of profits. But the oligopolistic firm wants its money sales to grow even though it earns minimum profits.

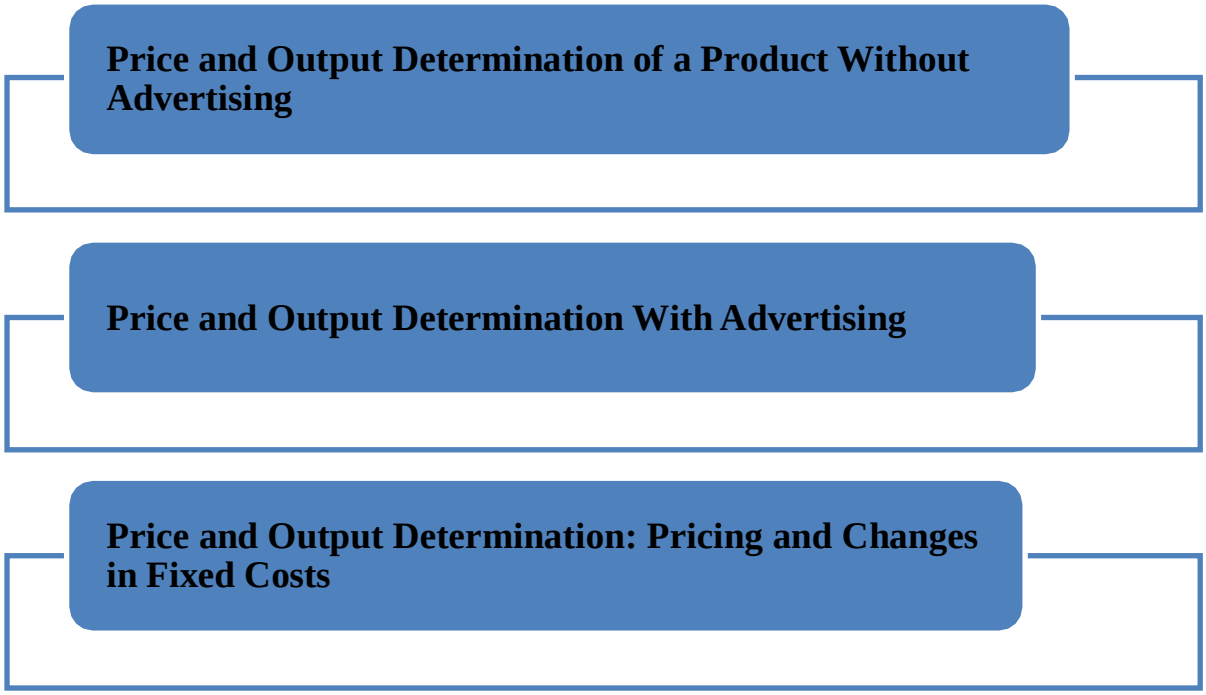
Minimum profits refer to the amount which is less than maximum profits. The minimum profits are determined on the basis of firm's need to maximize sales and also to sustain growth of sales. Minimum profits are required either in the form of retained earnings or new capital from the market.

The firm also needs minimum profits to finance future sales. Further, they are essential for a firm for paying dividends on share capital and for meeting other financial requirements. Thus minimum profits serve as a constraint on the maximisation of a firm's revenue. "Maximum revenue will be obtained only", according to Bamoul, "at an output at which the elasticity of demand is unity, i.e., at which marginal revenue is zero. This is

the condition which replaces the "marginal cost equals marginal revenue profit maximisation rule."

11.2.2 Price and Output Determination in Sales Maximisation Model

Price and output determination in sales maximization model can be explained in above two parts:



11.2.3 Price and Output Determination of a Product without Advertising

The first part of this model explains sales maximization of an oligopoly firm in case when a firm produces a single product and does not undertake any expenditure on advertising and other promotional activities. The assumptions in this are:

- Firm's time horizon is single period
- Firm seeks to maximize sales revenue subject to minimum profit constraint
- Price and output decision in the single period does not affect price and output in the subsequent period
- Minimum profit constraint is determined by demands and expectations of shareholders and financing institutions of a firm.

- The firm is oligopolistic firm. Its cost cures are U-shaped and the demand curve is downward sloping.
- The firm must achieve this minimum level of profits so as to satisfy shareholders and to prevent fall of prices in stock exchange.

  The empirical investigation of theory in America shows that firms follow sales maximization objective. There is separation of ownership and management and control of business is in hand of managers. Mangers seek higher salaries and rewards through higher sales. Revenue or sales maximization reveals the actual behavior of firm rather than profit maximization. The sales maximization is short run as well as long term objective of business firms. Most of the time short run revenue maximization leads to long term revenue maximization.

Arguments in Favor of objective of Sales Maximisation or Justification of objective of sales Maximisation:

- The firm attaches great importance to sales and is concerned about declining sales
- The firm with declining sales is not able to get funds from the market i.e. from bank, credit institutions and capital market.
- The firm with declining sales will not get good response from suppliers as well as distributors of product.
- The firm with declining sale will have low brand value and will not be popular among customers also.
- The firm with higher sales will be able to employee good quality qualified and experienced managers and staff.
- The firm with higher sales will enjoy economies of scale.
- The firm with good sales volume will be providing higher salaries, incentives and other benefits to its employees.

This part of the model can be explained with the help of graph 11.1.It shows that TC is the total cost curve, TR the total revenue curve, TP the total profit curve and MP the minimum profit or profit constraint line. The firm maximises its profits at OQ level of output corresponding to the highest point B on the TP curve. But the aim of the firm is to maximise its sales rather than profits. Its sales maximisation output is OK where the total

revenue KL is the maximum at the highest point of TR. This sales maximisation output OK is higher than the profit maximisation output OQ. But sales maximisation is subject to minimum profit constraint. Suppose the minimum profit level of the firm is represented by the line MP. The output OK will not maximise sales as the minimum profits OM are not being covered by total profits KS. For sales maximisation, the firm should produce that level of output which not only covers the minimum profits but also gives the highest total revenue consistent with it. This level is represented by OD level of output where the minimum profits DC (=0M) are consistent with DE amount of total revenue at the price DE/OD, (i.e., total revenue/total output). Bamoul's model of sales maximisation points out that the profit maximisation output will be smaller than the sales-maximisation output OD, and price higher than under sales maximisation. The reason for a lower price under sales maximisation is that both total revenue and total output are equally higher while. Under profit maximisation, total output is much less as compared to total revenue. Imagine if QB is joined to TR in Figure 11.1. "If at the point of maximum profit" writes Bamoul, "the firm earns more profit than the required minimum, it will pay the sales maximiser to lower his price and increase his physical output."

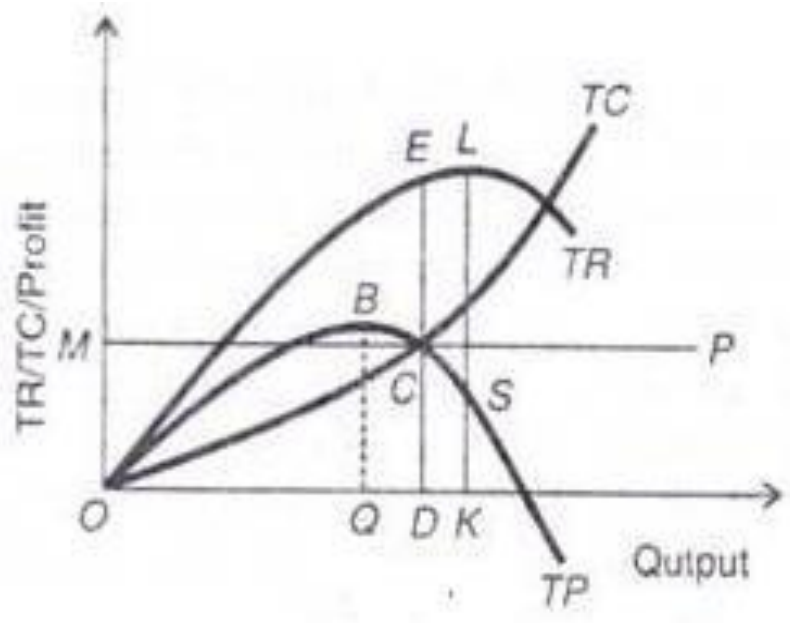


Figure 11.1 Sales Maximisation Model without Advertising

11.2.4 Price and Output Determination of a Product with Advertising

This model can be explained with advertisement expenditure. This part of the model can be explained with the help of figure 11.2.Bamoul has further shown that the profit constraint under sales maximization is also effective in advertising and thereby increases the firm's revenue. In Figure 11.2 expenditure on advertising is taken on the horizontal axis, and total revenue, costs and profit on the vertical axis. TR is the total revenue curve.

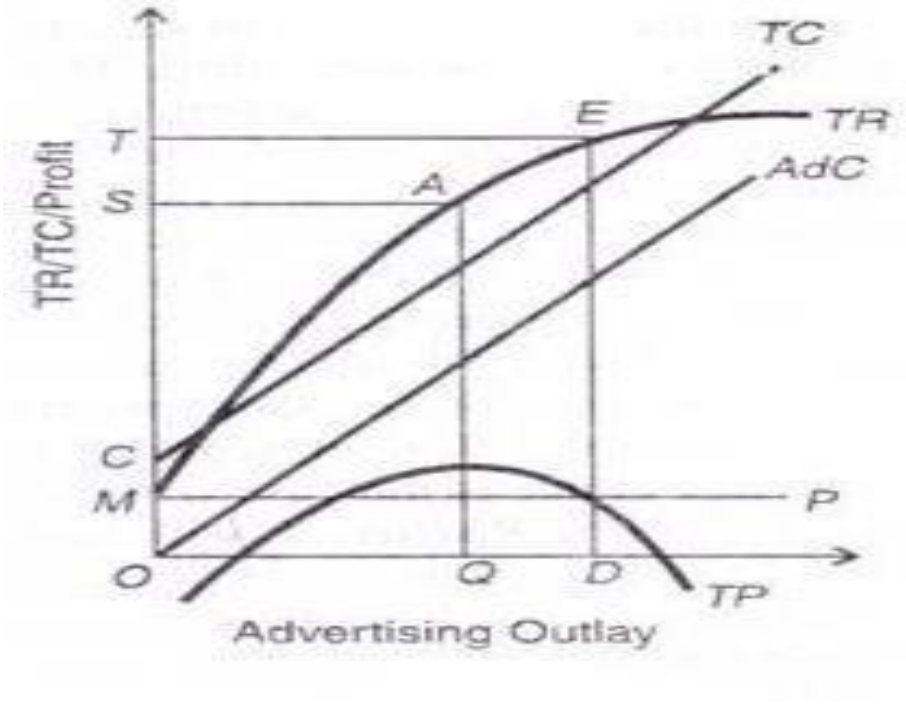


Figure 11.2 Sales Maximisation Model with Advertising

The 45° line AdC is the advertisement cost curve. By adding a fixed amount of other costs equal to OC to the AdC curve, we get the total cost curve TC. Here production costs OC are assumed independent of advertising costs. TP is the total profit curve which is the difference between the TR curve and the TC curve. MP is the minimum profit constraint line. The profit-maximisation firm will spend OQ on advertising and its total revenue will be OS (=QA). On the other hand, given the profit constraint AfP, the sales- maximisation firm will spend OD on advertising and earn OT (=DE) as the total revenue. Thus the sales-maximisation firm spends more on advertising (OD) than the profit-maximisation firm {OQ), OD >OQ and also earns higher revenue (DE) than the latter (QA), DE> QA,

at the profit constraint MP. Thus it will always pay the sales maximiser to increase his advertising outlay until he is stopped by the profit constraint.

Thus from the above explanation it can be concluded that the firm with the objective of sales maximization will:

- Produce Higher level of output
- Will try to increase the total revenue while keeping the level of prices low
- Will make investment on advertisement of product so that demand of product can be increased

11.2.5 Price and Output Determination: Pricing and Changes in Fixed Costs

An important implication derived from sales maximization hypothesis by Bamoul is the effect of changes in fixed or overhead costs on prices of products.Conventional price theory based on profit maximization asserts that so long as overhead costs do not vary with output, the changes in them would not affect prices of the products and nor even output produced of the products. But on the other hand it has been observed that in actual practice the changes in overhead costs do affect the prices of the products.If a firm chooses to maximize sales with a minimum acceptable profit constraint and is in equilibrium, then the rise in overhead cost would bring about increase in total cost and as a result the profit of the firm will fall below the minimum acceptable profit level. In order to prevent this fall in profit level and to be in equilibrium again, the constrained sales maximizing firm will reduce the production of the product so as to raise the selling price of the product.

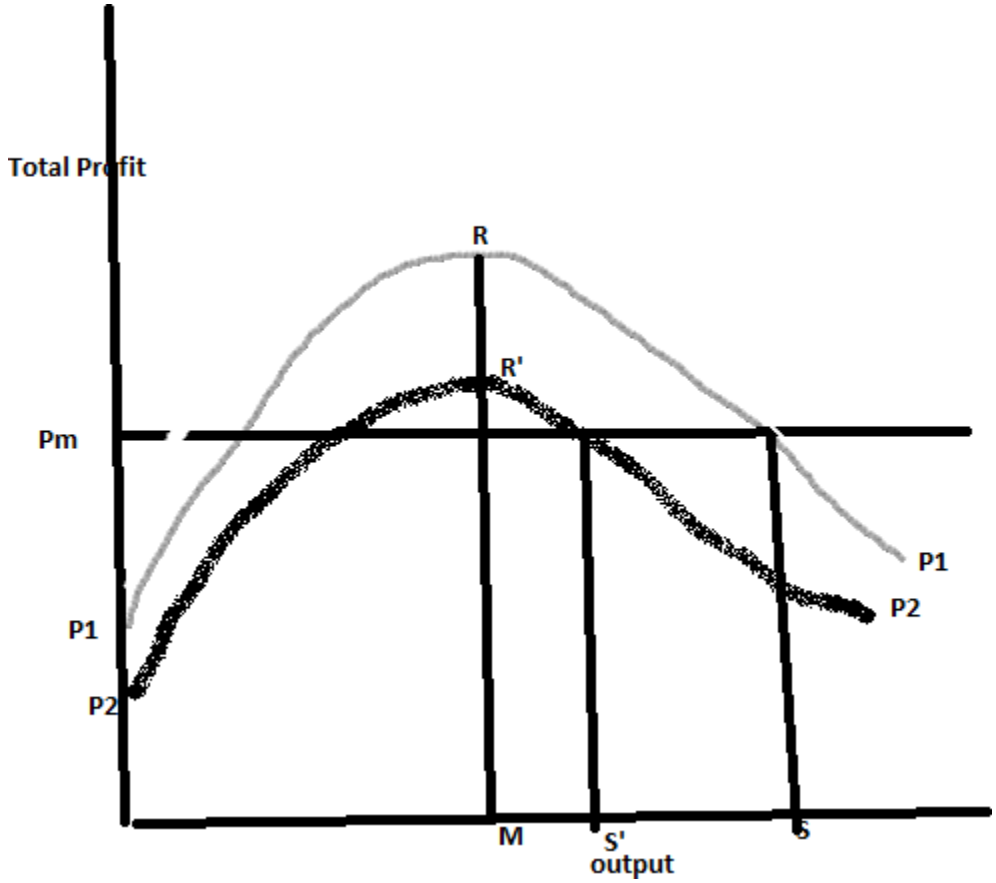


Figure 11.3 Sales MaximizationModel: Increase in fixed cost lowers the level of output and raises prices

The argument can be better understood with the help of figure 11.3 .Suppose that givren a certain cost and revenue situation, total profit curve is P1P1.If Pm is the minimum profit constraint then sales maximizing firm, with PM as minimum profit constraint will be in equilibrium at level OS.On the other hand profit maximizing firm will be in equilibrium at level OM output.

Now, suppose that there is increase in overhead cost by the amount P1P2,With this increase in overhead cost ,there will be uniform downward shift in the total profit curve by the amount P1P2.Thus after the shift ,we will get profit curve P2P2 dotted line .Even with the new profit curve P2P2 profit maximizing output remains at the same OM Level. Thus the increase in the overhead cost reduces the height of profit but they don't change their location of its peak. But a sales maximizing firm with Pm as the profit constraint

will reduce output to OS'.This reduction in output will permit the firm to raise the selling price of the product .Thus according to Bamoul, with the hypothesis of sales maximization with a minimum profit constraint we are better able to rationalize the businessman's behavior regarding changes in prices and output in response to changes in overhead costs.

Like the effects of changes in overhead costs on prices and output, salesmaximisization can also be explained as impact of corporate income tax on prices and output. It may be noted that corporation income tax is the tax on profits of public limited companies. The impact of corporate income tax on the prices and output is exactly the same as that of changes in overhead costs. If the firm objective is maximization of sales with minimum profit constraint, then the price will be raised and output reduced when corporate income tax is raised. According to Bamoul, "When taxes are raised, the firm will be motivated to increase its prices in order to make up lost profits.

11.2.6 Emphasis on Non-Price Competition in Sales Maximisation Model

Another important feature of sales maximization model is its emphasis on price competition in oligopoly as compared with price competition. It has been observed by many economists that oligopolists are often very much reluctant to use price cutting to promote their sales.Bamoul rightly argues that his reluctance on the part of the oligpoliststo use price as competitive weapon should not be explained merely by that they want to live in quiet life.This is because when competition under oligopoly does not become more intenseand vigorous, it may not be in terms of cutting but in terms of non price weapons,that is,in the form of more advertising expenditure, product modification,introduction of special services for the customers.

The possibility of indulge in non price competition under oligopoly can be better explained with sale maximization objective rather than the profit maximization objective. This is because an extra expenditure on advertising etc. increases the physical volume of sales; it must also increase the revenue, whereas the effect of price cutting on the total revenue is doubtful. The reason is that the prioce reduction is double –edged sword which ,while it serves as an influence ti increase total revenue in that it usually adds to the

number of units which can be sold, Simultaneously works in the opposite direction by reducing the revenue on each unit sold. In other words, as the economists know so well, depending on whether demand is or is not price elastic, price cutting is an uncertain means for increasing dollar sales. The effect of price cutting on profits is more uncertain because if it fails to raise total revenue, it will most probably reduce profits because the increase in output as a result of reduction in price will increase total cost. On the other hand the profitability of advertising, productmodification, and improved service is doubtful, thefavorable effect on sales is quite certain. Thus according to Bamoul, "the effect of advertising, improved services,etc.on sales is fairly sure while, veryoften, theirprofitability may be quite doubtful. Thus sales maximization makes for greater presumption that the businessman will consider non price competition to be more advantageous alternative.

Thus this theory provides that:

As per this theory a sales maximizing firm will adopt following strategy:

(a) Will produce at a higher level,

(b) Will keep low prices, and

(c) Will invest in such a manner, as on advertisement, that the demand for its product will increase.

11.2.7 Implications or Significance of Theory

Bamoul's sales maximisation theory has some important implications which make it superior to the profit maximisation model of the firm.

1. The sales maximising firm prefers larger sales to profits. Since it maximises its revenue when MR is zero, it will charge lower prices than that charged by the profit maximising firm.

2. It follows from the above that the sales maximising output will be larger than the profit maximising output.

3. The sales maximiser would spend more on advertising in order to earn larger revenue than the profit maximiser subject to the minimum profit constraint.

4. There may be a conflict between pricing in the short run and the long run. In the short run when output cannot be increased, revenue can be increased by raising the price. But in the long run, it would be in the interest of the sales maximisation firm to keep the price low in order to compete more effectively for a large share of the market and thus earn more revenue.

11.2.8 Criticism of Theory or Limitations of theory

Bamoul's sales maximisation model is not free from certain weaknesses.

1. Rosenberg has criticised the use of the profit constant for sales maximisation by Bamoul. Rosenberg has shown that it is difficult to specify exactly the relevant profit constraint for a firm. This is explained in Figure 11.4 . Sales revenue of the firm is measured along the vertical axis and profit on the horizontal axis. R refers to the profit constraint.

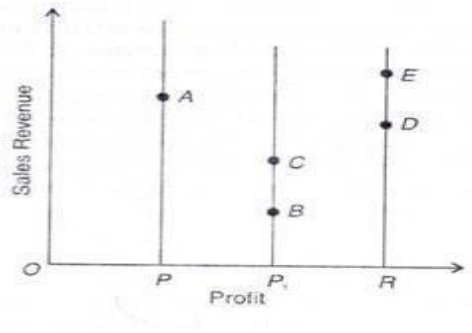


Figure: 11.4 Specifying Relevant Profit Constraint

For any two combinations with profits below the constraint, the one with the larger profit will be preferred. For instance, B on the profit level $P_1$is preferred to A at the profit level P_2since the line P_1 represents a higher level of profit. Again, of the two combinations B and C lying on the same profit line P_1, the one with higher sales will be preferred, i.e., C will be preferred to B. Similar is the case with points D and E on the constraint line R where E with higher sales will be preferred to D. Thus it is very difficult to choose the

sales maximisation and minimum profit constraint in Bamoul's model. Further, so long as profits exceed the constraint, they will always be converted into advertising to increase sales.

2. According to Shepherd, under oligopoly a firm faces a kinked demand curve and if the kink is large enough, total revenue and profits would be the maximum at the same level of output. So both the sales maximiser and the profit maximiser would not be producing different levels of output.

But Hawkins has shown that if the firm is engaged in any form of non-price competition such as good packaging, free service, advertising, etc.. Shepherd's conclusions become invalid. When the sales maximiser spends more on advertising, his output will be more than that of the profit maximiser. This is because the kink of the former's demand curve will occur to the right of the kink of the profit maximiser.

3. Hawkins has also shown that Bamoul's conclusion that a sales-maximiser will in general produce and advertise more than a profit-maximiser, is invalid. According to Hawkins, a sales-maximiser "may choose a higher, lower or identical output—and a higher, lower or identical advertising budget. It depends on the responsiveness of demand to advertising rather than price cuts. This conclusion holds for firms producing only one product, or one group of products."

4. In the case of multiproduct, Bamoul has argued that revenue and profit maximisation yield the same results. But Williamson has shown that sales maximisation yields different results from profit maximisation.

5. Another weakness of this model is that it ignores the interdependence of the prices of oligopolistic firms.

6. The model fails to explain "observed market situations in which price are kept for considerable time periods in the range of inelastic demand."

7. The model ignores not only actual competition, but also the threat of potential competition from rival oligopolistic firms.

8. The model does not show how equilibrium in an industry, in which all firms are sales maximisers, will be attained. Bamoul does not establish the relationship between the firm and industry.

9. Prof. Hall in his analysis of 500 firms came to the conclusion that firms do not operate in accordance with the objective of sales maximisation.

Despite these criticisms, there is no denying the fact that sales maximisation forms an important goal of firms in the present day business world. This model is definitely a significant alternative to profit maximizing model and brings close to actual behavior of firm. Even if in certain cases sales and profit maximization yield same result ,even then by providing interesting insight into managerial motivation in these days of manager dominated by big business corporations as well as by explicitly incorporating advertising and other forms of non price competition in his model , Bamoul has made a significant contribution to Price theory.

11.3 ANSWERS TO CHECK YOUR PROGRESS

1. Sales Maximization Concept is given by---------.

A. Adam Smith B. Samuelson C. Marshall D. Bamoul

2. Micro economic theory is also known as----------.

A. Business Theory B. Price Theory C. Individual Theory D. Cost theory

3. Which of the following is an objective of firm?

A. Salary maximization B. Interest maximization

C. Wealth maximization D. High employee turnover

4. What is maximization?

A. Increasing profit B. Decreasing cost

C. Increasing desired one at cost of anything D. Decreasing quality

5. Sales-revenue maximisation firm:

A. Will produce at a higher level

B. Will keep low prices

C. Will invest in such a manner that the demand for its product will increase.

D. All the above

11.4 SUMMARY

Sales Maximisation model given by W.J.Bamoul an American Economist is another model of oligopoly. The model challenges the profit maximisation assumption regarding the business behaviour in the modern times. In corporate form of business organisation sales maximisation is more valid and realistic assumption than profit maximisation. This is more rational objective of any business organisation.Prof.Bamoul was of the opinion that business managers are more interested in maximising sales rather than profit.This model is based upon the objective of maximization of sales. Maximisation of sales does not mean maximization of physical volume of sales but it is maximisation of total revenue from sales, that is the rupee value of sales made.Therefore this model can be called as Revenue Maximisation Model. This model does not ignore profit motive altogether. The model states that there is always a minimum acceptable level of profits which must be earned by mnagement so as to finance the furture growth of the firm through retained profits and also to induce the potential shareholders for subscribinhg to share capital of the company.Thus as per this model management of oligopolistic firm will always try to achieve maximum sales i.e. maximum total revenue subject to minimum profit constraint.The firm also needs minimum profits to finance future sales. Further, they are essential for a firm for paying dividends on share capital and for meeting other financial requirements. Thus minimum profits serve as a constraint on the maximisation of a firm's revenue. "Maximum revenue will be obtained only", according to Bamoul, "at an output at which the elasticity of demand is unity, i.e., at which marginal revenue is zero. This is the condition which replaces the "marginal cost equals marginal revenue profit

maximisation rule."The first part of this model explains sales maximization of an oligopoly firm in case when a firm produces a single product and does not undertake any expenditure on advertising and other promotional activities.The empirical investigation of theory in America shows that firms follow sales maximization objective. There is separation of ownership and management and control of business is in hand of managers. Mangers seek higher salaries and rewards through higher sales. Revenue or sales maximization reveals the actual behavior of firm rather than profit maximization. The sales maximization is short run as well as long term objective of business firms. Most of the time short run revenue maximization leads to long term revenue maximization.This model can be explained with advertisement expenditure. In this case the firm total cost will include advertisement expenditure and revenue will also be affected by same. Thus as per this model a sales maximizing firm will produce at a higher level,Will keep low prices, andWill invest in such a manner, as on advertisement, that the demand for its product will increase.

11.5 KEYWORDS

Sales Maximisation Maximisation of sales does not mean maximization of physical volume of sales but it is maximisation of total revenue from sales, that is the rupee value of sales made.

Non Price Competition is based on enhancing sales on the basis of advertisement and other strategies rather than reducing prices.

11.6 SELF- ASSESSMENT TEST

1) Explain Sales Maximisation hypothesis.
2) Describe Sales maximization model with advertising
3) Explain Price and output determination under sales maximization model without advertising.
4) Elaborate with suitable diagram the impact on price and output determination under sales maximization model when there is change in fixed cost.
5) Explain non price Competition as per sales maximization model.

6) Critically evaluate sales maximization model.

MANAGERIAL THEORY

Structure

12.0 LEARNING OBJECTIVES

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

- Understand the managerial theory concept
- Differentiate between owners equilibrium and manager equilibrium
- Explain the concept of owner Utility
- Explain the concept of Manager Utility
- Explain Williamson Model
- Understand different concepts of profits in Williamson Model
- Describe Marris Theory of Manager Equilibrium

12.1 INTRODUCTION

This chapter is related to another model of price and output determination under Oligopoly the title of which is “Managerial Theories”. There are different managerial theories of firms out of which Marris and Williamson’s Model are most significant models developed in the recent time period. Managerial theories do not admit the validity of profit maximisation hypothesis regarding the objective of business firms.Sales Maximisation model discussed in the previous chapter also based on similar assumption. This chapter further elaborates the objectives of corporate firms with the help of discussion of Marris and Williamson’s Model.

12.2 CONCEPT OF MANAGERIAL THEORIES

Managerial theories are the theories which lay stress on the role of managers and their behavioral pattern on deciding about price and output under oligopoly.The managerial

theories evolved due to separation of ownership and management in corporate form of business organizations.In traditional form of business organizations like sole proprietor and partnership, it is the owners themselves who take price and output decisions. But in corporate form of business organizations hired managers control and direct business. Shareholders are owners of such business and bear the risk of business. On the other hand price and output decisions are taken by managers. Profits of the business belong to stakeholders while the managers get salaries. So due to separation of ownership and management profit maximization may be the objective of owners but may not be for managers. There is greater possibility that managers try to achieve their own objectives rather than achieving the goal of maximization of profits.

Managerial theories are based upon above assumption that incentive to maximise profits is expected to weaker on the part of person who are not to get them. Thus in managerial theories price and output determination is based on real objectives of business managers rather than profit maximization objective. Like the sales maximization model profit maximization theories stress that business managers try to achieve different objectives subject to minim um profit level.

12.2.1 Managerial theories and Price and output determination

There are multiple managerial theories out of which following two most significant are discussed in this chapter:

Marris Mnagerial Theory

William Son Managerial Theory

12.2.2 Marries Managerial Theory

This theory is presented by economist R.Marris in Journal of Economics in 1963.He published a paper titled "A Model of Managerial Enterprise" related to this theory. He further elaborated this theory in 1964.This theory can be elaborated in the following points:

12.2.3 Assumptions of Theory

Major points or assumptions of the theory can be discussed as below:

1. Maximisation of Balanced Rate of Growth: As per this theory the objective of managers is maximization of balanced rate of growth. Maximization of balanced rate of growth means maximization of rate of growth of demand for the products of the firm and rate of growth of capital supply.Let G stands for balanced growth,Gd for growth rate of demand for the product,Gc for the rate of growth of capital supply,then the goal of manager is:

Maximize G=Gd=GC

2. Managerial Constraint and Financial constraint:The theory assumes that at the time of maximization of balanced rate of growth manager faces the constraints called

managerial constraint and financial constraint.Managerial constraint refers to the strength of the managerial team and their skills.Financial constraint refers to basically financial ratios which are Ratio of Debt to total assets (Debt Ratio D/A),Liquidity ratio which is also called liquid assets to total assets ratio (L/A), Retention ratio which refers to ratio of liquid assets of firm to total assets ($\pi r/\pi$)

Financial ratios or constraints mentioned above related to job security of managers. If these financial ratios exceed the prudent limit they expose the firm to risk of being taken over by others or the managers can be dismissed which endanger their security. Managers take into consideration job security while taking business decisions.

3. Difference in utility function of managers and owners: Managers seek to maximize the balanced rate of growth as per this theory. Maximization of balanced rate of growth includes balancing the utility function of managers and owners.Before Marris, it was agreed that goals of managers and that of owners are different. The utilityfunction which managers seek to maximize includes variables such as salaries,status,job security.On the other hand utility function which owners seek to maximize include variables such as profits,capital supply, size of output, market share and image of organization.There may be difference in the variables of managers and owners but all these variables are correlated positively to the size of firm. Maximizing long run growth of the firm requires the balance of growth of utility function of managers and owners.

4. Rate of growth of demand and rate of growth of capital supply are equal for balanced growth in the long run: Managers in the long run tries to maximize not the absolute size of the firm rather the rate of growth of the firm. Rate of growth of firm will

be maximum when rate of growth of demand (Gd) which managers want to maximize and rate of growth of Capital Supply (Gc) which owners want to maximize are achieved and in long run both of these become equal.

5. Firm grow by diversification: As per this model firm grows by diversification. It means the firm will grow by undertaking new products or by producing new designs or models of existing products.

12.2.4 Explanation of Firm Equilibrium under Managerial theory

The equilibrium position in the model can be explained with the help of above assumptions. Managers maximize their utility which depends upon rate of growth of demand of products. The utility function of managers can be written as:

$$Um=f(Gd)$$

On the other hand, owners try to maximize their own utility which according to Marris not depends upon profits but on the rate of growth of capital supply. Thus:

$$Uo=f(Gc)$$

The firm will be at equilibrium position when it achieves maximum rate of balanced growth rate of demand for firm's product and growth rate of firm's supply of capital. Thus the firm will be at equilibrium position when:

$$Gd=Gc=Maximum$$

In order to understand the equilibrium position it requires understanding the following two rate of growth:

Rate of Growth of Demand for the Products (Gd): Rate of growth of demand for products depends upon rate of diversification that is the introduction of entirely new products per period which are not close substitute of existing products. The second important factor on which rate of growth of demand of product depends is proportion of successful new products, denoted by K.

Proportion of Successful new products=f (Ratio of Diversification (d),the price of the product (p),expenditure on advertisement (a) and research and development (R&D)

Thus the whole function of demand for the firm's product can be written as :

$$Gd=f(D, K)$$

Where as explained above:

D=rate of diversification

K=Proportion of successful new products

Rate of Growth of Capital Supply (Gc): As explained above in the theory that shareholders or owners of the firm tries to maximize the growth of capital supply.

Capital Supply=Fixed Assets+ Inventories+ Short term Assets and cash reserves

The main source of capital supply is:

- Growth of profits which depends upon profit retention ratio
- Issue of new shares and bonds
- Borrowings from bank

Moreover rate of growth of capital supply depends upon average rate of profit earned by firm which is denoted by m.

$$M=P-C-A-R\&D$$

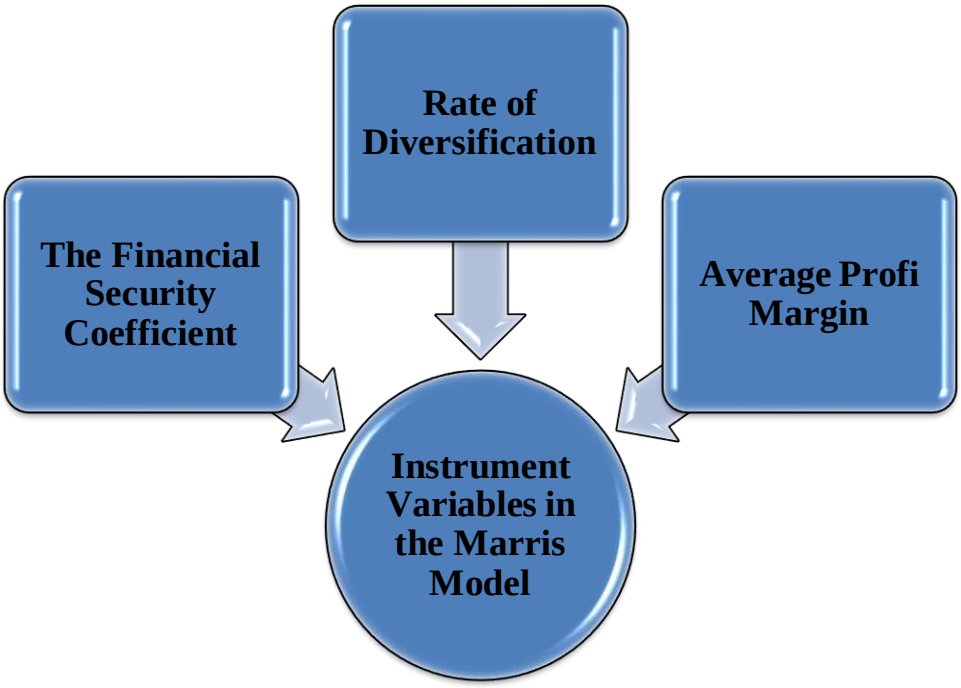
Profit Margin=Price-Cost-Advertisement Expenditure-Research and Development Expenditure

Thus we can say that firm will be in equilibrium when:

$$Gd=Gc=G\ Maximum$$

12.2.5 Major Variables in the Marris Model

There are three instrumental variables in the Marris Model which can be explained as below:



The instrumental variables are the policy variables which should be manipulated to achieve the objective ofmaximization of growth.These three variables can be explained below:

1. Financial Security Coefficient: The financial security coefficient depends upon financial policy of managers.Financial Security Coefficient depends upon three financial ratios.

Financial Security Coefficient is denoted by α

$$\alpha = \text{Weighted Average of } (D/A, L/A, \pi r/\pi)$$

Where D/A=Debt Ratio

L/A=Liquidity Ratio

$\pi r/\pi$*=Retention Ratio*

It means manager can change the growth rate by changing these three ratios.For example if goes for higher amount of debt in capital structure then debt ratio will increase and growth rate of the firm will be accelerated.But a wise manager will always choose prudent debt ratio and is never interested to take higher risk as there may be the risk for the firm to go bankrupt on account of demand for greater interest payments and repayment of principal amount.

Similarly liquidity policy is also very important and affects the growth rate.Low liquidity means the greater amount of funds of the firm are invested to bring about higher growth of output.But too high liquidity ratio will also increase the risk of the firm to go bankrupt.On the similar line profit retention ratio is also very important variable used by manager to accelerate growth.The greater the amount of retained profits there will be greater supply of capital which will ensure the higher rate of growth.But higher profit retention ratio means lower dividends to the shareholders which will make them unhappy and endanger the manager's security.So the managers will always believe to distribute reasonable amount of profits to satisfy shareholders and maintain a stable growth rate of firm.

2.Rate of Diversification: The growth rate of demand for products in Marrismodel depends upon rate of diversification.Rate of diversification depends upon the introduction of entirely new products per period which are not close substitute of existing products. The second important factor on which rate of growth of demand of product depends is proportion of successful new products. It should be remembered that in Marris Model price of the product as given by the market is accepted by the firm. Hence adjustment in price is not the instrumental variable in Marris's Model.There is uncertainty of

competitors' response with regard to price change so the firm does not believe in changing the price to promote the sales rather firm increases expenditure on advertisement.

3. Average Profit Margin: The final important variable or instrumental of growth rate is the choice of average profit margin.Average rate of profit earned by firm which is denoted by m.

$$M=P-C-A-R\&D$$

Profit Margin=Price-Cost-Advertisement Expenditure-Research and Development Expenditure

Since price and cost per unit is assumed to be given and constant by Marris, average profit margin is negatively associated with expenditure on advertising and research and development.Therefore higher the expenditure on advertisement and research and development activities lower will be the rate of growth of firm.

12.2.6 Criticism of Marris Model

Marris's growth-maximisation model has been severely criticised for its over-simplified assumptions by Koutsoyiannis and Hawkins.

1. Marris assumes a given price structure for the firms. He, therefore, does not explain how prices of products are determined in the market. This is a serious weakness of his model.

2. Another defect of this model is that it ignores the problem of oligopolistic interdependence of firms in non-collusive market.

3. This model also does not analyse interdependence created by non-price competition.

4. The model assumes that firms can grow continuously by creating new products. This is unrealistic because no firm can sell anything to the consumers. After all, consumers have their preferences for certain brands which also change when new products enter the market.

5. According to Koutsoyiannis, "Marris's model is applicable basically to those firms which produce consumers' goods. The model is not appropriate for analysing the behaviour of manufacturing businesses or traders."

6. Marris lumps together advertising and R&D expenses in his model. This is a serious shortcoming of the model because the effectiveness of these two variables is not the same in any given period.

7. Marris assumes that firms have their own R&D department on which they spend much for creating new products. But, in reality, most firms do not have such departments. For product diversification, they imitate the inventions of other firms and in case of patented inventions they pay royalties for using them.

8. The assumption that all major variables such as profits, sales and costs increase at the same rate is highly unrealistic.

9. It is also doubtful that a firm would continue to grow at a constant rate, as assumed by Marris. The firm might grow faster now and slowly later on.

10. It is difficult to arrive at the growth rate which maximises the market value of the firm's shares and the rate at which the take-over is likely to take place.

Despite these criticisms, Marris's theory is an important contribution to the theory of the firm in explaining how a firm maximises its growth rate.

12.3 WILLIAMSON'S MANAGERIAL THEORY OF THE FIRM

This theory is given by O.E. Williamson. Theory emphasizes that managers are motivated by their self interest and always want to maximise their own utility function. This maximization of utility function is subject to constraint that after tax profits are large enough to pay acceptable rate of dividends to shareholders and also to pay for necessary investments expenditure.

12.3.1 Assumptions of Theory

Theory is based upon following assumptions:

1. Separation of Ownership and Management: There is corporate form of organization and there is separation of ownership and management. This separation of ownership and vmnagement functions permit the managers to work for their self interest.

2. Maximisation of Managerial Utility subject to constraints: The managers pursue their objective of maximization of their utility but this objective is subject to certain constraints. These are the firm should be able to earn acceptable level of profits, the firm

must show reasonable rate of growth over a period of time and sufficient dividends are paid to shareholders to keep them happy.

3. Managers receive monetary compensation: Managers are receiving salaries and other form of monetary compensation from the business firms.These monetary factors along with some other factors determine the utility function of managers.

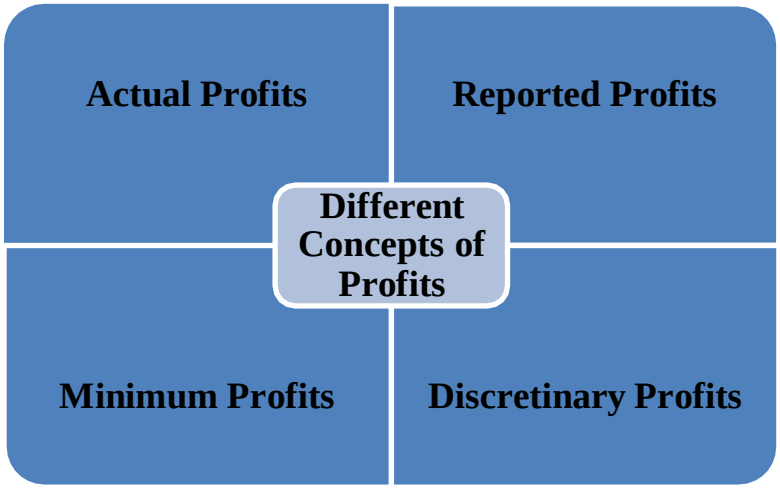
4. Number of staff under control of managers: The greater the number of staff under the control of manager the greater the power and prestige of a manager. It will also result in greater amount of salary and monetary awards. Since according to Williamson there is a positive relationship between the number of staff and the manger'ssalary, he takes a single variable monetary expenditure on the staff in his formal model of utility maximization by managers rather than the two separate variables of salary and number of staff.

5. Manager Utility depends upon Management Slack: The management slack consists of non essential management perquisites such as lavishly furnished offices, luxurious cars etc.which are not necessary for the efficient and effective operation of aafirm.The management slack also enters into cost of production of the firm and determines manager utility.

6. Magnitude of Discretionary investment expenditure: Finally the utility derived by managers depends upon discretionary investment expenditure by the manager that is the amount of resources which the managers can spend as per his own discretion. The magnitude of discretionary expenditure by a manager indicates the command over resources which he enjoys.

12.3.2 Different Concepts of Profits in Williamson's Model

Williamson model determination of equilibrium position is based on different concepts of profits.These concepts can be understood as follows:



1.Actual Profits: Actual profits are the difference between total revenue earned less the production cost and expenditure on staff:

$$\Pi = R - C - S$$

Π=*Actual Profits*

R=*Total Sales Revenue*

C=*Production Cost*

S=*Staff Expenditure*

2. Reported Profits: Reported profits are the difference between actual profits and nonessential managerial expenditure as represented by management slack. Thus:

$$\boldsymbol{Пr}=П-M$$

Where:

$$M=Management\ Slack$$

$$\boldsymbol{Пr}=R-C-S-M$$

3.Minimum Profits: (*По)* Minimum profits are the amount of profits after taxes which are required to be paid as acceptable dividends to satisfy the shareholders who are the owners of the firm. If the shareholders do not get reasonable dividends they may sell their shares and thereby exposing the firm to the risk of being taken over by others or alternatively they will vote for the dismissal of the top management.Both of these actions by the shareholders will reduce the job security of the top management team. Hence managers must give some minimum profits in the form of dividends to keep the shareholders satisfied as to promote their job security. The reported profits must be large enough to be equal to minimum profits plus the tax to be paid to government.

$$\boldsymbol{Пr}\geq По+T$$

4.Discretionary Profits: Discretionary profits are the actual profits minus minimum profits and tax to be paid:

$$\boldsymbol{Пd}\geq\boldsymbol{П}-По-T$$

Where:

Πd=Discretionary Profits, Π=Actual Profits, Πo=Minimum Profits, T=Tax to be paid to government

12.3.3 Determination of Equilibrium Position as per Williamson Model

The basic objective of the model is the maximization of managerial utility.It can be represented as below:

$$U=U(S,M,Id)$$

Where: *U is the utility function*

S stands for monetary expenditure on staff including salaries of managerial team

M stands for management slack

Id stands for amount of discretionary investment

Discretionary investment is equal to reported profits minus minimum profits and tax.Maximization of above utility function is subject to minimum profits constraints. This means level of profits must be such that to pay satisfactory dividends to shareholders and pay for economically necessary investment.In this model Price is regarded as a function of output, the expenditure on staff and a demand shift parameter:

Thus:

$$P=P(X,S,e)$$

Where:P stands for the price function

X stands for the output level in a period

S stands for the expenditure on staff

e stands for a demand shift parameter

12.3.4 Graphic Presentation of Williamson Model

From the above analysis we can conclude thatmanagerial utility function as

$U = f[S, (\Pi - \Pi_0 - T)]$

For simplicity we may assume that there is no lump-sum tax so that $T = t\ \Pi$. Thus the managerial utility function becomes

$U = f\ [S, (1 - t)\ \Pi - \Pi_0]$

Where $(1 — r)\ \Pi — \Pi_0 = \Pi_D$ is the discretionary profit.

The graphical presentation of the equilibrium of the firm in Williamson's model requires the construction of the indifference curves map of managers, and the curve showing the relationship between the two variables appearing in the utility function, S and Π_D.

The indifference curves of managers will be drawn on a graph on whose axes we measure staff expenditure (S) and discretionary profit (Π_D). Each indifference curve shows combinations of S and Π_B which give the same satisfaction to the managers. It is assumed that the indifference curves of managers are of the usual shape: they are convex to the origin implying diminishing marginal rate of substitution of staff expenditure and discretionary profit (figure 12.1).

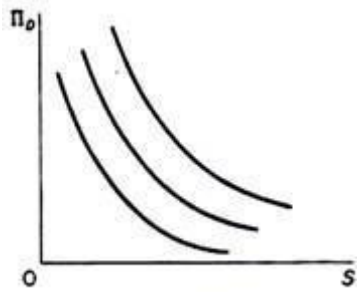


Figure 17.1

It is further assumed that the indifference curves do not intersect the axes. This assumption restricts the choice of managers to positive levels of both staff expenditures and discretionary profits, implying that the firm will choose values of Π_D and S 'that will yield positive utility with respect to each component of its utility function'. This means that the model in this version excludes corner solutions, such as points a, b, c, etc., (in figure 12. 2), where Π_D would be zero in the final equilibrium of the firm.

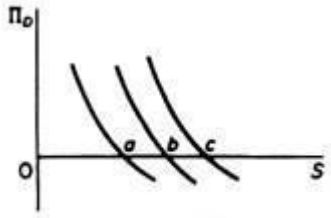


Figure 17.2

The relationship between S, staff expenditure, and Π_D, discretionary profit, is determined by the profit function

$\Pi = f(X) = f(P, S, s)$

Since t and Π_0 are exogenously given (by the tax laws and the demand for dividends of shareholders).

Assuming that output is chosen optimally (according to the marginalistic rule MC — MR) and that the market environment is given (Ɛ), the relationship between Π_0 and S is shown in figure 12.3.

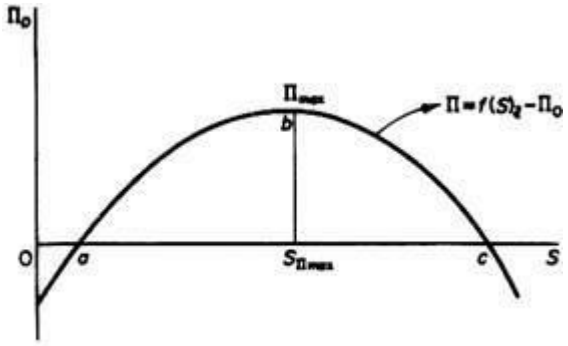


Figure 17.3

At the initial stages of production and up to the level of output where profits reach their maximum level (point b in figure 12.3) both discretionary profits and staff expenditures increase. However, if production exceeds this level, profits will start declining, but staff expenditures continue to increase. If these expenditures exceed point c, the minimum profit constraint is not satisfied and hence points to the right of c (and to the left of a) are not feasible solutions. It should be clear from the above discussion that the drawn profit curve does not include the minimum profit requirement Π_0.

An alternative way of showing the minimum acceptable profit would be to draw the profit function $\Pi = f(S)_{p,\varepsilon}$ and show Π_0 as in Baumol's model, by a straight line parallel to the S-axis. The advantage of subtracting Π_0 from each level of actual profit (Π) is that we can reduce the constrained maximisation problem into an unconstrained one. The equilibrium of the firm is determined by the point of tangency of the profit-staff curve with the highest possible managerial indifference curve (point e in figure 12.4).

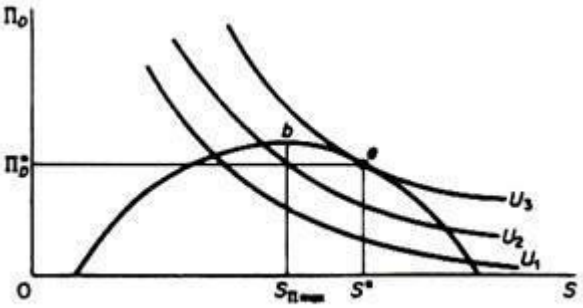


Figure 17.4

Given that the indifference curves have a negative slope; it follows that the equilibrium solution will be always on the falling section of the profit-staff curve. This shows the preference of managers for staff expenditure: in Williamson's model the staff expenditure (S*) will be greater than that of a profit maximiser ($S_{\Pi max}$). Furthermore, Williamson's model implies higher output, lower price and lower level of profit than the profit-maximization model. The above predictions will be better understood after the presentation of the general model of managerial discretion.

12.3.5 Evaluation of Williamson Model

Williamson has made various empirical studies from which he concludes that managerial theory of the firm can better explain the pricing and output under oligopoly than the model based on profit maximization. According to him reactions of firm to change in taxation, increase in expenditure on staff and managerial emoluments during period of boom and drastic cut in these expenditure in recession and changes in compensation of the top executives, staff expenditure in general and managerial emoluments in response to changes in fixed cost can be better explained with his managerial model than the profit maximization model.However the available evidence is not sufficient to prove the validity of hismodel. Moreover assumptions of model are not likely to be fulfilled under dynamic conditions of shift in demand and cost in boom and recession. Williamson fails to explain pricing and output in that firm of oligopolistic market structure where there is strong rivalry among firms.Model also does not take into account the interdependence of firms in oligopoly which is crucial for deciding about price and output under oligopoly.

Wiiliamson in his model lays stress on the managerial discretion in determining not only output and price laid but also the level of staff expenditure and managerial emoluments.Williamson distinguished between desire of manager for discretionary action

and the opportunity for managerial discretionary action. He measures the opportunity for managerial discretion by the concentration ratio in the industry. He argued that greater the concentration ratio in the industry in an industry, the stronger the barriers to the entry, the greater the opportunity for discretionary spending by managers. Further the proportionate representation of management on the board according to Williamson, a measure of desire of manager to act independently of shareholders of the firms. The critics have pointed out that this distinction between desire of management for discretionary behavior and the opportunity for managerial discretion as drawn in the model is not valid. This is because of the reason that greater the number of managers on the board, the greater the desire for managerial discretionary behavior.

12.4 CHECK YOUR PROGRESS

Answer the following fill in the blanks on the basis of Managerial Theory:

1. Marries Managerial Theory is presented by economist_____in Journal of Economics.
2. Marries Managerial Theory is propounded in_____.
3. Financial Security Coefficient, Rate of Diversification and _____ are the instruments of Marries Managerial Model.
4. Williamson's Managerial Theory of the Firm is given by_____.
5. _____ are the difference between total revenue earned less the production cost and expenditure on staff.

12.5 SUMMARY

This chapter is related to another model of price and output determination under Oligopoly the title of which is “Managerial Theories”. There are different managerial theories of firms out of which Marris and Williamson’s Model are most significant models developed in the recent time period. Managerial theories do not admit the validity of profit maximisation hypothesis regarding the objective of business firms.Sales Maximisation model discussed in the previous chapter also based on similar assumption. This chapter further elaborates the objectives of corporate firms with the help of discussion of Marris and Williamson’s Model.

Managerial theories are the theories which lay stress on the role of managers and their behavioral pattern on deciding about price and output under oligopoly. The managerial theories evolved due to separation of ownership and management in corporate form of business organizations. In traditional form of business organizations like sole proprietor and partnership, it is the owners themselves who take price and output decisions. But in corporate form of business organizations hired managers control and direct business. Shareholders are owners of such business and bear the risk of business. On the other hand price and output decisions are taken by managers. Profits of the business belong to stakeholders while the managers get salaries. So due to separation of ownership and management profit maximization may be the objective of owners but may not be for managers. There is greater possibility that managers try to achieve their own objectives rather than achieving the goal of maximization of profits.**Marris Managerial Theory** is presented by economist R.Marris in Journal of Economics in 1963.He published a paper titled “A Model of Managerial Enterprise” related to this theory. He further elaborated this theory in 1964.The theory assumes that at the time of maximization of balanced rate of growth manager faces the constraints called managerial constraint and financial

constraint. Managerial constraint refers to the strength of the managerial team and their skills. Financial constraint refers to basically financial ratios which are Ratio of Debt to total assets (Debt Ratio D/A),Liquidity ratio which is also called liquid assets to total assets ratio (L/A), Retention ratio which refers to ratio of liquid assets of firm to total assets ($\pi r/\pi$)Financial ratios or constraints mentioned above related to job security of managers. If these financial ratios exceed the prudent limit they expose the firm to risk of being taken over by others or the managers can be dismissed which endanger their security. Managers take into consideration job security while taking business decisions.

The equilibrium position in the model can be explained with the help of above assumptions. Managers maximize their utility which depends upon rate of growth of demand of products. On the other hand, owners try to maximize their own utility which according to Marris not depends upon profits but on the rate of growth of capital supply. Williamson has made various empirical studies from which he concludes that managerial theory of the firm can better explain the pricing and output under oligopoly than the model based on profit maximization. According to him reactions of firm to change in taxation, increase in expenditure on staff and managerial emoluments during period of boom and drastic cut in these expenditure in recession and changes in compensation of the top executives, staff expenditure in general and managerial emoluments in response to changes in fixed cost can be better explained with his managerial model than the profit maximization model. However the available evidence is not sufficient to prove the validity of his model.

12.6 KEYWORDS

Managerial Theory are the theories which lay stress on the role of managers and their behavioral pattern on deciding about price and output under oligopoly. The managerial theories evolved due to separation of ownership and management in corporate form of business organizations.

Managerial constraint refers to the strength of the managerial team and their skills.

Financial constraint refers to basically financial ratios which are Ratio of Debt to total assets (Debt Ratio D/A),Liquidity ratio which is also called liquid assets to total assets ratio (L/A), Retention ratio which refers to ratio of liquid assets of firm to total assets ($\pi r/\pi$)

Actual Profits: Actual profits are the difference between total revenue earned less the production cost and expenditure on staff:

Minimum profits are the amount of profits after taxes which are required to be paid as acceptable dividends to satisfy the shareholders who are the owners of the firm.

Reported profits are the difference between actual profits and nonessential managerial expenditure as represented by management slack

Discretionary profits are the actual profits minus minimum profits and tax to be paid.

12.7 SELF- ASSESSMENT TEST

1) Explain the concept of managerial theory.
2) Describe Williamson Model of Managerial theory along with its assumptions .Critically evaluate this model.

3) Describe Marris Model of Managerial theory along with its assumptions .Critically evaluate this model.
4) Explain different concepts of profit as per Williamson Model.

BEHAVIOURAL THEORY

Structure

13.0 LEARNING OBJECTIVES

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

- Understand the concept of Behavioural Model
- Differentiate behavioural theory from the traditional theories
- Understand the process of decision making and price determination in behavioural model
- Explaining different goals of firm as introduced by behavioural theory
- Understand the concept of organisational slack

13.1 INTRODUCTION

Behavioural Theory of the firm was first of all pronounced by H.A. Simon in 1955. He presented an article titled, " A Behavioural Model of Rational Choice" which was published in Quarterly Journal of Economics. This was further developed by Cyert and March and Cohen and Cyert.Behavioural theory of Cyert and March is an extension and modified version of Simon's Satisficing Behaviour Model of Corporate Firms. This model as given by Cyert and March can be appreciated better in contrast to other alternative theories of the firm. Traditional theory of the firm assumes profit maximisation as the sole goal of business firms. Managerial Utility model emphasize the role of dichotomy between the ownership and the management in setting business goals and claim that managers maximise their utility function. They argue that managers use their discretion to set goals for themselves different from profit maximisation. They set such goals for themselves as maximisation of sales revenue, maximisation of firm's

growth rate, maximisation of manager's own utility function and so on. On the other hand Behavioural Model look at large multiproduct corporations not as an ordinary firm, but as coalition of different but related interested groups including managers, owners, workers, suppliers, customers, bankers and tax authorities. Behavioural Theory concentrates upon that business firms don't focus upon maximisation of profits always. Firms target upon satisfactory performance with regard to profits, Market Share, Sales etc.Therefore behavioural theory is also called "Satisficing Theory of Firm."

13.2 CONCEPT OF BEHAVIORAL THEORY

Behavioural Theory is based upon how firms behave actually while taking decisions with regard to product, price and sales. These theories state that firms don't aim to maximise profits, sales and even utility. This theory has been drawn from actual behaviour of big firms while taking various types of decisions. Like Managerial models given by Marris and Williamson, behavioural models also consider a large corporate business firms in which ownership is separated from management.

This theory has been stated as by Cohen and Cyert

"In particular, as one looks closely at the behaviour of actual firms, the justification for the assumption of project maximisation seems to weaken. When one addsuncertainty to the firms decision making process, even defining the meaning of profit maximisation becomes difficult to do in an empirically meaningful way. The behavioural theory of the firm takes the position that arguments over motivation are somewhat fruitless. The critical issue is not whether one assumes profit maximisation instead of satisfying behaviour. Instead it is fruitful to develop an understanding of the process of decision making within the firm."

The theory is built upon understanding the behaviour of different stakeholders of the firm while setting and achievement of organisational goals. These different groups of stakeholders can be presented in the following figure 13.1:

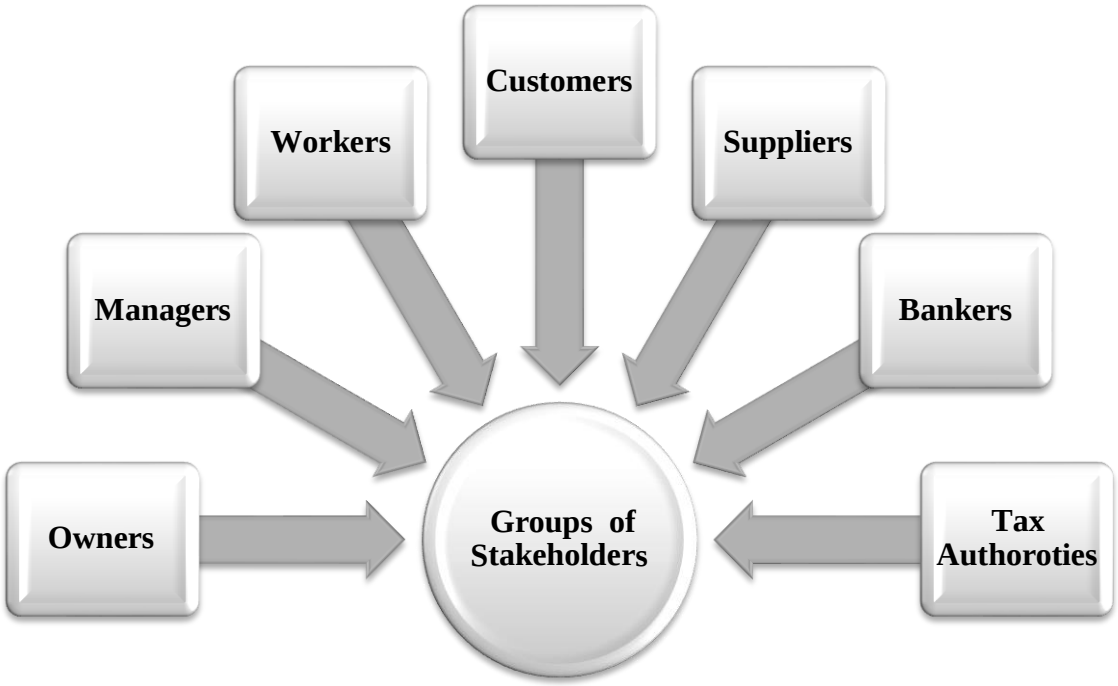


Figure 13.1 Groups of Stakeholders of the Firm

13.3 EXPLANATION OF BEHAVIORAL THEORY

Behavioral Theory as explained earlier is based upon the actual behavior of big fims. This theory can be understood with the help of following points which are depicted in the figure 13.2:

Figure 13.2 Explanation of Behavioural Model

13.3.1 Big Organisations are Complex Organisations

Behavioral theory is based upon the behavior of big organizations in while taking actual business decisions. These organizations are complex in nature. In these organizations decisions are taken by single entrepreneur or a few number of partners. These organizations are composed of various individuals and groups with conflicting interests. This conflicting number of groups includes different kind of stakeholders like managers, shareholders, workers, suppliers, bankers, customers, government and so on. All these groups impact goals of organization although the degree of impact may be low or high. These conflicting interests have been explained by the behavioral model as follows:

- Owners are interested in maximum profits
- Managers aim at high salary, power and perks.
- Workers are interested in high pay packages, bonus, safe working conditions, insurance and other facilities.
- Customers are interested in high quality goods and lower prices.
- Input suppliers are interested in continuity and growth in demand for their supplies at higher prices.
- Bankers expect and want their loans and advances to be secure and

repaid on time

- Tax authorities expect hones and regular tax payments

Thus big organizations are not simple organization like single entrepreneur type organization where the goals of the entrepreneur are goal of the organization. In sole entrepreneur organization usually the entrepreneur purchase conformity of different goals by payment in the form of wages to workers, interest to capital sources and profits to himself. As per behavioral theory prescribed by Cyert March and Cohen, each group in this business organization has its own set of goals or demands which are conflicting.

13.3.2 Firms have Conflicting Multiple Goals

Complexity of the nature of big organization result in the conflicting goals of different group of stakeholders. In conventional theory of the firm there was a single goal of profit maximization. However as per behavioral theory organizations have multiple goals which are depicted in the figure 13.3.

Production goal represents the demand of coalition members connected with production such as workers. Production goal aims at continuity in production irrespective of any seasonal variability in demand. This goal is achieved by preventing

- Underutilization of capacity in one period and overutilization in another period.
- Lay off of labour in one period and rush recruitment in another.

This helps in preventing undue variation in the cost of production and problem of labour unrest and dissatisfaction. As a result, owners, managers and workers are satisfied.

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Figure 13.3 : Conflicting Goals of Big Firm

Inventory goals represent the demand of finished goods inventory and raw material and other inputs inventory. A balanced inventory of inputs and raw materials ensures continuity of production and supply of goods to the customers and also keeps the suppliers of inputs satisfied. Demand for finished goods inventory set the demand for input inventory. Sales goods inventory represent the demand of those coalition groups who are intimately connected with sales such as salesmen.

Sales and Market Share goal aim at promotion and enhancing the market share of the firm. Sales are promoted through competitive advertising and pricing strategy. Sales promotion and increase in market share keep top managers and owners satisfied. Salesand market share goal is affected by those coalition members who are greatly interested in comparative success of the organization. For example top level managers who are linked with sales management activities.

Profit Goal is so determined that it satisfies the owners, the bankers and other

financers of the firm. Besides, the profit goal aims at making adequate financial provision for future projects. Profit maximizing objective is related to different stakeholders such as meeting the demand of shareholders for dividend, creditors for interest and also to management who are interested in showing their favorable performance by the amount of profits earned. Profits goal is generally set in terms of aspiration level with respect to amount of money profits to be made. The profits goal may however be set in form of return on investment or profit share. It is the profit goal which is intimately connected with the pricing and output decision of a firm

13.3.3 Implicit Order of Priority Among Goals

As per behavioral theory business firms are guided by above stated goals while taking pricing, profits and sales related decisions. These five goals are not merely theoretical hypothesis but have been found actually true by empirical investigation of theory in different time period. As per the theory all goals must be satisfied but there is always implicit order of priority among these goals. These goals are there in every big organization but there is variation in the priorities of these goals. These priorities are different due to difference in the bargaining position of different stakeholders.

13.3.4 Satisficing Behaviour of Firms

Behavioural theory is based upon the concept of aspiration level given by H.A. Simon. Simon points out that the most psychological theories assume that instead of maximizing, rational men normally satisfice. Applying the concept to various decisions, Simon suggested that instead of amaximising profits the firms aim at satisficing. It means to achieve the satisfactory level of performance of firm regarding different goals as defined by Cyert and March.This satisfying behavior of the firm has further been elaborated by Koutosyiannis

, “The firm is satisficing organization rather than a maximizing entrepreneur. The top management responsible for the coordination of the activities of various members of the firms wishes to attain satisfactory level of production to attain a satisfactory share of the market to earn satisfactory level of profits, to divert a satisfactory percentage of the total receipts to research and development or to

advertising, to acquire a satisfactory image and so on."

Thus as per this concept the top management aims to achieve the overall satisfactory level of performance of the firm. The practical methods of the satisficing behavior are to bring reconciliation between the conflicting and competing aspirations. The methods that are generally used for the purpose are:

- Budget allocation and delegation of authority
- Regular payments of dues to related interest groups
- Allocation of funds for research and development as side payment
- Slack Payments to deserving groups
- Allocation of priorities to demand from different groups and meeting them in the same sequence
- Decentralisation of decision making powers at different managerial functions

13.3.5 Bounded Rationality

This theory lays stress upon bounded rationality to justify satisficing behavior of big corporate firms. The bounded rationality means the prudent behavior under the given constraints. Satisficing is viewed as the attainment of aspiration level of goals which are finally set by top management and ratified by Board of Directors of the corporate firm. It means that goals are not set in terms of maximization of some relevant magnitudes such as profits, sales, market share etc. but as the achievement of the aspiration levels of goals set. Thus, the behavioral model redefines rationality. Traditional theory defined the rational firm as the firm that maximizes profit. The behavioural school is the only theory that postulates a satisficing behavior of the firm which is rational given the limited information and limited occupational abilities of the managers.

A rational firm always sets its level of aspiration. Aspiration level of firm is based upon its goals and its past experience. Aspiration level is always fixed taking into consideration different uncertainties. If the actual performance of the firm reveals a given level of aspiration level can be easily achieved, it will be revised upward. On the other hand if it is found that a given level of aspiration is difficult to be

achieved, it will be lowered. When the actual performance of the firm falls short of aspiration level, search activity is started to find out the ways of better performance in the future and therefore achieving the aspiration level. As per behavioural theory there is a limit to searching activities which a firm will undertake, because for searching activity must be balanced against its cost. That is why at the same time aspiration level is adjusted downward to a level which is more likely to be achieved. Since the firm limits its searching activity on account of its cost, it does not maximiseprofits. Therefore, while the firms behaving rationally aim at satisficing rather than maximizing.

13.3.6 Resolution of Conflicting Interest

As per this theory there is not perfect harmony among various members of organisatuional coalition and conflicts among them often arise with regard to achievement of their goals. So therefore organization can be seen as coalition of conflicting interests. These conflicts among the coalition members are resolved within the firm as a result of persuasion and accommodation of each others's viewpoint.

Conflicts are also reconciled by side payments which are various monetary and non monetaryforms. An organizational coalition is viable if the payments made to various coalition members are adequate to keep them in the organization. If there are sufficient resources at the disposal of the organization to meet all the demands of its members, the coalition is feasible one, otherwise not. Since the demand of the members adjusts to the actual payments and their opportunity costs, there is a long run tendency for the payments and demands to be equal. But in the behavioural theory of Cyert and March, emphasis is laid on the short the short run relation between payments and demands and on the imperfections in the factor markets.

13.3.7 Organisational Slack

The notion of organizational slack is also an important concept in behavioral theory. Thisconcept is related to the situation when the organization is not able to accommodate demands, which may be mutually conflicting and inconsistent. It may be because of the reason that available resources are not sufficient to meet

demands of all conflicting organizational groups.Cyert and March introduced the notion of organizational slack which is the excess of the actual payments to the various coalition members over and above what is required to keep them in the organization. Thus slack consist in making payments to the various groups of coalition in excess of what is needed for the efficient working of the firm. Behavioral theory defines organizational slack as

, *"Because of the friction in the mutual adjustment of payments and demands, there is ordinarily a disparity among the resources available to the organiasation and payments required to maintain the organization. The difference between the total resources and total necessary payments is called the organizational slack.Slack consist in payments to members of coalition in excess of what is required to maintain the organization. Many interesting phenomena within the firm occur because the slack is typically not zero."*

The major points as given by the theory related to organizational slack are as follows:

1. This theory considers that the organizational slack is existing. It is opposite to the traditional theory where organizational slack is zero at least in equilibrium situation.
2. The theory has enumerated organizational slack through various examp0ples. Such as stockholders are paid higher dividends to keep them within the organization. Prices are set lower than necessary to maintain adequate income to customers. Wages are paid in excess to maintain the skilled workforce in the organization. Similarly executives are paid excess salaries and are provided with personal luxuries in excess to keep them in the organization.
3. Organizational slack provides a pool of emergency resources for the organiasation. It pays a stability and adaptive role for the organization. When the external environment and market conditions are good and favourable, the organization secures excess resources. This situation is

possible in the boom period. In this situation excess resources are used for slack payments to meet revised demands of those members of coalition group which are helpful for better achievement of organizational goals in good time period. However when the environment is unfavourable organizational slack serves as the cushion. In such time period scarcity of the resources will lead towards the reduced excess paymentsto various coalition members. Thus, if this organizational slack did not exist, the dwindling of resources in unfavorable times would have cut into the necessary payments of the members and thereby would have endangered the survival of the organization.

13.3.8 Decision Making in Organisation

In the behavioural theory the goals of the firm as set by the top management are implemented through decision making at two levels, one is at the level of top management itself and second at the lower level of management. Given the goals of the firm the resources at the disposal of the firm are allocated among the various departments or divisions according to the demands and goals of the organization. However, managers of various departments bargain to obtain as large share as possible from the budgetary resources. The top management retains some funds for use at its description at any point of time. Decision making in the organization is based upon the following considerations:

- In approving proposals of various departments, two simple criteria are generally followed; the first one is the financialcriterion which examines whether the required funds are available, given the budgetary resources of the organization.The second is the improvement criterion which assesses whether the implementation of the proposal will improve the condition of the organization.
- In the decision making process, the information is required to take appropriate decisions. However, gathering of information is not cost-less and requires budgetary resources. Cyert and March, following Simon, consider that search of information is not undertaken according to marginalist rule, that is, up to the point where the marginal cost of

information flow is equal to marginal benefit that would accrue to firm.

- The decision making process at the lower level of management is made with various degrees of freedom by departmental managers. With the given share of budget, the departmental managers enjoy considerable discretion in spending funds allotted to them. Besides there is lot of decentralization in taking routine day to day decisions which is achieved through delegation of authority within each department or division.
- The uncertainty prevailing in the organization impact the decision making process. Thereare two types of uncertainties which are discussed in the behavioral model. First type of uncertainty arises as a result of change in consumer's tastes, invention of new methods of production and development of new products. In the behavioural theory this market uncertainty overcome by business firms by undertaking only short term planning and avoiding long term planning. The second type of uncertainty arises out of competitor's reaction to the firm's decisions. The behavioural theory does not consider this type of uncertainty at all. This is because this model assumes that the existing firms have some form of tacit collusion. In this way the behavioural model does not consider interdependence among the oligopolistic firms which is a prominent feature of oligopolistic market structure. As per this theory, through trade associations meetings, issue of information bulletins by the firms keep their competitors informed about the price, changes in product and outlays they intend to make in future.

13.4 CRITICAL EVALUATION OF BEHAVIOURAL THEORY:

The behavioral model is different from the traditional theories and have made following contributions to the theory of the firm:

- It has provided a great insight in the process of goal formation and fixation

of aspiration levels and also allocation of resources within the firm.

- Its contribution also lies in analyzing the stability role of organization slack for a activity of the firm through changes in slack payments in periods of boom and depression.
- Further, unlike traditional theory of the firm, the behavioral theory analyses resource allocation within firm and the decision making process of a big corporate firm.
- Theory also highlights the fact that firm enjoys discretion in decision making and does not take the constraints of market environment as given and impossible to change.
- In fact as per the Opinion of Prof. Koutsoyiannis is of the view that traditional theory of the firm and behavioral theory of the firm are complementary rather than substitutes. Traditional theory stressed the role of the market mechanism for the allocation of resources between the various sectors of the economy, while the behavioral theory examines the mechanism of resource allocation within the firm. So both the theories are complementary rather than substitutes.

However Behavioral theory has also been criticized on the various grounds as follows:

- It is said that behavioral model uses a sledge hammer to crack a walnut. It means this model over emphasized upon the behavior of the firm in the decision making process. The question has been raised as to whether we should really try to construct mirror images of firms, virtually assembling the decision making process brick by brick for the purpose of predicting their behavior as the behavioralapproach does.
- It has also been stated instead of detailed and complicated simulated model as suggested by behavioraltheory, simple model of profit maximization of the firm is sufficient for the prediction of price behavior of business firms.

- Behavioral model has only suggested a simulation of managerial technique rather than providing actual behavioral model.
- This model does not analyse and reveal how a firm reaches its equilibrium level in its more satisficing behavior.
- Moreover behavioral model does not deal with the independence in case of oligopolistic firms.
- Behavioral model does not have any predictive power.
- At its best, it only presents managerial behavior rather than economic behavior of the firm.

13.5 SUMMARY

Behavioural Theory of the firm was first of all pronounced by H.A. Simon in 1955. Traditional theory of the firm assumes profit maximisation as the sole goal of business firms. Managerial Utility model emphasize the role of dichotomy between the ownership and the management in setting business goals and claim that managers maximise their utility function. On the other hand Behavioural Model look at large multiproduct corporations not as an ordinary firm, but as coalition of different but related interested groups including managers, owners, workers, suppliers, customers, bankers and tax authorities. Behavioural Theory is based upon how firms behave actually while taking decisions with regard to product, price and sales. These theories state that firms don't aim to maximise profits, sales and even utility. Behavioral theory is based upon the behavior of big organizations in while taking actual business decisions. These organizations are complex in nature. Behavioural theory is based upon the concept of aspiration level given by H.A. Simon. Simon points out that the most psychological theories assume that instead of maximizing, rational men normally satisfice. The notion of organizational slack is also an important concept in behavioral theory. This concept is related to the situation when the organization is not able to accommodate demands, which may be mutually conflicting and inconsistent. In fact as per the Opinion of Prof. Koutsoyiannis is of the view that traditional theory of the firm and behavioral theory of the firm are complementary rather than substitutes. Traditional theory stressed the role of the market mechanism for the allocation of resources between the various sectors of the economy, while the behavioral theory examines the mechanism of resource allocation within the firm. So both the theories are complementary rather than substitutes.

13.6 KEYWORDS

Complex Organisation is composed of various individuals and groups with conflicting

interestsis the want satisfaction power of a commodity.

Production goal represents the demand of coalition members connected with production such as workers.

Sales and Market Share goal aim at promotion and enhancing the market share of the firm.

Inventory goals represent the demand of finished goods inventory and raw material and other inputs inventory.

Satisficing Behaviour aims to achieve the satisfactory level of performance of firm regarding different goals

Organisational Slack is the excess of the actual payments to the various coalition members over and above what is required to keep them in the organization.

13.7 SELF-ASSESSMENT QUESTIONS

1. What is meant by Satisficing behavior? Critically examine the view that corporate business firms are satisficers rather than maximisers.

2. The firm is a "Coalition of groups with conflicting goals". Explain the position of behavioural model of the firm.

3. Explain the multiple goals of a corporate business firm. How are these goals formed and who set these goals.

4. What is meant by aspiration level? Explain this concept in the context of satisficing behavior.

5. It is said that behavioural model of the firm redefines rationality. How is it different from the concept of rationality in the traditional theory?

6. What is meant by organizational slack. Explain its role in the behavioural theory of the firm.

7. Compare the behavioural theory of the firm with the traditional theory of the firm. Are the two complementary or substitutes?

8. How price and output is determined in the behavioural model? Compare it with the marginalist rule of traditional theory.

9. Critically evaluate the behavioural model of the firm.

NATIONAL INCOME CONCEPTS

Structure

14.0 LEARNING OBJECTIVES

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

- Understand the different concepts of National Income
- Differentiate between Domestic and National Income
- Differentiate Between Market Price and Factor Cost
- Differentiate between Gross and Net of Different Concepts
- Explain the use of personal income and Disposable Income Concept

14.1 INTRODUCTION

Macro Economics is the study of major economics totals or aggregate. Unemployment, Inflation and productivity are regarded as three major concepts of macroeconomics.Third concept of Macroeconomics which is productivity deals with generation of output in any economy.Growth of any economy depends upon output.Output leads to generation of National Income. National income is one of the macroeconomic variables that measures the total amount of money earned within a country within a year. It is the sum total of aggregate income of any country in particular year. National Income is the basic indicator of monetary growth of any country. It is the base for drafting as well as evaluation of Economic planning and different economic policies such as fiscal policy, monetary policy and other. This chapter deals with different concepts related to measurement of national income. Methods related to measurement of national income are covered in the next chapter. The concepts of national income are the base for learning different methods for measurement of national income.

14.2 MEANING OF NATIONAL INCOME

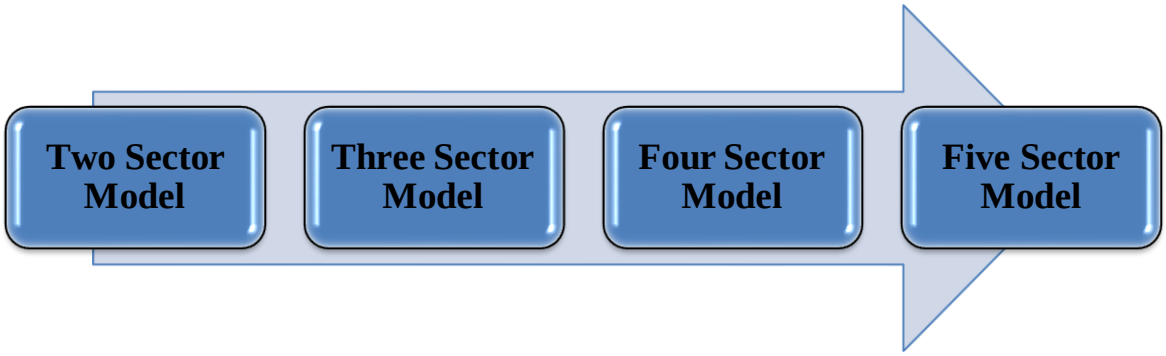
National income or national product can be described as the money value of all final goods and services produced within the domestic territory of a country in an accounting year plus net factor income from abroad. National income or national product is the value of production by the national residents of a country (within or outside the domestic territory).On the other hand, Domestic Income is the value of production within the domestic territory of a country.

The important thing to understand about national income is how the national income of a country is related to national product.In fact in an economy with no government and no foreign trade national income and national product issame thing from two different viewpoints.The sum of all incomes of the people in a country is called national

income.The national income is greatly related to national product.In fact in an economy without taxes and depreciation national income and national product is one and the same thing. The incomes with different people of the society are obtained by them through their contribution of labour,land, capital and entrepreneur services to the national product.Hence the income which labourer get are wages, the owner of land gets rent, capitalists get interest for their capital and entrepreneur gets profits for starting and organizing business. The Sum of incomes obtained as wages, rent, intesest and profit is called national income on the other hand their respective contribution is called national product.

14.2.1 Process of Generation of NationalIncome:(Circular Flow of Income)

The process of generation of national income can be explained with the help of circular flow of national income.Understanding the basic concepts of national income requires the understanding of circular flow of generation of national income.Circular flow of national income describes that production generates income,income give rise to demand for goods and services and demand in turn gives rise to expenditure.Expenditure leads to further production.The flow of production,income and expenditure are interlinked with each other in circular flow.The circular flow of national income has following four types:



Circular Flow of National Income Models

1. Two Sector Model of Circular Flow of National Income: The two sector model of generation of national income assumes that there are two sectors in the economy which are household sector and business sector.There is equilibrium in the economy in which

Income(Y)=Expenditure(E)=Output(O)

The Model takes further these assumptions:

- The household sector spends whole of their income on purchase of goods and services as there is no savings.
- All output produced by Business sector is purchased by household sector.
- There is no financial sector.
- There is no government sector.
- There is no foreign sector.

The model is shown in the figure 14.1.It shows that expenditure of buyers or household sector becomes income for the seller or business sector. The business sector spends whole of this income on different factors of production such as Labour,capital and raw material. This in turn becomes income of factors of production that spends this income to buy goods and services.

:

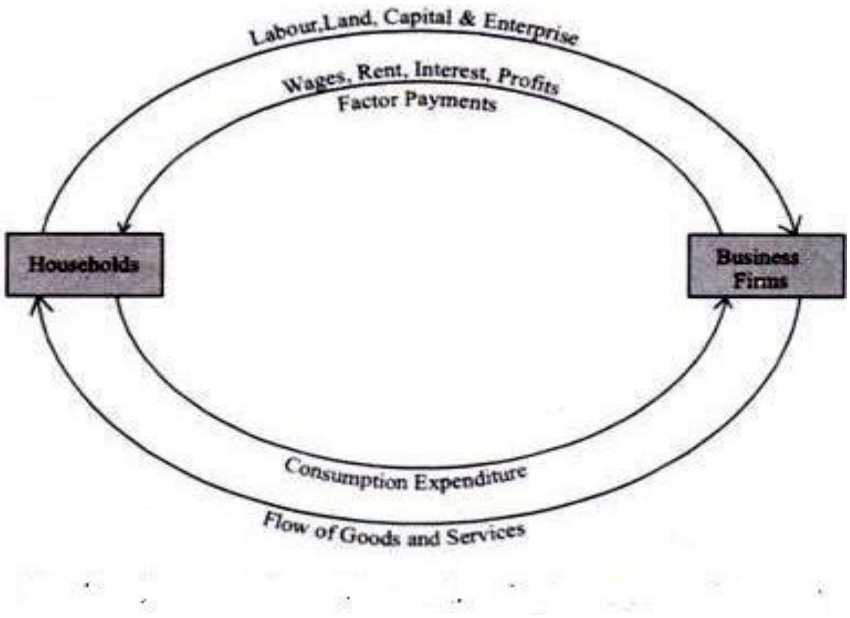


Figure 14.1 Two Sector Model of Circular Flow of National Income

2. Three Sector Model of Circular Flow of National Income: The three sector model of generation of national income assumes that there are three sectors in the economy

which are household sector, business sector and Government Sector..There is equilibrium in the economy in which

Income(Y) =Expenditure (E) =Output (O)

Here the household sector and business sector pays taxes to government. The government has income and spends it in the circular flow in the form of that government also purchases goods and services. Secondly government makes payment to household sector in the form of subsidies and transfer payments.As a result of this income always remains equal to expenditure and makes this circular flow unending.The model is shown in figure 14.2:

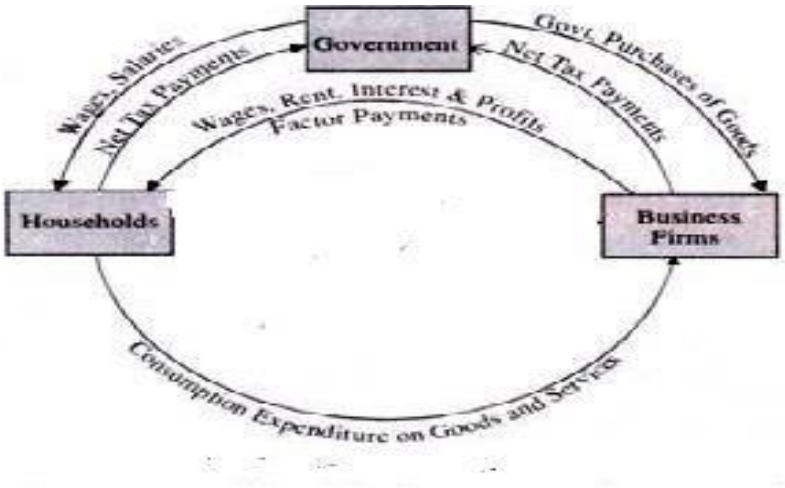


Figure 14.2 Three Sector Model of Circular Flow of National Income

The Model takes further these assumptions:

- The household sector spends whole of their income on purchase of goods and services as there is no savings.
- All output produced by Business sector is purchased by household sector and government sector.
- Government has income and also makes expenditure.
- There is no financial sector.

- There is no foreign sector and economy is closed.

3. Four Sector Model of Circular Flow of National Income: The four sector model of generation of national income assumes that there are four sectors in the economy which are household sector, business sector and Government Sector and Financial Sector.There is equilibrium in the economy in which

Income(Y) =Expenditure (E) =Output (O)

This is shown in figure 14.3. Here the each of the above sectors receives some payments from the other in lieu of goods and services which makes a regular flow of goods and physical services. Money facilitates such an exchange smoothly. A residual of each market comes in capital market as saving which in turn is invested in firms and government sector. Technically speaking, so long as lending is equal to the borrowing i.e. leakage is equal to injections, the circular flow will continue indefinitely. However, this job is done by financial institutions in the economy.

The Model takes further these assumptions:

- The household sector spends whole of their income on purchase of goods and services as there is no savings.
- All output produced by Business sector is purchased by household sector and government sector.
- Government has income and also makes expenditure.
- There is financial sector.
- A residual of each market comes in capital market as saving which inturn is invested in firms and government sector. Technically speaking, so long as lending is equal to the borrowing i.e. leakage is equal to injections
- There is no foreign sector and economy is closed.

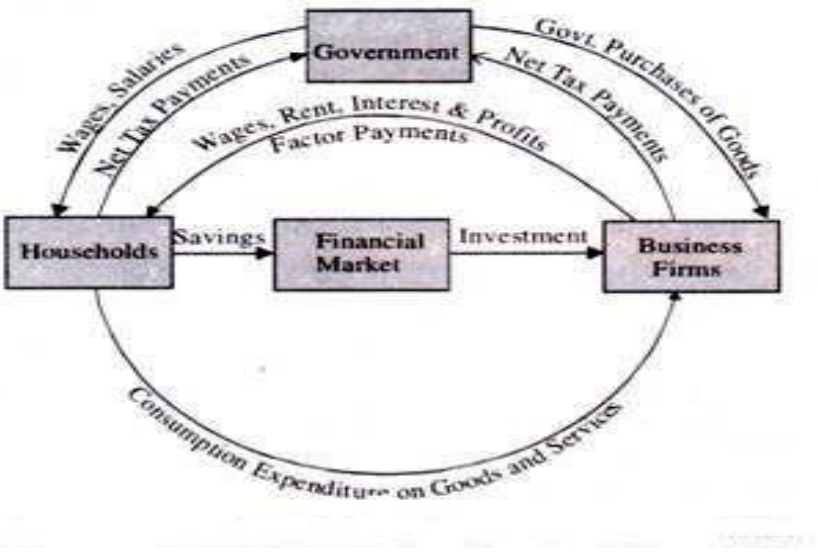


Figure 14.3 Four Sector Model of Circular Flow of National Income

4. Five Sector Model of Circular Flow of National Income: The five sector model of generation of national income assumes that there are five sectors in the economy which are household sector, business sector and Government Sector, Finacial Sector and Foreign Sector. There is equilibrium in the economy in which

Income(Y) =Expenditure (E) =Output (O)

This is shown in figure 14.5. Here the each of the above sectors receives some payments from the other in lieu of goods and services which makes a regular flow of goods and physical services. Due to open economy there is interaction with the foreign sector in the form of purchase and sale of goods and services. In the following diagram purchase and sale from foreign countries are done by business sector through import and exports.

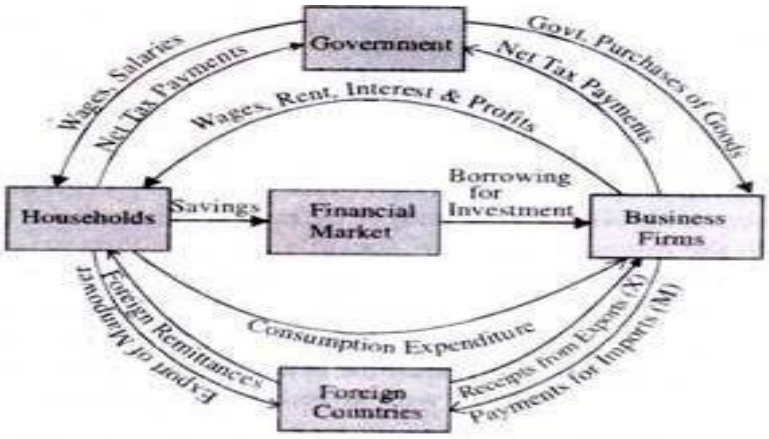


Figure 14.2 Five Sector Model of Circular Flow of National Income

Thus from the above explanation it is clear that national income generates through interaction between different economic sectors. The process of receipts and payments leads to flow of income in the economy from one sector to another sector.

14.3 CONCEPTS OF NATIONAL INCOME

There are many different concepts of national income. The measurement of national income with the help of different methods is based on these concepts. The following are different concepts which are explained in this chapter:

1. Gross National Product at Market Price: (GNPmp): Gross NationalProduct is an important concept of national income. Gross National Product is defined as the total market value of all final goods and services produced by residents of country in a year. Following are the important points to be considered at the time of calculation of Gross National Product:

- Gross National Product measures the market value of annual output. In other words GNP is monetary measure. There are no other way of adding up the different sorts of goods and services produced in a year except in terms of its monetary prices. In order to see accurately the changes in physical output over a period of time, the figure of gross national product is adjusted for price changes.

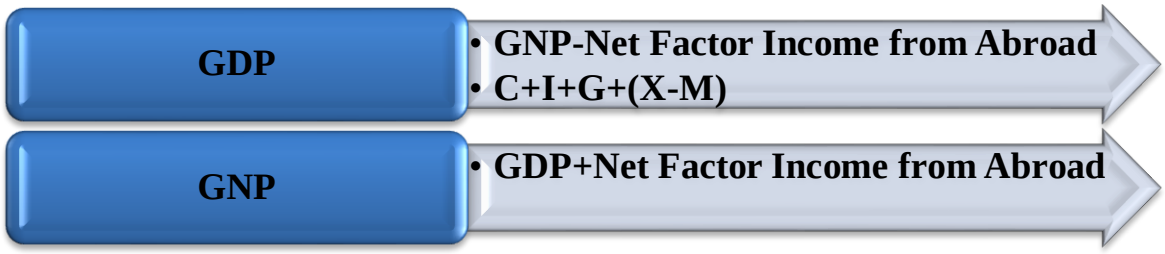
- Secondly for calculating Gross National Product accurately, all goods and services produced in a year must be counted once and not more than once. Most of the goods go through a series of production stages before reaching the market. Part of components of many goods and services are bought and sold many times. Hence to avoid double counting market value of only final goods and services are included. Transactions involving intermediate goods are excluded.

Gross National Product includes value of goods and services currently produced by normal residents of the country in a year. These residents may be national or non nationalcompanies. Thus many foreign countries have set up plants in India. These companies owned by non nationals but produce goods and services within the domestic territory of India and generate income for Indian residents employed in them. These foreign companies can only send back profits earned by them to their own countries.

Components of Gross National Product can be summarised as below:

- **Net Factor Income from Abroad:**The sum of factor income such as wages and salaries,rent,interest and profits generated within the domestic territory of a country is called domestic factorincome. It includes factor income by both the residents and non residentsworking within the domestic territory of a country.Similarly some residents of a country go abroad and work in the territories of other countries and earn factor income.It includes both the individual residents and also the domestic companies have operation in foreign countries. Now the net factor income from abroad is the difference between the factor income such as wages, rent, interest and profits received from abroad by normal residents of India for rendering services abroad minus factor income paid to non residents for factor services rendered by them in domestic territory of India.

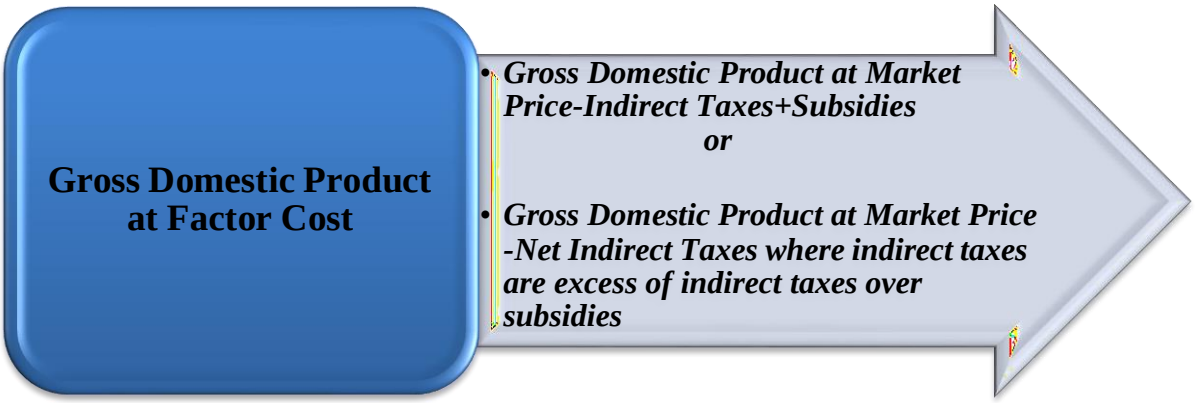
2. Gross Domestic Product at Market Price (GDP mp): GrossDomestic product is the money value of all final goods and a service produced by all normal residents working in the domestic territory of a country but does not include net factor income earned from abroad.Thus the difference between the gross national product and agross domestic product arises due to the existence of net factor income from abroad.Therefore:



It should be noted that net factor income from abroad should never be confused with net exports.Net Exports i.e. Export –Import are part of both GDP as well as GNP.But Net Factor Income from abroad is excluded while calculating GDP.

3. Gross Domestic Product at Factor Cost (GDPfc): Gross Domestic Product at market price is distinguished from gross domestic product at factor cost .The difference is of the market price and factor cost. The market price of goods and services are raised by inclusion of indirect taxes such as excise duty, Goods and Services Tax etc. Levied by government .Similarly price is reduced by the subsidies provided by government on

certain goods andservices. Therefore to derive Gross Domestic Product at factor cost, gross domestic product at market price need to be adjusted for taxes and subsidies.Therefore:



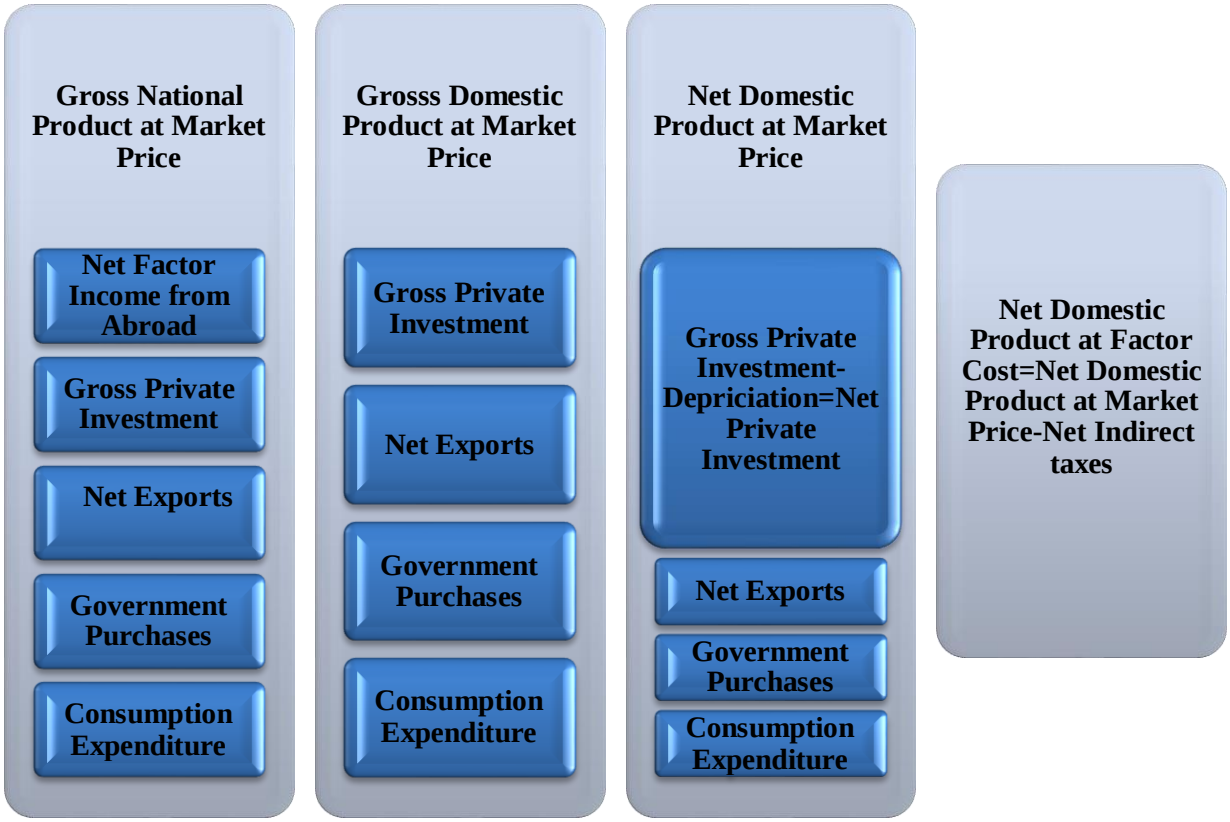
4. Net National Product or National Income at Market Price: The production of gross national product of a year includes the consumption of some fixed capital such as equipment and machinery etc.The capital goods such as plant, machinerywere out or fall in value as a result of consumption or use in the production process during the year. This consumption of fixed capital or fall in the value of fixed capital due to wear and tear during the year is called depreciation.When charges of depreciation are reduced from gross national product then we get net national product.So, it means Net National Product at market price is the market value of all final goods and services produced in the domestic territory of a country in a year after providing for depreciation.This is also called national income at market price.

4. National Income or Net National Product at Factor Cost: Net National Product at factor cost which is also called national income means the sum of all incomes earned by suppliers of factors of production for their contribution of land, labour ,capital

and entrepreneurial ability ,In other words national income or net national product at factor cost shows how much it costs society in terms of economic resources to produce net output.The difference between net national product at factor cost ornational income and net national product at market price arises from that of indirect taxes and subsidies.

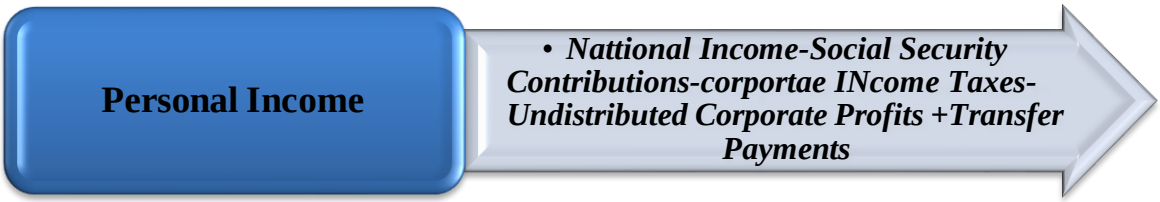
Difference between Gross National Product at Market Price, Gross Domestic Product at Market Price, Net Domestic Product at Market Price and Net Domestic Product at factor Cost:

The difference in Gross National Product at Market Price,Gross Domestic Product at Market Price, Net Domestic Product at Market Price and Net Domestic Product at factor Cost as discussed above can be summarised as below:

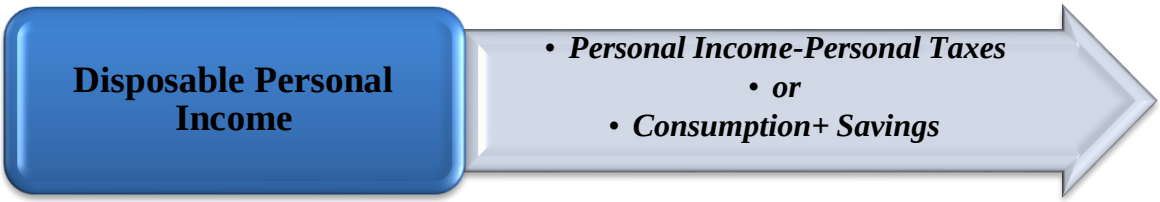


The explanation above as well as the diagram explained the difference between GrossNational product and Gross domestic product is of net factor income from abroad. On the other hand the difference between Gross Domestic Product and Net Domestic Product is of Depreciation i.e. for gross domestic product gross investment is added while for net domestic product net private investment added after deducting depreciation.Similarly the difference between market price for any concept and factor cost is of taxes and subsidies i.e. to reach at the concept of factor cost the market price must be added for subsidies and deducted for taxes.

5. Personal Income: Personal Income is the sum of all incomes actually received by all individuals or households during a year. In order to calculate personal income from the national income we have to add those incomes which are received by household but not actually earned by the households. Similarly there is need to subtract those incomes which are earned but not actually received. For Example Social Security Contributions, Corporate Income Taxes and undistributed corporate profits are earned but not actually received need to be deducted. Similarly transfer payments such as old age pension, unemploymentcompensation, relief payments etc.are received but not actually earned need to be added in national income in order to calculate personal income.



6. Disposable Personal Income: Disposable personal income refers to income available for consumption. Whole of the income which are actually received by people are not available to them for consumption. This is because government levy some personal taxes such as income tax; property tax etc.Thereforedisposable personal income is the personal income after deduction of personal taxes. Disposable personal income need not to be wholly consumed. A part of disposable personal income is consumed and other part is saved.



Difference between National Income, Personal Income and Disposable Personal Income:

The difference between these three concepts elaborated above can be summarised as below:

National Income or Net National Product at Factor Cost	Personal Income	Disposable Income
• Wages and Salaries • Rent • Interest • Profits • Net Factor Income from Abroad	• National Income • Less Undistributed Corporate Profits,Corporate Taxes,Social Security Contributions • Plus Transfer Payments	• Personal Income Less Personal Taxes • or • Consumption +Savings

14.3.1 Items Excluded from Calculation of Gross National Product and GrossDomestic Product

It is clear from the above explanation that Gross national Product and Gross Domestic Product is the total market value of all final goods and services produced in a year.In the real world many transactions occur which although involve final goods and services but are excluded from the measurement of gross national product and gross domestic product. These transactions or items can be discussed as below:

1. Buying and Selling of Securities: The sale and purchase of shares and bonds of a corporate house are not includes in the measurement of national income, asthese involve only transfer of ownership rights of the assets.No new assets are created in this transaction and hence excluded from the calculation of national income.

2. Government transfer payments: Transfer payments by government such as unemployment benefits,interest on public debt, old age pension etc.for which no goods or

services are provided in exchange by the recipient in the current year are exclude from the calculation of national income.

3.Private Transfer Payments: Private transfer payments such as pocket money given by parent to children ,gifts by elders to young ones etc.involve only transfer of money from one individual to another individual and not results in the production of any new goods or services. These are excluded from the calculation of national income.

4. Saleof Second Hand Goods:in the calculation of national income sale and purchase of old used goods such as sale of old car,sale of old house etc.are excluded from the calculation. The reason is national income measures the market value of final goods and services produced in year.Old second hand goods were produced in earlier years not in current year and hence excluded while measuring the value of output for the current year.

5. Non Market Goods and Services: National income measures the value of those goods and services which are bought and sold in the market. There are certain goods and services which are not coming in the market for sale and purchase and hence excluded from the calculation of national income. For example vegetables grown by some households in their own farm instead of buying them from the market, the work related to repairing electricity fault by house owner himself are not included in the measurement of national income. Similarly services rendered by housewife to her husband, children and other family members are not included in the measurement of national income as housewife services are not paid and hence not has market value.

6. Illegal Activities and Transactions: Incomes earned from illegal activities such as smuggling,gambling, drug trafficking,prostitution, sale of illegal arms etc. are not counted in the calculation of national income. It is because of the reason that it is difficult to know the exact value of transactions involving these illegal activities These illegal activities are part of underground economy and are unaccounted because these are unlawful.

7. The Value of Leisure: Leisure is regarded as a normal economic good.The more leisure to an individual leads to greater amount of satisfaction,although more leisure leads to greater amount of satisfaction and happiness but it is difficult to measure the market

value of such leisure.So the value of leisure although affects the generation of income but are excluded from the calculation of national income.

14.3.2 Real and Nominal National Income

Real national income is the national income at constant price .It is very useful index to measure the actual growth of an economy. It is defined as value of current output at some base year prices. It is obtained by multiplying the goods and services produced in current year with the prices prevailing in the base or constant year.

National income at current prices or nominal national income is not the proper measure of economic growth. It is defined as the value of current output at current year prices. It is obtained by the multiplying the goods and services produced in the current year with the prices prevailing in the current year.

National income at the current price includes changes in prices to neutralise the effect of change in prices. National income at current prices can be converted into national income at constant price with the help of following formula:

National Income at constant Prices= (National Income at current Prices/Price index of Current Year)xBase Year

Price Index of base year is always taken as 100.

14.3.3 Gross National Product Deflator

It measures the average level or prices of all goods and services that make Gross National Product. It is calculated by following formula:

GNP Deflator= (Nominal GNP/Real GNP) X100

14.3.4 Green GNP

Green GNP is defined as GNP which would help to attain a sustainable use of natural environment and equitable distribution of benefits of development.This concept is used to denote sustainable economic development i.e. development which should not cause

environment degradation and depletion of resources and at same time promote economic welfare for a long period of time.

14.4 CHECK YOUR PROGRESS

Answer the following Multiple Choice Questions on the basis of your knowledge regarding National Income:

1- Gross National Product equals:

a) Net National Product adjusted for inflation

b) Gross Domestic Product adjusted for inflation

c) Gross Domestic Product plus net property income from abroad

d) Net National Product plus net property income from abroad

2- The standard of living is often measured by:

a) Real GDP per capita

b) Real GDP

c) Real GDP minus population

d) Real GDP plus depreciation

3- Real national income measures:

a) Nominal national income adjusted for population change

b) Nominal national income adjusted for unemployment

c) Nominal national income adjusted for inflation

d) Nominal national income adjusted for exchange rates

4- GDP measures:

a) A country's income

b) A country's wealth

c) Consumer spending

d) Net trade income

5- Which of the following statements is true about the circular flow?

a) Output is greater than income

b) Income is more than expenditure

c) Output is less than expenditure

d) Output equals income equals expenditure

14.5 SUMMARY

Macro Economics is the study of major economics totals or aggregate. Unemployment, Inflation and productivity are regarded as three major concepts of macroeconomics. Third

concept of Macro economics which is productivity deals with generation of output in any economy. Growth of any economy depends upon output. Output leads to generation of National Income. National income is one of the macroeconomic variables that measures the total amount of money earned within a country within a year. It is the sum total of aggregate income of any country in particular year. National Income is the basic indicator of monetary growth of any country. It is the base for drafting as well as evaluation of Economic planning and different economic policies such as fiscal policy, monetary policy and other. This chapter deals with different concepts related to measurement of national income. National income or national product can be described as the money value of all final goods and services produced within the domestic territory of a country in an accounting year plus net factor income from abroad. National income or national product is the value of production by the national residents of a country (within or outside the domestic territory).On the other hand, Domestic Income is the value of production within the domestic territory of a country. The process of generation of national income can be explained with the help of circular flow of national income. Understanding the basic concepts of national income requires the understanding of circular flow of generation of national income. Circular flow of national income describes that production generates income, income give rise to demand for goods and services and demand in turn gives rise to expenditure. Expenditure leads to further production. The flow of production, income and expenditure are interlinked with each other in circular flow. The circular flow of national income has following four types: There are many different concepts of national income. The measurement of national income with the help of different methods is based on these concepts. The Gross National Product is an important concept of national income. Gross National Product is defined as the total market value of all final goods and services produced by residents of country in a year.Gross Domestic product is the money value of all final goods and a service produced by all normal residents working in the domestic territory of a country but does not include net factor income earned from abroad. Thus the difference between the gross national product and a gross domestic product arises due to the existence of net factor income from abroad.

Gross Domestic Product at market price is distinguished from gross domestic product at factor cost .The difference is of the market price and factor cost. The market price of

goods and services are raised by inclusion of indirect taxes such as excise duty, Goods and Services Tax etc. Levied by government .Similarly price is reduced by the subsidies provided by government on certain goods and services. Therefore to derive Gross Domestic Product at factor cost, gross domestic product at market price need to be adjusted. The production of gross national product of a year includes the consumption of some fixed capital such as equipment and machinery etc. The capital goods such as plant, machinery were out or fall in value as a result of consumption or use in the production process during the year. This consumption of fixed capital or fall in the value of fixed capital due to wear and tear during the year is called depreciation. When charges of depreciation are reduced from gross national product then we get net national product. So, it means Net National Product at market price is the market value of all final goods and services produced in the domestic territory of a country in a year after providing for depreciation. This consumption of fixed capital or fall in the value of fixed capital due to wear and tear during the year is called depreciation. When charges of depreciation are reduced from gross national product then we get net national product. So, it means Net National Product at market price is the market value of all final goods and services produced in the domestic territory of a country in a year after providing Personal Income is the sum of all incomes actually received by all individuals or households during a year. In order to calculate personal income from the national income we have to add those incomes which are received by household but not actually earned by the households. Similarly there is need to subtract those incomes which are earned but not actually received. For Example Social Security Contributions, Corporate Income Taxes and undistributed corporate profits are earned but not actually received need to be deducted. Similarly transfer payments such as old age pension, unemployment compensation, relief payments etc. are received but not actually earned need to be added in national income in order to calculate personal income.

14.6 KEYWORDS

National Income is defined as money value of all final goods and services produced within the domestic territory of a country in one accounting year plus net factor income from abroad.

Gross Domesticproduct at Marketpriceis defined as the market value of all final goods and services produced by the producers in the domestic territory of a country in one accounting year.

Gross National Product at Market Price is defined as the market value of all final goods and services produced in an economy during an accounting year plus net factor income from abroad.

Net National product at Market Price is the market value of final goods and services produced in an economy by normal residents during an accounting year including net factor income from abroad but exclusive of depreciation.

Net Domestic Product at Market Price is the market value of final goods and services produced exclusive of depreciation in the domestic territory of a country by its normal residents and non residents in an accounting year.

Net Domestic Product at Factor Cost is the sum of net value added by all producers in the domestic territory of a country in one accounting year which is adjusted for taxes and subsidies.

Gross Domestic Product at Factor Cost is the sum of net value added by all producers in the domestic territory of a country in one accounting year which is adjusted for taxes and subsidies and the consumption of fixed capital

Gross National Product at Factor Cost is the sum of factor cost of the product inclusive of depreciation attributable to the factors of production supplied by normal residents of the country in a year and the net factor income from abroad.

Circular Flow is the process of production, distribution and disposition goes on simultaneously in a circular manner.

Real National Income is the national income measured at constant price i.e. the value of current output at some base year price.

Nominal National Income is the national income at current price i.e. the value of current output at current prices.

Green GNP is the GNP which would help to attain a sustainable use of natural environment and equitable distribution of benefits of development.

14.7 SELF-ASSESSMENT TEST

1) Elaborate in detail circular flow of national income in two sector and three sector economy.
2) Discuss Circular Flow of National Income in four sector economy.
3) Differentiate between Real and Nominal Natuional Income.
4) Define Green GNP.
5) Differentiate between Gross Domestic Product at Market Price and Gross National Product at Market Price.
6) Differentiate between Net National Product at Market Price and Net Domestic Product at Market Price.
7) Differentiate between Net Domestic Product at Market Price and Net Domestic Product at factor cost.
8) Differentiate between Gross National Product at factor cost and Net National Product at factor cost.

MEASUREMENT OF NATIONAL INCOME

Structure

15.0 LEARNING OBJECTIVES

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

- Understand the different methods of measuring national income
- Differentiate between income, expenditure and value added method

- Explain the income method of measuring national income
- Explain the expenditure method of measuring national income
- Explain the value added method of measuring national income
- Understand the concept of net economic welfare

15.1 INTRODUCTION

This last chapter elaborates the circular flow of national income and different concepts including GNP, GDP, NNP, and NDP at factor cost and market prices.The previous chapter set the base for the measurement of national income.This chapter is about different methods related to measurement of national income.The circular flow model with different sectors explained the national income generation and distribution in a simultaneous and continuous process. It means national income is created, thendistributed, then spent and then created and so on. There are different ways of analyzing national income i.e. from the income perspective, expenditure perspective or value addition perspective. Each way of looking at national income suggests a different method of calculating national income. There are different methods of measuring national income out of which Income Method, Expenditure Method and Value addition method are used in India.These three methods are discussed in this chapter.

15.2 MEASUREMENT OF NATIONAL INCOME

The national Income can be measured from the point of view of Expenditure, Income or valueaddition of production.So there are following three methods of measurement of national income:

15.2.1 Income Method

This method measures the national income from the point of distribution of income to the different factors of production.National Income generated is paid or received by different factors of production .Thus under this method the national income is calculated by summing up the incomes of all individuals in the country.The individuals earn income by contributing their own services or the services of their resources.Thus under this method national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital and profits of entrepreneur and income of self-employed people.This method shows the distribution of national income towards different individuals such as landlords, owners of capital, worker and entrepreneur.

National Income=Sum of Factor Income paid out to residents only

According to Paul Studenski, "National income of a country can be calculated either by taking the sum of incomes paid out by producing units or by income by the factors."

National Income or NNP at Factor Cost=Compensation of Employees+ Operating Surplus(Rent+ Interest+ Profit)+Mixed Income of Self Employed+ Net Factor Income from Abroad

Steps in calculation of national income under income method:

1.The first step under this method is to identify the productive enterprises and classify them into various individual sectors such as agriculture, fishing, forestry, manufacturing, transport, trade, commerce, banking etc.

2.The second step is classifying the factor payments.The factor payments are classified into following categories:

- Components of employees which includes wages and salaries, employees contribution to social security schemes
- Rent
- Interest
- Profits including Dividends, Undistributed Profits and Corporate Income Tax
- Mixed Income of Self Employed

3. The third step is to measure factor payments. Income paid by each enterprise can be estimated by gathering information about the number of units of each factor employed and the income paid to each unit of every factor. The price paid to each factor multiplied by the number of units of each factor employed will give the factor income.

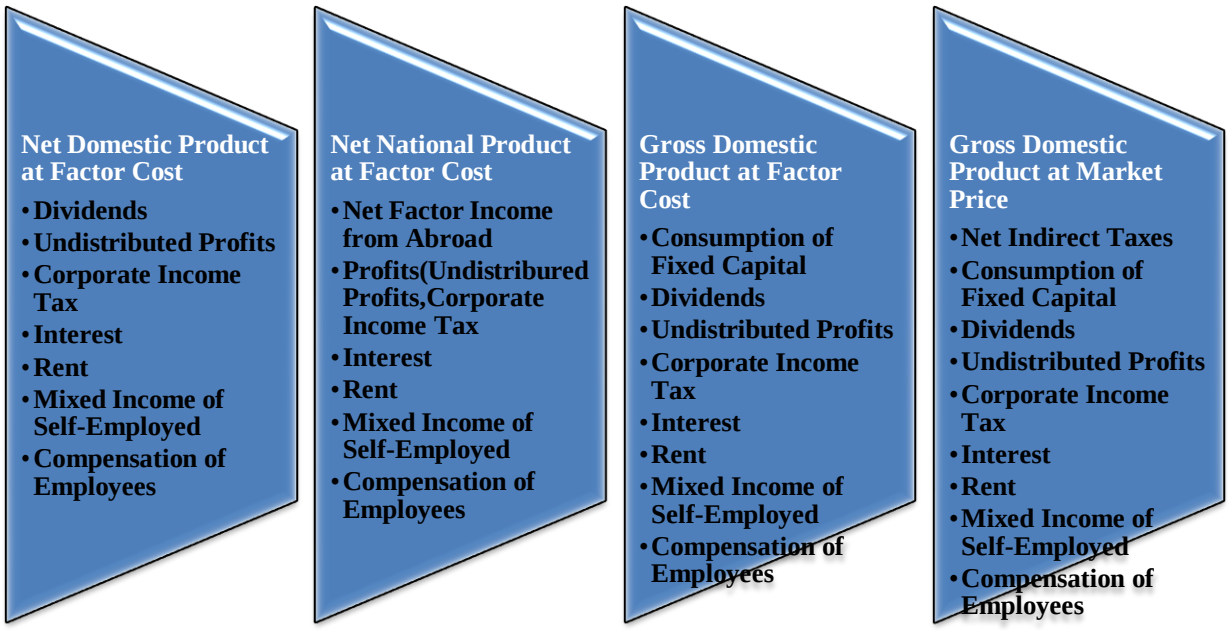
4. The next step is calculation g the factor payments by an individual sector. This is done by adding up factor payments by all enterprises belonging to an individual sector.

5. The next step is summing up the incomes paid out by all industrial sectors will give domestic factor income which is called Net Domestic Product at factor cost.

6. In the net domestic product at factor cost finally income earned from abroad id added to obtain net national product at factor cost or national income.

*Meaning of Mixed Income of Self Employed:*Mixed income of self-employed is theother category of factor income.In a country like India many people are engaged in household industries,in family farms and other unorganized enterprises.Because of self-employment nature of business it is very difficult to separate wages for the work done by the self-employed from the surplus of profits made by them.Therefore income earned by them are mixed of wages,rent,interest,and profits and therefore called mixed income.These mixed incomes are added in other factor incomes to calculate national income.

Calculation of National Income by Income Method: The steps described above can be displayed in one diagram for the calculation of national income. The diagram again presents that the difference between Net Domestic Product at Factor Cost and Net National Product at factor Cost is of net factor income from abroad. On the other hand the difference between gross domestic product at factor cost and is of gross domestic product at market price is of Net indirect taxes i.e. indirect taxes –Subsidies. The national income calculation from income perspective in all the following cases adds on the factor income paid to different factors of production.



Points to be considered for Calculation of National Income by Income Method: At the time of calculating national income through income method the following points need special consideration:

1. **Transfer Payments are not considered in the calculation of national income:** Transfer payments are not included in estimating the national income through this method.This is because these payments are not received for any service provided in the current year.

2. **Imputed Rent of Self Occupied House:** Imputed Rent of self-occupied house are included in the national income as these houses provide services to those who occupy them and its value can be easily estimated from the market value of the same.

3. **Illegal Money not included in the calculation of National Income:**Illegal Money such as money earned through smuggling is not included in the national calculation.

4.Windfall gains not included in the calculation of national income: Windfall gains such as prizes won, lotteries etc.are not included while estimating national income as they do not represent contribution to any current productive activity.

5. Corporate Profit Tax not separately included: Corporate Profit Tax i.e. tax on the profits of companies should not be separately included as it has already been included as part of profits.

6. Death duties, Gift Tax are not included in calculation of national Income: Death duties, gift tax, wealth tax, tax on lotteries etc. are paid from past savings or wealth and not from current incomes. Therefore they should not be treated as part of national income of current year.

7. Receipts from sale of second hand goods not included: The receipts from the sale of second hand goods should not be treated as part of national income. This isbecause second hand goods do not create in the new flow of goods and services in the current year.

8. Value of Production used for self-Consumption: Income equal to the value of production used for self-consumption used by farmers and others should be estimated and included in the measure of national income.

15.2.2 Expenditure Method

Expenditure method of measuring national income is also called income disposal method or consumption and investment method. Expenditure method is a method which measures the national income from the final expenditure on gross domestic product at market price during an accounting period. This method measures the national income from the point of

expenditure made on goods and services during a year. Income earned can be spent either on consumer goods or capital goods. Expenditure can be incurred by private individuals and households or by government and other enterprises. Further people of foreign countries spent on goods and services which a country exports to them. Further people of a country spend on imports of goods and services from other countries. All these expenditures are added to obtain national income by expenditure method.

Steps in calculation of national income under Expenditure method:

Following types of expenditures are added in the step by step procedure to obtain national; income by expenditure method:

1. First of all expenditure on consumer goods and services by individuals and households is considered. This is called final private consumption expenditure and is denoted by C.

2. Secondly, Government expenditure on goods and services is added. This is called government final consumption expenditure and is denoted by G.

3. The expenditure by productive enterprises on capital goods and inventories of stock. This is called gross domestic capital formation or gross domestic investment and is denoted by GDCF.GDCF is divided into two parts:

- Gross Fixed Capital Formation
- Addition to stocks or Inventories

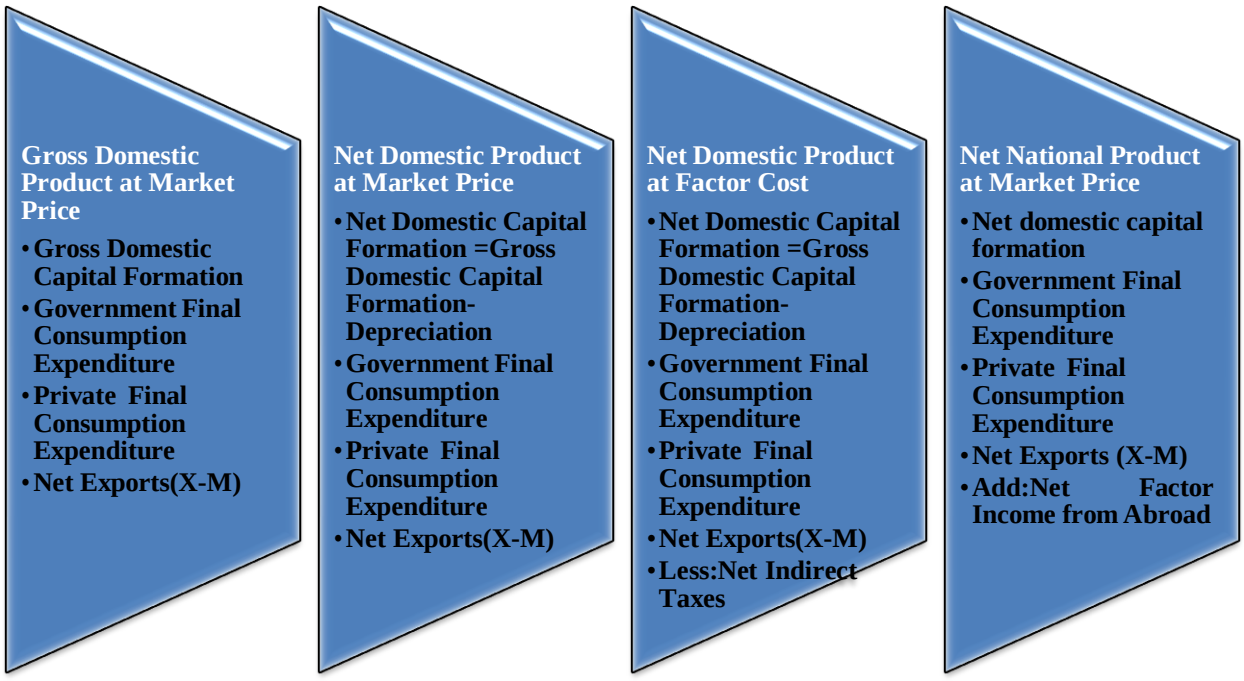
4. In the next step Net Exports are added .Net Exports are the difference between exports and imports. Exports are expenditure made by foreigners to buy goods and services exported to other countries and are denoted by X.From this export imports are deducted to get net exports.

The addition of above stated four steps result into Gross Domestic Product at Market Price or GDPmp.

Gross Domestic Product at Market Price=

Private final Consumption Expenditure+ Government's final consumption expenditure+ Gross Domestic Capital Formation+ Net Exports.

Calculation of National Income by Expenditure Method: The steps described above can be displayed in one diagram for the calculation of national income. The diagram again presents that the difference between Net Domestic Product at Factor Cost and Net National Product at factor Cost is of net factor income from abroad. On the other hand the difference between gross domestic product at factor cost and is of gross domestic product at market price is of Net indirect taxes i.e. indirect taxes –Subsidies. The national income calculation from expenditure perspective in all the following cases adds on the expenditure on goods and services by different sectors of economy.



So we can say that:

$$GDP=C+G+I+(X-M)$$

$$=C+G+I+Xn$$

Points to be considered for Calculation of National Income by Expenditure Method: At the time of calculating national income through expenditure method the following points need special consideration:

1. Second Hand Goods: The expenditure made on second hand goods should not be included because this does not contribute to the current year production of goods and services.

2. Purchase of shares and bonds: Expenditure on purchase of old shares and bonds from other people and from business enterprises should not be included while estimating gross domestic product through expenditure method. This is because of the reason that bonds and shares are just financial claims and not represent expenditure on currently produced goods and services.

3. Expenditure on Transfer Payments: Expenditure on transfer payments by government such as payment of unemployment benefits, old age pension shall not be included in the calculation of national income. The reason is that because of these payments no goods or productive services are produced in exchange by the recipients of these payments.

4. Expenditure on intermediate Goods: Expenditure on intermediate goods such as fertilizers and seeds by farmers and wool, cotton and yarn by manufacturing firms shall not be included in the calculation of national income. The reason is that the expenditure

on only final goods and services is included in the calculation of national income and not the expenditure on intermediate goods.

15.2.3 Value Added Method

Product Method or Value Added Method is also called Industrial Origin method or net output method.Value added method is defined as that method,which measures the national income by estimating the contribution of each producing enterprise to production in the domestic territory of the country in accounting year. This is also called output method or production method. In this method the contribution of each enterprise to the generation of flow of goods and services is measured. Under this method, the economy is divided into different sectors such as agriculture, industry, fishing, mining, construction, manufacturing, trade and commerce, transport, communication and other services. Then the Net Value Added at factor cost by each productive enterprise as well as by each industry or sector is estimated. Measuring Net Value Added at factor cost by each industry requires first to find out value of output. Value of output of an enterprise is found only by multiplying the physical output with market prices of the goods produced.

Steps in calculation of national income under Value Added Method:

Following steps are followed for the calculation of national income by value added method:

National Income by Value Added Method=

1. ***Gross Value Added by Primary Sector within the domestic territory***
2. ***+ Gross Value Added by Secondary Sector within the domestic territory***
3. ***+ Gross Value Added by Tertiary Sector within the domestic territory***
4. ***–Depreciation***
5. ***–Net Indirect Taxes***
6. ***+Net Factor Income from Abroad***

1. First of all economy is divided into different sectors such as agriculture, fishing,mining,manufacturing,construction,transport,communication etc.

2. Value of output of each enterprise and sector is calculated. This is calculated by multiplying their physical output with market prices of Goods produced.

3. Net value added at factor cost by each productive enterprise as well as by each industry sector is calculated by adding the value of their output.

4. The following items are excluded while calculating the value of output:

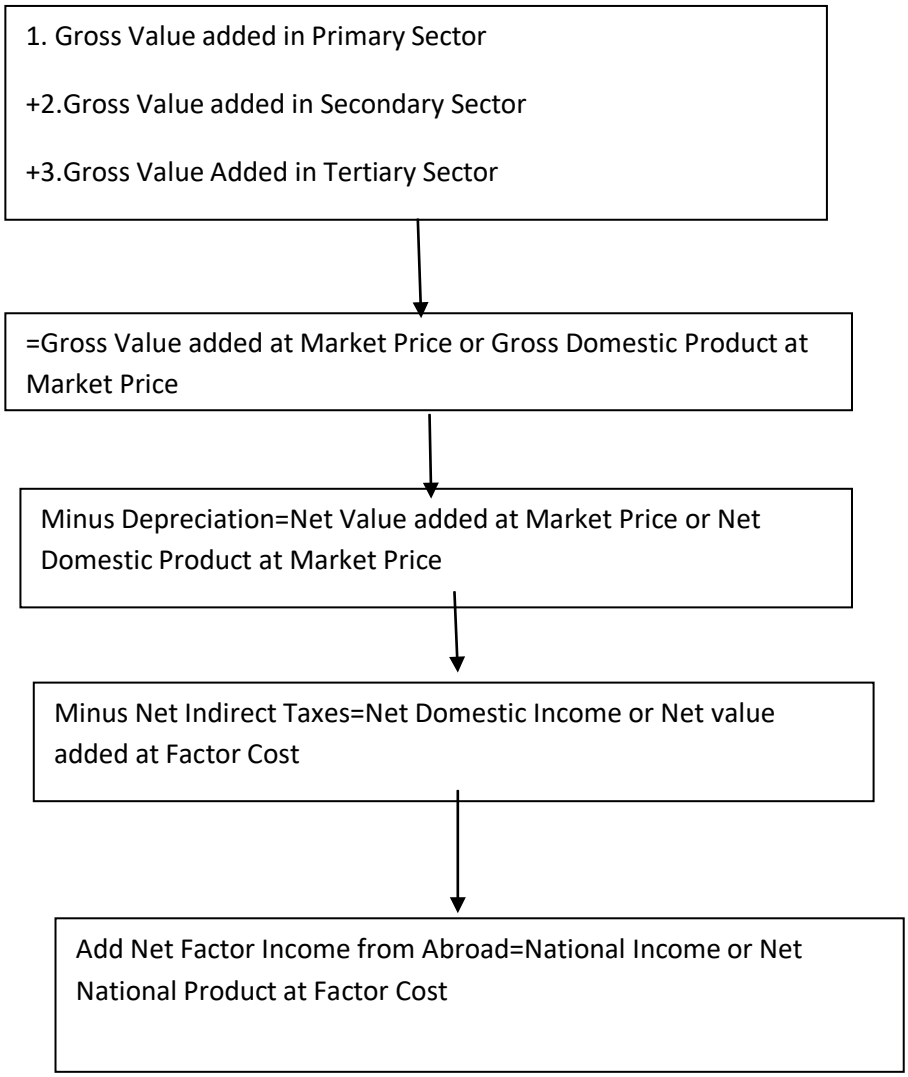
- Intermediate consumption which is the value of goods such as raw material, fuel purchased from other firms.
- Consumption of fixed capital i.e. depreciation
- Net indirect taxes

5.Summing up the net value added at factor cost by all productive enterprises of an industry or sector gives the net value added at factor cost of each industry or sector. We then add up net value added at factor cost by all industries or sectors to get net domestic product at factor cost.

6. Lastly, to the net domestic product we add the net factor income from abroad to get net national product at factor cost which is also called national income. Thus:

National Income or Net National Product at factor cost = Net Domestic Product at factor cost+Net Factor income from abroad

Calculation of National Income by Value Added Method:



The above flow chart represents calculation of National Income by Value Added Method. A very important error that all statisticians often encounter while calculating national income is that of double counting. Efforts must be taken to include only final goods and services and not intermediate goods in calculating national income. By strictly saying value added at each stage and taking care to subtract expenditure on intermediate goods,

double counting can be properly avoided and wages, interest, rent and profit can be recorded exactly one time.

Points to be considered for Calculation of National Income by Value AddedMethod: At the time of calculating national income through value added method the following points need special consideration:

1. Value of Imputed Rent: Imputed Rent which is the value of rent of self-occupied house should be included in the value of output. Although these payments are not made to others, their value can be easily determined from prevailing rental value in the market.

2. Sale and Purchase of second hand goods: Sale and purchase of second hand goods should not be included in the measurement of national income of a year because their values were considered in the year of output of their production. But commission or brokerage earned in their sale and purchase should be included because this is a new service rendered in the current year.

3. Value of Production for Self Consumption: Value of production for self-consumptionis to be counted for measuring national income. The value of self-production is determined at current market price.

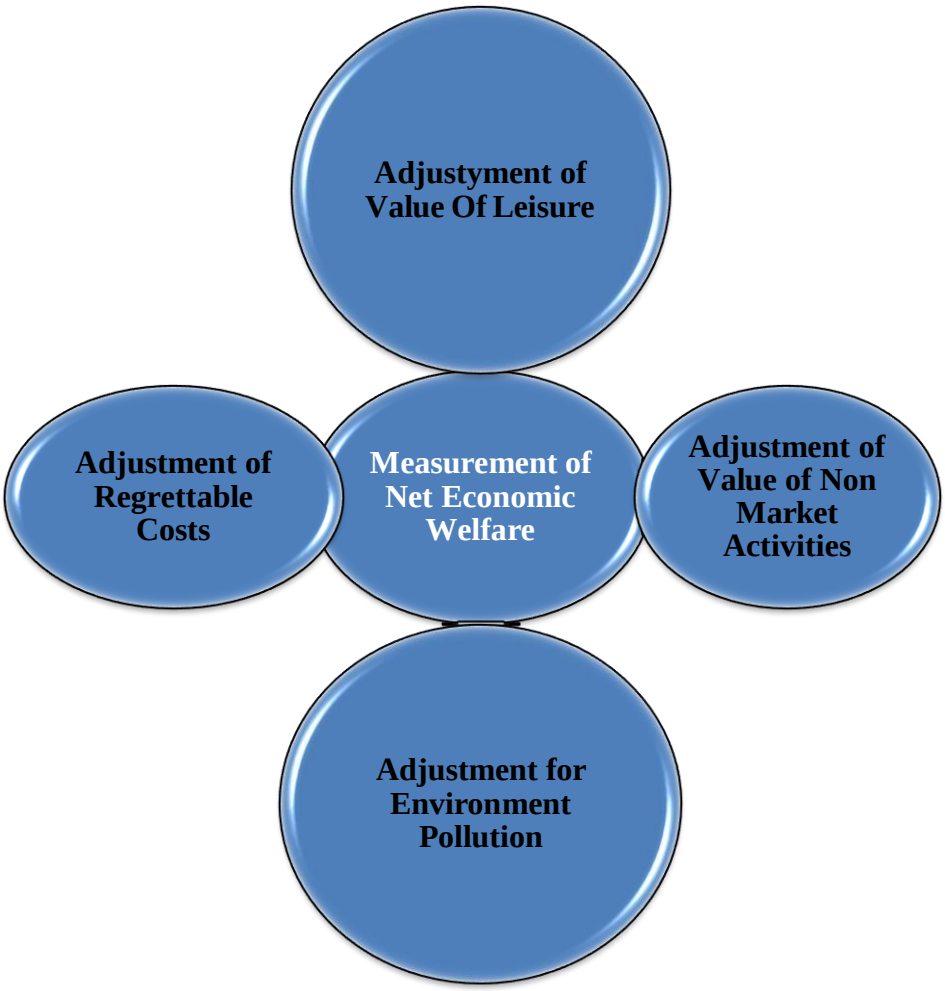
4. Value of Services of Housewives: Value of services of housewives are not included because it is not easy to correctly find out the value of their services at the prevailing market price.

5. Value of Intermediate Goods: Value of intermediate goods must not be counted while measuring the value added because this will amount the double counting.

6. Census of Production: This method can be easily employed where there is census of production for the year. In many countries the data for production of only important industries are known. Hence this method is employed along with other methods to calculate national income.

15.2.4 Validity of National Income as a Measure of Economic Welfare

National income is generally regarded as a measure of economic welfare. It is considered that an increase in national income leads to increase in economic welfare also and vice versa. The reason is that goods and services satisfy the wants of people and leads to satisfaction, national income which is based on production of these goods and services is regarded as measure of satisfaction or economic welfare. But in modern times economists have raised doubts regarding validity of national income as measure of economic welfare. The economists stated that national income requires certain adjustments in terms of certain additions and deductions to measure economic welfare. Nationalincome includes certain things which do not increase economic welfare. Thus all these things must be excluded in order to get true measure of economic welfare. The true measure of economic welfare is called Net Economic Welfare or NEW .Similarly usual concept of national income excludes some goods and services which increase satisfaction of people and therefore ought to be included in any good Index of Net Economic Welfare. The measurement of Net Economic Welfare is explained below:



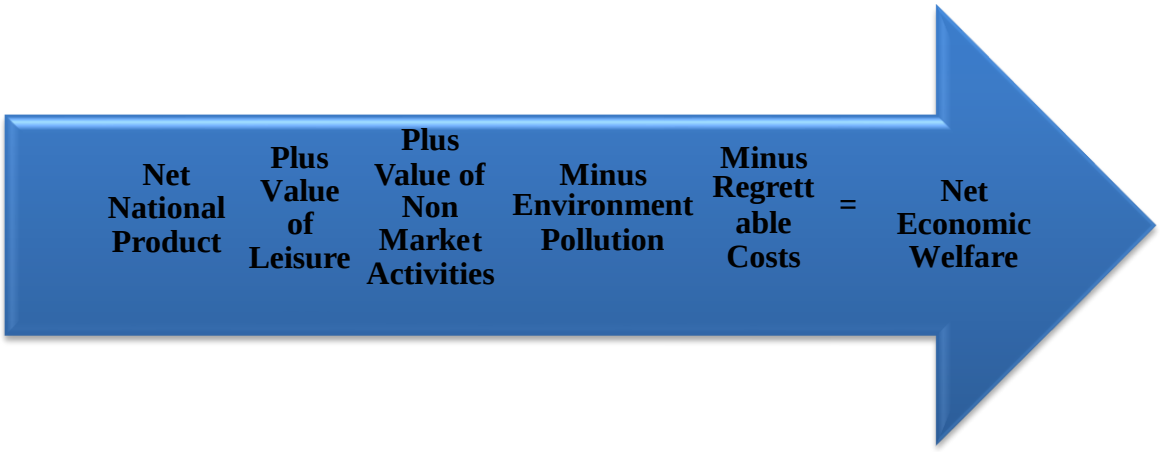
1. Adjustment for Value of Leisure: The usual concept of measurement of national income does not attach any significance to the amount of leisure people enjoy. The individual derive satisfaction not only from the consumption of goods and services but also from leisure. Therefore the construction of index of net economic welfare requires the value of leisure must be added.For example if average working hours are reduced ,this is likely to reduce national income as it will lead to less production but may raise welfare of people by enabling them to enjoy more leisure.

2. Adjustment for Non Market Activities: The other thing which must be added for the measurement of net economic welfare is the market value of non-market personal

activities or services. These activities not included in the national income but lead to raise the satisfaction or welfare of people. For example services rendered by housewife to the family members greatly add to their welfare but they are not recorded in the national incomeaccounting. Similarly services rendered by individuals to themselves such as gardening, painting one's own house raise their satisfaction or welfare but are not included in the calculation of national income. The market value of such services is added to get the value of net economic welfare.

3. Adjustment for Environment Pollution: The production process of industries many a times leads to environment pollution such as polluting air, water and calmness which reduce the welfare of people.These activities may lead to more production and hence increase the value of national income. But as these are harmful for welfare of people so requires adjustment for calculation of net economic welfare. The cost of these activities or pollution is deducted from national income to get the value of net economic welfare.

4. Adjustmentfor Regrettable Cost: Regrettablecost includes wasteful and non-productive expenditure of government. This includes expenditure on police and law courts so as to maintain law and order and on defence to protect the country from external aggression. These costs have been called as regrettable costs because economists consider them necessary expenditure which does not lead to increase in welfare .So the calculation of Net economic welfare can be presented as below:



15.3 OTHER CONSIDERATIONS OR CAUTIONS IN THE MEASUREMENT OF NATIONAL INCOME

Net Economic Welfare as discussed above may not represent truly the welfare of people and following points demand consideration at the time of calculation of national income and formulation of economic policies on the basis of the same:

1. **Distribution of Income should be Equal:** The national income volume should be interpreted along with distribution of national income.If with increase in total national income and per capita income rich are getting rich and poor are getting poorer ,then this kind of growth in the national income cannot be said of promoting welfare.The growth of national income does not truly indicate the welfare or well being of people if it is unequally distributed.It is necessary that the growth of national income should be accompanied by increasing the employment opportunities and reduction of poverty.

2. **Composition of Output:** National income should be seen along with the composition of output to conclude anything about welfare of people.The national income of a country may be very high but the welfare of people will be very low if the composition of output mainly include the war materials and equiplments.

3.Relative Proportion of Necessaities and luxuries: The welfare of people also depends upon the proportion of necesasities and luxurires in the composition of national product.The welfare of people requires greater proportion of necessaities in the composition of total output.If the proportion of luxuries is very high then the rich will be enjoying abundance of luxuries and poor will be deprived of even the necessaities of life.This will lead to reduction in welfare of people.

4.The Method of Generation of National Income: The increase in national income will not lead to increase in welfare of the people if it does not take into account how the national income is being produced .If incresae in national income has been brought about by forcing workers to work for longer hours and exploiting them,impairing their health and efficiency ,then this increase in national income will not lead to increase in welfare of people.Similarly if increse in national income has been achieved by more machines and leading to unemployment of workers even then welfare will be reduced.

Thus it can be concluded that increase in welfare of nation cannot be judged from the increse in national income.It should be reconsidered and concluded with other indicators such as unemployment,reduction in poverty and equality in the distribution of national income.

15.5 Summary

This chapter is about different methods related to measurement of national income. The circular flow model with different sectors explained the national income generation and distribution in a simultaneous and continuous process. It means national income is created, then distributed, then spent and then created and so on. There are different ways of analyzing national income i.e. from the income perspective, expenditure perspective or value addition perspective. Each way of looking at national income suggests a different method of calculating national income. There are different methods of measuring national income out of which Income Method, Expenditure Method and Value addition method are used in India. These three methods are discussed in this chapter. The national Income can be measured from the point of view of Expenditure, Income or value addition of

production. This income method measures the national income from the point of distribution of income to the different factors of production. National Income generated is paid or received by different factors of production .Thus under this method the national income is calculated by summing up the incomes of all individuals in the country. The individuals earn income by contributing their own services or the services of their resources. Thus under this method national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital and profits of entrepreneur and income of self-employed people. This method shows the distribution of national income towards different individuals such as landlords, owners of capital, worker and

entrepreneur. Expenditure method of measuring national income is also called income disposal method or consumption and investment method. Expenditure method is a method which measures the national income from the final expenditure on gross domestic product at market price during an accounting period. This method measures the national income from the point of expenditure made on goods and services during a year. Income earned can be spent either on consumer goods or capital goods. Expenditure can be incurred by private individuals and households or by government and other enterprises. Further people of foreign countries spent on goods and services which a country exports to them. Further people of a country spend on imports of goods and services from other countries. All these expenditures are added to obtain national income by expenditure method.Product Method or Value Added Method is also called Industrial Origin method or net output method. Value added method is defined as that method, which measures the national income by estimating the contribution of each producing enterprise to production in the domestic territory of the country in accounting year. This is also called output method or production method. In this method the contribution of each enterprise to the generation of flow of goods and services is measured. Under this method, the economy is divided into different sectors such as agriculture, industry, fishing, mining, construction, manufacturing, trade and commerce, transport, communication and other services. Then the Net Value Added at factor cost by each productive enterprise as well as by each industry or sector is estimated. Measuring Net Value Added at factor cost by each industry requires first to find out value of output. Value of output of an enterprise is found only by multiplying the physical output with market prices of the goods produced.National income is generally regarded as a measure of economic welfare. It is considered that an increase in national income leads to increase in economic welfare also and vice versa. The reason is that goods and services satisfy the wants of people and leads to satisfaction, national income which is based on production of these goods and services is regarded as measure of satisfaction or economic welfare. But in modern times economists have raised doubts regarding validity of national income as measure of economic welfare. The economists stated that national income requires certain adjustments in terms of certain additions and deductions to measure economic welfare. National income includes certain things which do not increase economic welfare. Thus all these things must be excluded in order to get true measure of economic welfare. The true

measure of economic welfare is called Net Economic Welfare or NEW .Similarly usual concept of national income excludes some goods and services which increase satisfaction of people and therefore ought to be included in any good Index of Net Economic Welfare.Thus it can be concluded that increase in welfare of nation cannot be judged from the increse in national income.It should be reconsidered and concluded with other indicators such as unemployment,reduction in poverty and equality in the distribution of national income.

15.6 KEYWORDS

Value Added Method It is defined as a method which measures the national income by estimating the contribution of each producing enterprise to production in the domestic territory of a country in an accounting year.

Income Method is the method in which national income is measured in terms of payments made to primary factors of production.

Expenditure Method is a method which measures the final expenditure on gross domestic product at market price during an accounting year.

Net Economic Welfare is the measure of growth which requires certain adjustment in national income to measure the true economic welfare of a Nation.

15.7 SELF-ASSESSMENT TEST

1) Explain measurement of National income by Income method. Which are different precautions should be taken at the time of measurement of national income by income method.

2) Explain measurement of National income by Expenditure method. Which are different precautions should be taken at the time of measurement of national income by Expenditure method.

3) Explain measurement of National income by Product or Value Added Method. Which are different precautions should be taken at the time of measurement of national income by Product or Value Added Method. Define Green GNP.

4) Differentiate between Income Method, Expenditure Method and Value Added Method of measuring National Income.

5) What is meant by Net Economic Welfare? How is Net Economic Welfare derived from National Income?