

**Subject: Economic Analysis**  
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**Lesson: 01**

## **INTRODUCTION TO ECONOMIC ANALYSIS**

**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

### **LESSON STRUCTURE**

- 1.1 Introduction
- 1.2 Why to Study Economics?
- 1.3 Basic Themes of Economics
- 1.4 Microeconomics and Macroeconomics
- 1.5 The Logic of Economics
- 1.6 What Can Economics Do?
- 1.7 Major Problems of an Economy
- 1.8 Alternative Economic Systems
- 1.9 Economic Inputs and Outputs
- 1.10 Economic Analysis
- 1.11 Summary
- 1.12 Self- Assessment Exercise
- 1.13 Suggested Readings

### **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)*

Nook 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 ago, 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.

### **1.3 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 they 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.

## 1.4 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.

## **1.5 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.

## **1.6 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.

## **1.7 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.

## 1.8 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.

## **1.9 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 Scarce Resources Implies the Guns-Butter Tradeoff		
	Butter	Guns
Possibilities	(millions of rupees)	(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 Table 1.1, 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.

## 1.10 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.

## **1.11 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*.)

## 1.12 Self-Assessment Exercise

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.

### **1.13 Suggested Readings**

1. Modern Microeconomics *by* A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. Micro-Economic Theory *by* M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. Managerial Economics *by* D.N. Dwivedi. Vikas Publishing House., New Delhi.
4. Managerial Economics and Business Strategy *by* Michael P. Beye. IRWIN., Chicago.
5. Economics: Principles, Problems and Policies *by* C. R. McConnell and S. L. Brue. McGraw Hill., New York.
6. Economic Analysis *by* K.P.M. Sundharam and E. N. Sundharam. Sultan Chand and Sons., New Delhi.
7. Managerial Economics *by* R. L. Varshney and K. L. Maheshwari. Sultan Chand and Sons., New Delhi.

**Subject: Economic Analysis**  
**Course Code: MC-104**

**Author: Dr. Karam Pal**  
**Vetter: Dr. B S Bodla**

**Lesson: 02**

## **MANAGERIAL ECONOMICS: AN OVERVIEW**

Objectives: **On learning this lesson, the students will be able to understand the fundamental managerial economics and its related concepts.**

### ***Structure***

- 2.1. *What is Managerial Economics?*
- 2.2. *What is Economic Analysis?*
- 2.3. *Economic Reasoning*
- 2.4. *Summary*
- 2.5. *Self-Assessment Questions*
- 2.6. *Suggested Readings*

### **2.1 What is Managerial Economics?**

Economics (from the [Greek](#) οίκος [oikos], 'house', and νομος [nomos], 'rule', hence "household management") is a [social science](#) that studies the [production](#), [distribution](#), [trade](#) and [consumption](#) of [goods](#) and [services](#). Economics is said to be [normative](#) when it recommends one choice over another, or when a subjective value judgment is made. Conversely, economics is said to be [positive](#) when it tries objectively to predict and explain consequences of choices, given a set of [assumptions](#) and/or a set of [observations](#). The choice of which assumptions to make in building a model as well as which observations to highlight is, however, normative.

Economics, which focuses on measurable variables, is broadly divided into two main branches: [microeconomics](#), which deals with individual agents, such as households and businesses, and [macroeconomics](#), which considers the economy as a whole, in which case it considers [aggregate supply](#) and

[demand](#) for [money](#), [capital](#) and [commodities](#). Aspects receiving particular attention in economics are [resource allocation](#), production, distribution, trade, and [competition](#). Economic logic is increasingly applied to any problem that involves choice under scarcity or determining economic [value](#).

The mainstream economic theory currently in vogue in the business schools of most industrial countries is [neoclassical economics](#).

Economics is usually divided into two main branches: [Microeconomics](#), which examines the economic behavior of individual actors such as businesses, households, and individuals, with a view to understand decision making in the face of scarcity and the consequences of these decisions.

[Macroeconomics](#), which examines an economy as a whole with a view to understanding the interaction between economic aggregates such as [national income](#), [employment](#) and [inflation](#). Note that [general equilibrium](#) theory combines concepts of a macro-economic view of the economy, but does so from a strictly constructed microeconomic viewpoint.

Attempts to join these two branches or to refute the distinction between them have been important motivators in much of recent economic thought, especially in the late [1970s](#) and early [1980s](#). Today, the consensus view is arguably that good macroeconomics has solid microeconomic foundations. In other words, its premises ought to have theoretical and evidential support in microeconomics.

Why is managerial economics so valuable to a great diverse group of decision makers? The answer lies in the meaning of the term managerial economics. A manager is a person who directs resources to achieve a stated goal. Economics is the science of making decision in the presence of scarce resources. Then managerial economics is the study of how to direct

resources in the way that most that most efficiently achieves a managerial goal. The nature of sound managerial decisions varies depending on the underlying goals of the manager. An effective manager should:

1. Identify goals and constraints: Making sound decisions implies to have a well-defined *goal*, because different goals entail making different decisions. *Constraints* limit the decision-capacity of the manager.
2. Recognize the nature and importance of profits: *Economic profits* are the difference between total revenue and total opportunity cost of producing of producing the firm's goods or services. The *opportunity cost* of using a resource is the cost of explicit and implicit resources that are forgone when a decision is made.
3. Understand incentives: Profits signal to resource holder where resources are more highly valued by society. According to Adam Smith, by moving scarce resources toward the production of goods most valued by society, the total welfare of society is improved. This phenomenon is due not to benevolence on the part of the firms' manager but to the *self-interested goal of maximizing profit*.
4. Understand markets: It is important to bear in mind that there are always two sides to every transaction in a market.

Managerial Economics uses the tools of economics to help managers make decisions. Recall that economics is a social science that uses the scientific method (observe, theorize, test, refine theory) to try to understand how the economy and its many parts function and interrelate. This allows economists to forecast future economic conditions. Perhaps you can see how this ability can be useful to managers making decisions such as these: • Production methods • Strategic responses to competitors • Research and

development and many more. In this class you won't learn enough to become practicing economists, but:

- You will be able to communicate in a knowledgeable manner with economists.
- You will be able to use the economists' way of thinking, which is to dispassionately

## **2.2 *What is Economic Analysis?***

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*.)

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.

Some corporations in fact use elaborate computer programs to minimize costs or maximize their profits, and the entire field of operations research

was designed to create and implement such maximization programs. Thus, while individuals don't carry out the calculations, some companies do. A good example of economic reasoning is the sunk cost fallacy. Once one has made a significant non-recoverable investment, there is a psychological tendency to invest more even when the return on the subsequent investment isn't worthwhile. France and Britain continued to invest in the Concorde (a supersonic aircraft no longer in production) long after it became clear that the project would generate little return. Watching a movie to the end, after you are convinced that it stinks, would be another example. The fallacy is the result of an attempt to make an investment, which you wish you hadn't made, turn out to be good, even when you are sure it won't. The popular phrase associated with the sunk cost fallacy is "throwing good money after bad." The fallacy of sunk costs arises because of a psychological tendency to try to make an investment pay off when something happens to render it obsolete. It is a mistake in most circumstances. The fallacy of sunk costs is often thought to be an advantage of casinos. People who lose a bit of money gambling hope to recover their losses by gambling more, with the sunk "investment" in gambling inducing an attempt to make the investment pay off. The nature of most casino gambling is that the house wins on average, which means the average gambler (and even the most skilled slot machine or craps player) loses on average. Thus, for most, trying to win back losses is to lose more on average.

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.

Finally, one last introductory warning before we get started. A parody of economists talking is to add the word *marginal* before every word. Marginal is just economist’s jargon for “the derivative of.” For example, marginal cost is the derivative of cost; marginal value is the derivative of value. Because introductory economics is usually taught to students who have not yet studied calculus or can’t be trusted to remember even the most basic elements of it, economists tend to avoid using derivatives and instead talk about the value of the next unit purchased, or the cost of the next unit, and describe that as the marginal value or cost. This book uses the term marginal frequently because one of the purposes of the book is to introduce the necessary jargon so that you can read more advanced texts or take more advanced classes. For an economics student not to know the word marginal would be akin to a physics student not knowing the word mass. The book minimizes jargon where possible, but part of the job of a principles student is to learn the jargon, and there is no getting around that.

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.

The value of items – French fries, eyeglasses, violins – is not necessarily close to what one has to pay for them. For people with bad vision, eyeglasses might be worth ten thousand dollars or more, in the sense that if eyeglasses and contacts cost \$10,000 at all stores, that is what one would be willing to pay for vision correction. That one doesn't have to pay nearly that amount means that the consumer surplus associated with eyeglasses is enormous. Similarly, an order of French fries might be worth \$3 to a consumer, but because French fries are available for around \$1, the consumer obtains a surplus of \$2 in the purchase. How much is a second order of French fries worth? For most of us, that first order is worth more than the second one. If a second order is worth \$2, we would still gain from

buying it. Eating a third order of fries is worth less still, and at some point we're unable or unwilling to eat any more fries even when they are free, which implies that at some point the value of additional French fries is zero. We will measure consumption generally as units per period of time, e.g. French fries consumed per month.

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.

### **2.3 *Economics Reasoning***

Economics relies on rigorous styles of argument. Economic methodology has several interacting parts: Collection of economic data. These data consist of measurable values of price and changes in price, for measurable

commodities. For example: the cost to hire a worker for a week, or the cost of a particular commodity, and how much is typically used. Formulation of [models](#) of economic relationships, for example, the relationship between the general level of prices and the general level of employment. This includes observable forms of economic activity, such as [money](#), consumption, preferences, buying, selling, and prices. Some of the models are simple [accounting](#) models, while others postulate specific kinds of economic behavior, such as utility or profit maximization. An example of a model that illustrates both of these aspects is the classical mathematical formulation of the [Keynesian](#) system involving the [consumption function](#) and the [national income](#) identity. This article will refer to such models as formal models, although they are not formal in the sense of [formal logic](#).

Production of economic statistics. Taking the data collected, and applying the model being used to produce a representation of economic activity. For example, the "general price level" is a theoretical idea common to macroeconomic models. The specific inflation rate involves taking measurable prices, and a model of how people consume, and calculating what the "general price level" is from the data within the model. For example, suppose that diesel fuel costs 1 euro a liter: To calculate the price level would require a model of how much diesel an average person uses, and what fraction of its income is devoted to this—but it also requires having a model of how people use diesel, and what other goods they might substitute for it. Reasoning within economic models. This process of reasoning (see the articles on [informal logic](#), [logical argument](#), [fallacy](#)) sometimes involves advanced mathematics. For instance, an established (though possibly unexamined) tradition among economists is to reason about economic variables in two-dimensional graphs in which curves representing relations between the axis variables are parameterized by various indices. A good example of this type of reasoning is exhibited by

[Paul Krugman's](#) online essay, *There's something about macro*. See also the article [IS/LM model](#). One critical analysis of economic reasoning is studied in [Paul Samuelson's](#) thesis, *Foundations of Economic Analysis*: he identifies a class of assertions called operationally meaningful theorems which are those that can be meaningfully formulated within an economic model. As usual in science, the conclusions obtained by reasoning have a [predictive](#) as well as confirmative (or dismissive) value. An example of the predictive value of economic theory is a prediction as to the effect of current deficits on interest rates 10 years into the future. An example of the confirmative value of economic theory would be confirmation (or dismissal) of theories concerning the relation between marginal tax rates and the deficit.

Formal modeling is motivated by general principles of consistency and completeness. Formal modeling has been adapted to some extent by all branches of economics. It is not identical to what is often referred to as [mathematical economics](#); this includes, but is not limited to, an attempt to set [microeconomics](#), in particular general equilibrium, on solid [mathematical](#) foundations. Some reject mathematical economics: The [Austrian School](#) of economics believes that anything beyond simple logic is often unnecessary and inappropriate for economic analysis. In fact, the entire empirical-deductive framework sketched in this section may be rejected outright by that school. However, the framework sketched here accurately represents the current predominant view of economics.

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.

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?



This proposition is quite easy to see. To maximize the gains from trade, clearly the highest value buyers must get the goods. Otherwise, if there is a potential buyer that doesn't get the good with higher value than one who does, the gains from trade rise just by diverting the good to the higher value buyer. Similarly, the lowest cost sellers must supply those goods; otherwise we can increase the gains from trade by replacing a higher cost seller with a lower cost seller. Thus, the only question is how many goods should be traded to maximize the gains from trade, since it will involve the lowest cost sellers selling to the highest value buyers. Adding a trade increases the total gains from trade when that trade involves a buyer with value higher than the seller's cost. Thus, the gains from trade are maximized by the set of transactions to the left of the equilibrium, with the high value buyers buying from the low cost sellers.

In the economist's language, the equilibrium is *efficient*, in that it maximizes the gains from trade, under the assumption that the only people affected by any given transaction are the buyers and seller. Supply and demand offers one approach to understanding trade, and it represents the most important and powerful concept in the toolbox of economists. However, for some issues, especially those of international trade, another related tool is very useful: the production possibilities frontier. Analysis using the production possibilities frontier was made famous by the "guns and butter" discussions of World War II. From an economic perspective, there is a tradeoff between guns and butter – if a society wants more guns, it must give up something, and one thing to give up is butter. That getting more guns might entail less butter often seems mysterious, because butter, after all, is made with cows, and indirectly with land and hay. But the manufacture of butter also involves steel containers, tractors to turn the soil,

transportation equipment, and labor, all of which either can be directly used (steel, labor) or require inputs that could be used (tractors, transportation) to manufacture guns. From a production standpoint, more guns entail less butter (or other things).

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.

Fixed factors of production give particular regions a comparative advantage in the production of some kinds of goods, and not in others. Europe, the United States and Japan have a relative abundance of highly skilled labor, and have a comparative advantage in goods requiring high skills, like computers, automobiles and electronics. Taiwan, South Korea, Singapore and Hong Kong have increased the available labor skills, and now manufacture more complicated goods like VCRs, computer parts and the like. Mexico has a relative abundance of middle-level skills, and a large number of assembly plants operate there, as well as clothing and shoe manufacturers. Lower skilled Chinese workers manufacture the majority of the world's toys. The skill levels of China are rising rapidly.

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.

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

#### **2.4 *Managerial Economics and Mathematical Pedestal***

The language of economics is mathematics; models constructed by economists are highly mathematical. In this class we shall not employ the level of mathematical sophistication used by most practicing economists. Still, we shall employ a lot of algebra and a bit of calculus. In another set of class notes we shall review some of the mathematical techniques that we shall use in our course.

**Managerial economics** (also called **business economics**), is a branch of [economics](#) that applies [microeconomic](#) analysis to specific business decisions. As such, it bridges economic theory and economics in practice. It draws heavily from quantitative techniques such as [regression](#) and [correlation](#), [Lagrangian calculus](#), [linear programming](#), decision theory, and [game theory](#). It is similar to [operations research](#) in this regard, and indeed uses operations research techniques.

If there is a unifying theme that runs through most of managerial economics it is the attempt to [optimize](#) business decisions given the firm's objectives and given constraints imposed by scarcity.

Almost any business decision can be analysed with managerial economics techniques, but it is most commonly applied to:

**Demand estimation** - statistical techniques such as regression analysis are used to determine the level of demand for a [product](#), [service](#), or [brand](#).

**Risk analysis** - various uncertainty models, decision rules, and [risk](#) quantification techniques are used to assess the riskiness of a decision.

**Production analysis** - microeconomic techniques are used to analyse [production efficiency](#), [optimum factor allocation](#), [costs](#), [economies of scale](#) and to estimate the firm's cost function.

**Pricing analysis** - microeconomic techniques are used to analyse various [pricing decisions](#) including [transfer pricing](#), [joint product pricing](#), [price discrimination](#), price elasticity estimations, and choosing the optimum pricing method.

**Capital budgeting** - Investment theory is used to examine a firm's [capital purchasing decisions](#).

At universities, the subject managerial economics is taught primarily to advanced undergrads. It is approached as an integration subject. That is, it integrates many concepts from a wide variety of prerequisite courses.

## 2.5 *Summary*

Economics studies the optimum allocation of scarce resources among people – examining what goods and services wind up in the hands of which people. Why scarce resources? Absent scarcity, there is no significant allocation issue. All practical, and many impractical, means of allocating

scarce resources are studied by economists. Markets are an important means of allocating resources, so economists study markets. Markets include stock markets like the New York Stock Exchange, commodities markets like the Chicago Mercantile, but also farmer's markets, auction markets like Christie's or Sotheby's (made famous in movies by people scratching their noses and inadvertently purchasing a Ming vase) or eBay, or more ephemeral markets, such as the market for music CDs in your neighborhood. In addition, goods and services (which are scarce resources) are allocated by governments, using taxation as a means of acquiring the items. Governments may be controlled by a political process, and the study of allocation by the politics, which is known as political economy, is a significant branch of economics.

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.

## **2.6 Self-Assessment questions**

1. *“Managerial 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 tools of managerial economics that are essentials in decision making process.*
3. *“The objective of managerial economics is not merely to discover the truth but also to assist in the solution of concrete problems.”  
Comment.*

## **2.7 Suggested Readings**

1. *Modern Microeconomics by A. Koutsoyiannis.* ELBS, The Macmillan Press Ltd., London.
2. *Micro-Economic Theory by M. L. Jhingan.* Vrinda Publications (P) Ltd., Delhi.
3. *Managerial Economics by D.N. Dwivedi.* Vikas Publishing House., New Delhi.
4. *Managerial Economics and Business Strategy by Michael P. Beye.* IRWIN., Chicago.
5. *Economics: Principles, Problems and Policies by C. R. McConnell and S. L. Brue.* McGraw Hill., New York.
6. *Economic Analysis by K.P.M. Sundharam and E. N. Sundharam.* Sultan Chand and Sons., New Delhi.
7. *Managerial Economics by R. L. Varshney and K. L. Maheshwari.* Sultan Chand and Sons., New Delhi.



**Subject: Economic Analysis**  
**Course Code: MC-104**

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**Lesson: 03**

## **OBJECTIVES OF THE BUSINESS FIRM**

Objectives: **On learning this lesson, the students will be able to understand the fundamental objectives of a firm and its related concepts.**

### ***Lesson Structure***

- 3.1. *Introduction*
- 3.2. *Types of Firms*
- 3.3. *Profit Maximization*
- 3.4. *Summary*
- 3.5. *Self-Assessment Questions*
- 3.6. *Suggested Readings*

### ***3.1. Introduction***

The most basic theory of the firm views the firm as a means of transforming things into other, more valuable things, which is known as *production*. Thus, smelting of copper or gold removes impurities and makes the resulting product more valuable. Silicon Valley transforms silicon, which is the primary ingredient of sand, along with a thousand other chemicals and metals, into computer chips used in everything from computers to toasters. Cooking transforms raw food, adding flavor and killing bacteria. Moving things to locations where they have higher value is a form of production. Moving stone to the location of a house where the stone can be installed in the exterior, or bringing the King Tut museum exhibit temporarily to Chicago, or a basketball team to the playoffs, are all examples of production. In this simplistic view, a firm is comprised of a technology or set of technologies for transforming things and then chooses

the transformation to maximize the net profits. This “firm as a production function” view of the firm is adequate for some purposes, especially when products are relatively standardized and technologies widely available, but fares poorly when the internal organization of the firm matters a great deal. Nevertheless, the “firm as a production function” model is a natural starting point in the investigation of competition.

### **3.2 Types of Firms**

There are four major types of firms created in law, although these broad types have many subtypes. At the smallest end is the *proprietorship*, in which a firm is owned by a single individual (the proprietor) or perhaps a family, and operated by a relatively small number of people. The family farm, many restaurants, convenience stores, and laundromats are operated this way. Debts accrued by the proprietorship are the personal responsibility of the proprietor. Professionals like attorneys and accountants are often organized as *partnerships*. Partnerships share profits according to a formula (some equally by partner, some assigning shares or points to partners so that ‘rainmakers’ who generate more of the business obtain a larger share of the profits) and usually all are liable for losses incurred by the partnership. Thus, if a partner in a law firm steals a client’s money and disappears, the other partners are generally responsible for the loss.

In contrast, a corporation is a legal person, which means a corporation itself can incur debt and the responsibility for repayment of that debt is with the corporation, not with the officers or owners of the corporation. When the energy trader company Enron collapsed, the shareholders in Enron lost their investment in the stock, but were not responsible for the remaining debts of the corporation.

Moreover, executives of the company are also not financially responsible for debts of the corporation, provided the executives act legally and carry out their responsibilities appropriately. If a meteor strikes a manufacturing facility and bankrupts the corporation, the executives are not personally responsible for the debts the corporation fails to pay. On the other hand, breaking the law is not permitted, and executives at Archer Daniels Midland, the large agriculture firm, who colluded in the fixing of the price of lysine went to jail and were personally fined. The corporation was fined as well. Corporations shield company executives and shareholders from liability, and are said to offer “limited liability.” So why would anyone in their right mind organize a firm as a proprietorship or a partnership? Corporations cost money to organize, about \$1,000 per year at the time of this writing, and are taxed, which is why many small businesses are organized as proprietorships: it is cheaper.

Moreover, it may not be possible for a corporation owned by a family to borrow money to open a restaurant: potential lenders fear not being repaid in the event of bankruptcy, so insist on some personal liability on the part of the owners. So why are professional groups organized as partnerships and not corporations? The short answer is that a large variety of hybrid organizational forms exist. The distinctions have been blurred and organizations like “Chapter S Corporations” and “Limited Liability Partnerships” offer the advantages of partnerships (including avoidance of taxation) and corporations. The disadvantages to these forms is primarily larger legal fees, and limitations on the nature of ownership and rules specific to individual states.

It is usually the case that proprietorships are smaller than partnerships, and partnerships smaller than corporations, although there are some very large

partnerships (e.g. the big four accounting firms) and some tiny corporations. The fourth kind can be of any size, for its distinction is not how it is organized internally but what it does with the revenue. The *non-profit* firm is prohibited from distributing a profit to its owners. Religious operations, academic associations, environmental groups, most zoos, industry associations, lobbying groups, many hospitals, credit unions (a type of bank), labor unions, private universities and charities are all organized as non-profit corporations. The major advantage of non-profit firms is that the government doesn't tax them. In exchange for avoiding taxes, non-profits must be engaged in government-approved activities, meaning generally that the non-profit operates for the benefit of some segment of society. So why can't you establish your own non-profit, that operates for the benefit of you, and avoid taxes? Generally you alone aren't enough of a socially worthy purpose to meet the requirements to form a non-profit.<sup>19</sup> Moreover, you can't establish a non-profit for a worthy goal and not serve that goal but just pay yourself all the money the corporation raises, because non-profits are prohibited from overpaying their managers, since overpaying the manager means not serving the worthy corporate goal as well as possible. Finally, commercial activities of non-profits are taxable. Thus, when the non-profit zoo sells stuffed animals in the gift-shop, generally the zoo collects sales tax and is potentially subject to corporate taxes.

The modern corporation is a surprisingly recent invention. Prior to World War I, companies were generally organized in a pyramid structure, with a president at the top, and vice-presidents who reported to him, etc. In a pyramid structure, there is a well-defined chain of command, and no one is ever below two distinct managers of the same level. The problem with a pyramid structure is that two retail stores that want to coordinate have to

contact their managers, and possibly their managers' managers, and so on up the pyramid until a common manager is reached. There are circumstances where such rigid decision-making is unwieldy, and the larger the operation of a corporation, the more unwieldy it gets. Four companies – Sears, Du Pont, General Motors and Standard Oil of New Jersey (Exxon) – found that the pyramid structure didn't work well for them. Sears found that its separate businesses of retail stores and mail order required a mix of shared inputs (purchased goods) but distinct marketing and warehousing of these goods. Consequently, retail stores and mail order needed to be separate business units, but purchasing had to answer to both of them.

Similarly, DuPont's military business (e.g. explosives) and consumer chemicals were very different operations serving very different kinds of customers, yet often selling the same things, so again the inputs needed to be centrally produced and to coordinate with two separate corporate divisions. General Motors' many car divisions employ 'friendly rivalry,' in which technology and parts are shared across the divisions but the divisions compete in marketing their cars to consumers. Again, technology can't be under just one division, but instead is common to all. Finally, Standard Oil of New Jersey was attempting to create a company that managed oil products from oil exploration all the way through pumping gasoline into automobile gas tanks. With such varied operations all over the globe, Standard Oil of New Jersey required extensive coordination and found that the old business model needed to be replaced. These four companies independently invented the modern corporation, which is organized into separate business units. These business units run as semi-autonomous companies themselves, with one business unit purchasing, at a negotiated price, inputs from another unit, and selling outputs to a third. The firm transforms inputs into outputs. For example, a bakery takes inputs like

flour, water, yeast, labor, and heat and makes loaves of bread. An earth-moving company takes capital equipment, ranging from shovels to bulldozers, and labor and digs holes. A computer manufacturer buys parts, generally “off-the-shelf” like disk-drives and memory, along with cases and keyboards and other parts that may be manufactured specially for the computer manufacturer, and uses labor to produce computers. Starbucks takes coffee beans, water, some capital equipment, and labor and produces brewed coffee.

Many if not all firms produce several outputs. However, we can view a firm producing multiple outputs as using several distinct production processes, and thus it is useful to start by looking at a firm that produces only one output. Generally, we can describe this firm as buying an amount  $x_1$  of the first input,  $x_2$  of the second input, and so on (we’ll use  $x_n$  to denote the last input) and producing an amount  $y$  of the output, that is, the production function is  $y = f(x_1, x_2, \dots, x_n)$ . Mostly we will focus on two inputs in this section, but carrying out the analysis for more than two inputs is straightforward.

The fixed proportions production function has the property that adding an input beyond a necessary level does no good. For example, the productive value of having more than one shovel per worker is pretty low, so that shovels and diggers are reasonably modeled as producing holes using a fixed proportions production function. Moreover, without a shovel or other digging implement like a backhoe, a bare-handed worker produces so little digging as to be nearly useless, so extra workers beyond the number of shovels have little effect. Ultimately, the size of the holes is pretty much determined by  $\text{Min}\{\text{number of shovels, number of diggers}\}$ .

The *marginal product* of an input is just the derivative of the production function with respect to that input. An important aspect of marginal products is that they are affected by the level of other inputs. The *value of the marginal product* of an input is just the marginal product times the price of the output. If the value of the marginal product of an input exceeds the cost of that input, it is profitable to use more of the input.

Some inputs are more readily changed than others. It can take five years or more to order and obtain new passenger aircraft, four years to build an electricity generation facility or a pulp and paper mill. Very skilled labor – experienced engineers, animators, patent attorneys – is often hard to find and challenging to hire. It usually takes three to five years to hire even a small number of academic economists. On the other hand, it is possible to buy shovels, telephones, and computers and to hire a variety of temporary workers quite rapidly, in a matter of a day or so. Moreover, additional hours of work can be obtained by an existing labor force simply by hiring them “overtime,” at least on a temporary basis. The amount of water or electricity a production facility uses can be varied second by second. If you run a restaurant, you can use more water tonight to wash dishes if you need it. If you start in the morning, you can probably get a few additional workers by that evening by paying overtime to those who aren’t scheduled to work. It will probably take a few days or more to hire additional waiters and waitresses, and perhaps more than a few days to find a skilled chef. You can obtain more ingredients, generally the same day, and more plates and silverware pretty quickly. You can lease more space, but it will probably take more than a month to actually occupy a larger space, what with finding the space for rent, renting it, remodeling it and obtaining the necessary permits.

That some inputs or *factors* can be varied quickly, others only slowly, lead to the notions of the long-run and short-run. In the short-run, only some inputs can be adjusted, while in the long-run, all inputs can be adjusted. Traditionally, economists viewed labor as quickly adjustable, and capital equipment as more difficult to adjust. That is certainly right for airlines – obtaining new aircraft is a very slow process – and for large complex factories, and for relatively low-skilled and hence substitutable labor. On the other hand, obtaining workers with unusual skills is a slower process than obtaining warehouse or office space. Generally speaking, the long-run inputs are those that are expensive to adjust quickly, while the short-run factors can be adjusted in a relatively short time frame. What factors belong in which category is dependent on the context or application under consideration.

### 3.3 Main Objectives of the Firm

Consider an entrepreneur that would like to maximize profit, perhaps by running a delivery service. The entrepreneur uses two inputs, capital  $K$  (e.g. trucks) and labor  $L$  (e.g. drivers), and rents the capital at cost  $r$  per dollar of capital. The wage rate for drivers is  $w$ . The production function is  $F(K, L)$ , that is, given inputs  $K$  and  $L$ , the output is  $F(K, L)$ .

In addition, a second characteristic of a maximum is that the second derivative is negative (or non-positive). This arises because, at a maximum, the slope goes from positive (since the function is increasing up to the maximum), to zero (at the maximum), to a negative number (because the function is falling as the variable rises past the maximum). This means that the derivative is falling, that is, the second derivative is negative. This is an important conclusion because different kinds of capital may be complements or substitutes for labor. Are computers complements or



substitutes for labor? Some economists consider that computers are complements to highly skilled workers, increasing the marginal value of the most skilled, but substitute for lower skilled workers. In academia, the ratio of secretaries to professors has fallen dramatically since the 1970s as more and more professors use machines to perform secretarial functions. Computers are thought to have increased the marginal product of professors and reduced the marginal product of secretaries,

**The Shadow Value :** When capital  $K$  can't be adjusted in the short-run, it creates a constraint on the profit available on the entrepreneur – the desire to change  $K$  reduces the profit available to the entrepreneur. There is no direct value of capital, because capital is fixed. That doesn't mean we can't examine its value, however, and the value of capital is called a *shadow value* because it refers to the value associated with a constraint. Shadow value is well-established jargon. What is the shadow-value of capital? Let's return to the constrained, short-run optimization problem. Any constraint has a shadow value. The term refers to the value of relaxing a constraint. The shadow value is zero when the constraint doesn't bind; for example, the shadow value of capital is zero when it is set at the profit maximizing level. Technology binds the firm; the shadow value of a superior technology is the increase in profit associated with it. For example, parameterize the production technology by a parameter  $a$ , so that  $aF(K, L)$  is produced.

**Input Demand :** Over a long period of time, an entrepreneur can adjust both the capital and the labor used at the plant. This lets the entrepreneur maximize profit with respect to both variables  $K$  and  $L$ . We'll use a double star, \*\*, to denote variables in their long-run solution. The approach to maximizing profit over two variables is to maximize it separately over each

variable, thereby obtaining. How do equilibrium values of capital and labor respond to a change in input prices or output price for the Cobb-Douglas production function? It is useful to cast these changes in percentage terms. It is straightforward to demonstrate that both capital and labor respond to a small percentage change in any of these variables with a constant percentage change.

An important insight of profit maximization is that it implies minimization of costs of yielding the chosen output, that is, profit-maximization entails efficient production. The logic is straightforward. The profit of an entrepreneur is revenue minus costs, and the revenue is price times output. For the chosen output, then, the entrepreneur earns the revenue associated with the output, which is fixed since we are considering only the chosen output, minus the costs of producing that output. Thus, for the given output, maximizing profits is equivalent to maximizing a constant (revenue) minus costs. Since maximizing  $-C$  is equivalent to minimizing  $C$ , the profit-maximizing entrepreneur minimizes costs. This is important because profit-maximization implies not being wasteful in this regard: a profit-maximizing entrepreneur produces at least cost.

**Dynamic Firm Behavior :** In this section, we consider a firm or entrepreneur that can't affect the price of output or the prices of inputs, that is, a competitive firm. How does such a competitive firm respond to price changes? When the price of the output rises, the firm earns profits. The long-run marginal cost has a complicated relationship to short-run marginal cost. The problem in characterizing the relationship between long-run and short run marginal costs is that some costs are marginal in the long-run that are fixed in the short-run, tending to make long-run marginal costs larger than short-run marginal costs. However, in the long-run, the assets can be

configured optimally, while some assets are fixed in the short-run, and this optimal configuration tend to make long-run costs lower. Instead, it is more useful to compare the long-run average total costs and short run average total costs. The advantage is that capital costs are included in short run average total costs.

An economy of scale – that larger scale lowers cost – arises when an increase in output reduces average costs. We met economies of scale, and their opposite, diseconomies of scale, in the previous section, with an example where long-run average total cost initially fell, then rose, as quantity was increased. What makes for an economy of scale? Larger volumes of productions permit the manufacture of more specialized equipment. If I am producing a million identical automotive tail lights, I can spend \$50,000 on an automated plastic stamping machine and only affect my costs by five cents each. In contrast, if I am producing 50,000 units, the stamping machine increases my costs by a dollar each, and is much less economical. Indeed, it is somewhat more of a puzzle as to what produces a diseconomy of scale. An important source of diseconomies are managerial in nature – organizing a large, complex enterprise is a challenge, and larger organizations tend to devote a larger percentage of their revenues to management of the Investment.

The distinction between the short-run supply and the long-run supply is governed by the time that investment takes. Some of the difference between the short-run demand and the long-run demand arises because we don't scrap capital goods – cars, fridges, and air conditioners – in response to price changes. In both cases, investment is an important component of the responsiveness of supply and demand. In this section, we take a first look at investment. We will take a second look at investment from a somewhat

different perspective later when we consider basic finance tools near the end of the book. Investment goods require expenditures today to produce future value, so we begin the analysis by examining the value of future payments.

**Present value :** The promise of \$1 in the future is not worth \$1 today. There are a variety of reasons why a promise of future payments is not worth the face value today, some of which involve risk that the money may not be paid. Let's set aside such risk for the moment; we'll consider risk separately later. Even when the future payment is perceived to occur with negligible risk, nevertheless most people prefer \$1 today to \$1 payable a year hence. One way of expressing this is that the *present value* – the value today – of a future payment of a dollar is less than a dollar. From a present value perspective, future payments are *discounted*. From the individual perspective, one reason that you should value a future payment less than a current payment is due to *arbitrage*. Suppose you are going to need \$10,000 one year from now, to put a down-payment on a house. One way of producing \$10,000 is to buy a government bond that pays \$10,000 a year from now. What will that bond cost you? At current interest rates, a secure bond will cost around \$9700. This means that no one should be willing to pay \$10,000 for a future payment of \$10,000, because instead one can have the future \$10,000, by buying the bond, and have \$300 left over to spend on cappuccinos or economics textbooks. In other words, if you will pay \$10,000 for a secure promise to repay the \$10,000 a year hence, then I can make a successful business selling you the secure promise for \$10,000, and pocketing \$300. This *arbitrage* consideration also suggests how to value future payments: discount them by the relevant interest rate.

A simple investment project involves spending an investment,  $I$ , and then reaping a return over time. If you dig a mine, drill an oil well, build an apartment building or a factory, or buy a share of stock, you spend money now, in the hopes of earning money subsequently. We will set aside the very important risk issue until the next subsection, and ask how to make the decision to invest. The *NPV* approach involves assigning a rate of return  $r$  that is reasonable for, and specific to, the project and then computing the present value of the expected stream of payments. Since the investment is initially expended, it is counted as negative revenue.

**Investment under Uncertainty:** Risk has a cost, and people, and corporations, buy insurance against financial risk. The standard approach to investment under uncertainty is to compute an NPV, with the revenues composed of expected values, and the interest rate used adjusted to compensate for the risk. For example, consider a project like oil exploration. The risks are enormous. Half of all underwater tracts in the Gulf Coast near Louisiana and Texas that are leased are never drilled, because later information makes them a bad bet. Half of all the tracts that are drilled are dry. So right off the bat, three-quarters of the tracts that are sold produce zero or negative revenue, and positive costs. To see how the economics of such a risk investment might be developed, suppose that the relevant rate of return for such a risky investment is 18%. Suppose the tract can be leased for \$500,00 and the initial exploration costs \$1 million. If the tract has oil (with a 25% probability), it produces \$1 million per year for twenty years, and then runs dry. This gives expected revenue of \$250,000 per year. To compute the expected net present value, we first compute the returns:

**Resource Extraction :** For the past sixty years, the world has been “running out of oil.” There are news stories about the end of the reserves being only ten, fifteen or twenty years away. The tone of these stories is that, at that time, we will run out of oil completely and prices will be extraordinarily high. Industry studies counter that more oil continues to be found and that the world is in no danger of running out of oil. If you believe that the world will run out of oil, what should you do? You should *buy and hold*. That is, if the price of oil in twenty years is going to be \$1,000 per barrel, then you can buy oil at \$40 and hold it for twenty years, and sell it at \$1,000.

**A Time to Harvest :** A tree grows slowly, but is renewable, so the analysis doesn't help us understand when it is most profitable to cut the tree down. Consider harvesting for pulp and paper use. In this use, the amount of wood chips is what matters to the profitability of cutting down the tree, and the biomass of the tree provides a direct indication of this. Suppose the biomass sells for a net price  $p$ , which has the costs of harvesting and replanting deducted from it, and the biomass of the tree is  $b(t)$  when the tree is  $t$  years old.

**Collectibles :** Many people purchase durable goods as investments, including Porsche Speedsters, Tiffany lamps, antique telephones, postage stamps and coins, baseball cards, original Barbie dolls, antique credenzas, autographs, original rayon Hawaiian shirts, old postcards, political campaign buttons, old clocks and even Pez dispensers. How is the value of, say, a 1961 Porsche Speedster or a \$500 bill from the confederacy, which currently sells for over \$500, determined? The theory of resource prices can be adapted to cover these items, which are in fixed supply. There are four major differences that are relevant. First, using the item doesn't consume it;

the goods are durable. I can own an “I Like Ike” campaign button for years, then sell the same button. Second, these items may depreciate. Cars wear out even when they aren’t driven, and the brilliant color of Pez dispensers fades. Every time a standard 27 ½ pound gold bars, like the kind in the Fort Knox depository, is moved, approximately \$5 in gold wears off the bar. Third, the goods may cost something to store. Fourth, the population grows, and some of the potential buyers are not yet born.

**Consumer Theory:** Consumer theory is the parallel for demand that producer theory is for supply. The major difference is that producer theory assumes that sellers are motivated by profit, and profit is something that one can usually directly measure. Moreover, the costs that enter into profit arise from physical properties of the production process – how many coffee cups come from the coffee cup manufacturing plant? In contrast, consumer theory is based on what people like, so it begins with something that we can’t directly measure, but must infer. That is, consumer theory is based on the premise that we can infer what people like from the choices they make. Now, inferring what people like from choices they make does not rule out mistakes. But our starting point is to consider the implications of a theory in which consumers don’t make mistakes, but make choices that give them the most satisfaction. Economists think of this approach as analogous to studying gravitation in a vacuum before thinking about the effects of air friction. There is a practical consideration that dictates ignoring mistakes. There are many kinds of mistakes, e.g. “I meant to buy toothpaste but forgot and bought a toothbrush,” a computational problem, “I thought this toothpaste was better but it is actually worse,” a learning issue, and “I meant to buy toothpaste but I bought crack instead,” a self-control issue. All of these kinds of mistakes lead to distinct theories. Moreover, we

understand these alternative theories by understanding the basic theory first, and then seeing what changes these theories lead to.

**Utility Maximization:** Economists use the term *utility* in a peculiar and idiosyncratic way. Utility refers not to usefulness but to the flow of pleasure or happiness that a person enjoys – some measure of the satisfaction a person experiences. Usefulness might contribute to utility, but so does style, fashion, or even whimsy. The term *utility* is unfortunate not just because it suggests usefulness, but because it makes the economic approach to behavior appear more limited than it actually is. We will make very few assumptions about the form of utility that a consumer might have. That is, we will attempt to avoid making value judgments about the preferences a consumer holds – whether they like smoking cigarettes or eating only carrots, watching Arnold Schwarzenegger movies or spending time with a hula hoop. Consumers like whatever it is that they like; the economic assumption is that they attempt to obtain the goods that they like. It is the consequences of the pursuit of happiness that comprise the core of consumer theory. The consumption of goods doesn't take place in a single instance, but over time. How does time enter into choice? We're going to simplify the problem a bit, and focus only on consumption and set aside working for the time being. Let  $x_1$  be consumption in the first period,  $x_2$  in the second period.

**Risk:** There are many risks in life, even if one doesn't add to these risks by intentionally buying lottery tickets. Gasoline prices go up and down, the demand for people trained in your major fluctuates, house prices change. How do people value gambles? The starting point for the investigation is the *von Neumann- Morgenstern* utility function. The idea of a von Neumann-Morgenstern utility function for a given person is that for each



possible outcome  $x$ , there is a value  $v(x)$  assigned by the person, and the average value of  $v$  is the value the person assigns to the risky outcome. This is a “state of the world” approach, in the sense that each of the outcomes is associated with a state of the world, and the person maximizes the expected value of the various possible states of the world. Value here doesn’t mean a money value, but a psychic value or utility. To illustrate the assumption, consider equal probabilities of winning \$100 and winning \$200. The expected outcome of this gamble is \$150 – the average of \$100 and \$200. However, the expected value of the outcome could be anything between the value of \$100 and the value of \$200. The von Neumann- Morgenstern utility is  $\frac{1}{2}v(\$100) + \frac{1}{2}v(\$200)$ . The von Neumann-Morgenstern formulation has certain advantages, including the logic that what matters is the average value of the outcome. On the other hand, in many tests, people behave in ways not consistent with the theory. Nevertheless, the von-Neumann approach is the prevailing model of behavior under risk.

**Market Imperfections:** We have so far focused on unimpeded markets, and seen that markets may perform efficiently. In this chapter, we examine impediments to the efficiency of markets. Some of these impediments are imposed on otherwise efficiently functioning markets, as occurs with taxes. Others, such as monopoly or pollution, are problems that may arise in some circumstances, and may require correction by the government.

**Price Floors and Ceilings:** A *price floor* is a minimum price at which a product or service is permitted to sell. Many agricultural goods have price floors imposed by the government. For example, tobacco sold in the United States has historically been subject to a quota and a price floor set by the Secretary of Agriculture. Unions may impose price floors as well. For example, the screen actors guild imposes minimum rates for guild

members, generally pushing up the price paid for actors above that which would prevail in an unconstrained market. (The wages of big name stars aren't generally affected by SAG, because these are individually negotiated.). The most important example of a price floor is the *minimum wage*, which imposes a minimum amount that a worker can be paid per hour. A *price ceiling* is a maximum price that can be charged for a product or service. Rent control imposes a maximum price on apartments (usually set at the historical price plus an adjustment for inflation) in many U.S. cities. Taxi fares in New York, Washington, D.C. and other cities are subject to maximum legal fares. During World War II, and again in the 1970s, the United States imposed price controls to limit inflation, imposing a maximum price for legal sale of many goods and services. For a long time, most U.S. states limited the legal interest rate that could be charged (these are called *usury laws*) and this is the reason so many credit card companies are located in South Dakota. South Dakota was the first state to eliminate such laws. In addition, ticket prices for concerts and sporting events are often set below the equilibrium price. Laws prohibiting scalping then impose a price ceiling. Laws preventing scalping are usually remarkably ineffective in practice, of course.

**Political Motivations:** The politics of rent control are straightforward. First, rent control involves a money transfer from landlords to tenants, because tenants pay less than they would absent the law, and landlords obtain less revenue. In the short run, due to the inelastic short-run supply, the effect on the quantity of apartments is small, so rent control is primarily just a transfer from landlords to tenants.

**Externalities:** When the person sitting next to you lights up a cigarette, he gets nicotine, and the cigarette company gets some of his money. You just

suffer, with no compensation. If your neighbor's house catches fire because he fell asleep with that cigarette burning in his hand, your house may burn to the ground. The neighbor on the other side who plays very loud music late into the night before your big economics test enjoys the music, and the record company and stereo component companies get his money. You flunk out of college and wind up borrowing \$300,000 to buy a taxi medallion. Drunk drivers, cell phones ringing in movies, loud automobiles, polluted air, and rivers polluted to the point that they catch fire like Cleveland's Cuyahoga did, are all examples where a transaction between two parties harmed others. These are "external effects." But external effects are not necessarily negative. The neighbor who plants beautiful flowers in her yard brightens your day. Another's purchase of an electric car reduces the smog you breathe. Your neighbor's investment in making his home safe from fire conveys a safety advantage to you. Indeed, even your neighbor's investment in her own education may provide an advantage to you – you may learn useful things from your neighbor. Inventions and creations, whether products or poetry, produce value for others. The creator of a poem, or a mathematical theorem, provides a benefit to others.

These effects are called *external effects*, or *externalities*. An externality is any effect on people not involved in a particular transaction. Pollution is the classic example. When another person buys and smokes cigarettes, there is a transaction between the cigarette company and the smoker. But if you are sitting near the smoker, you are an affected party not directly compensated from the transaction, at least before taxes were imposed on cigarettes. Similarly, you pay nothing for the benefits you get from viewing your neighbor's flowers, nor is there a direct mechanism to reward your neighbor for her efforts.

Externalities will generally cause competitive markets to behave inefficiently from a social perspective, absent a mechanism to involve all the affected parties. Without such a mechanism, the flower-planter will plant too few beautiful flowers, for she has no reason to take account of your preferences in her choices. The odious smoker will smoke too much, and too near others, and the loud neighbor will play music much too late into the night. Externalities create a *market failure*, that is, a competitive market does not yield the socially efficient outcome.

Education is viewed as creating an important positive externality. Education generates many externalities, including more and better employment, less crime, and fewer negative externalities of other kinds. It is widely believed that educated voters elect better politicians.<sup>64</sup> Educated individuals tend to make a society wealthy, an advantage to all of society's members. As a consequence, most societies subsidize education, in order to promote it. A major source of externalities arises in communicable diseases. Your vaccination not only reduces the likelihood that you contract a disease, but also makes it less likely that you infect others with the disease.

**Private and Social Value, Cost:** Let's consider pollution as a typical example. A paper mill produces paper, and a bad smell is an unfortunate by-product of the process. Each ton of paper produced increases the amount of bad smells produced. The paper mill incurs a marginal cost, associated with inputs like wood and chemicals and water. For the purposes of studying externalities, we will refer to the paper mill's costs as a *private cost*, the cost to the paper mill itself. In addition, there are *external costs*, which are the costs borne by others, which arise in this case from the smell. Adding the private costs and the external costs yields the social costs.

### 3.4 Summary

Most academic economics today begins with the premise that resources are scarce and that it is necessary to choose between competing alternatives. That is, economics deals with [tradeoffs](#). With scarcity, choosing one alternative implies forgoing another alternative—the [opportunity cost](#). The opportunity cost creates an implicit price relationship between competing alternatives. In addition, in both market oriented and planned economies, scarcity is often explicitly quantified by [price](#) relationships.

Understanding choices by individuals and groups is central. Economists believe that incentives and desires play an important role in shaping [decision making](#). Concepts from the [Utilitarian](#) school of [philosophy](#) are used as analytical concepts within economics, though economists appreciate that society may not adopt utilitarian objectives. One example of this is the idea of a [utility function](#), which is assumed to represent how economic agents rank the choices given to them. Then the utility function ranks available choices from best to worst, and the agent gradually learns to choose the best-ranked choice in the [feasible set](#) of his alternatives. Most economists also acknowledge the existence of [market failure](#) and many insights from [Keynesian economics](#). They look to [game theory](#) and [asymmetric information](#) to solve problems on a microeconomic level.

Economics studies the optimum allocation of scarce resources among people – examining what goods and services wind up in the hands of which people. Why scarce resources? Absent scarcity, there is no significant allocation issue. All practical, and many impractical, means of allocating scarce resources are studied by economists. Markets are an important

means of allocating resources, so economists study markets. Markets include stock markets like the New York Stock Exchange, commodities markets like the Chicago Mercantile, but also farmer's markets, auction markets like Christie's or Sotheby's (made famous in movies by people scratching their noses and inadvertently purchasing a Ming vase) or eBay, or more ephemeral markets, such as the market for music CDs in your neighborhood. In addition, goods and services (which are scarce resources) are allocated by governments, using taxation as a means of acquiring the items. Governments may be controlled by a political process, and the study of allocation by the politics, which is known as political economy, is a significant branch of economics.

### **3.5 Self-Assessment questions**

1. *“Managerial Economics may be defined as the study of the allocation of scarce resources among competing ends.” Examine the statement in the light of firm's objectives..*
2. *Discuss and illustrate the different objectives of a firm that are essentials in decision making process.*
3. *“The objective of managerial economics is not merely to discover the truth but also to assist in the solution of concrete problems.”*  
*Comment.*

### **3.6 Suggested Readings**

1. *Modern Microeconomics* by A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. *Micro-Economic Theory* by M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. *Managerial Economics* by D.N. Dwivedi. Vikas Publishing House., New Delhi.
4. *Managerial Economics and Business Strategy* by Michael P. Beye. IRWIN., Chicago.
5. *Economics: Principles, Problems and Policies* by C. R. Mcconnell and S. L. Brue. McGraw Hill., New York.
6. *Economic Analysis* by K.P.M. Sundharam and E. N. Sundharam. Sultan Chand and Sons., New Delhi.
7. *Managerial Economics* by R. L. Varshney and K. L. Maheshwari. Sultan Chand and Sons., New Delhi.

**Subject: Economic Analysis**  
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**Lesson: 04**

## **FUNDAMENTAL ECONOMIC CONCEPTS**

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

### ***Structure***

- 4.1. *Introduction*
- 4.2. *Fundamental Concepts*
- 4.3. *Self-Assessment Questions*
- 4.4. *Suggested Readings*

### **4.1 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 "There Aren'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.

## **4.2 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?

#### **4.3 Self-Assessment Questions**

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.*

#### **4.4 Suggested Readings**

1. Modern Microeconomics *by* A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. Micro-Economic Theory *by* M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. Managerial Economics *by* D.N. Dwivedi. Vikas Publishing House., New Delhi.
4. Managerial Economics and Business Strategy *by* Michael P. Beye. IRWIN., Chicago.
5. Economics: Principles, Problems and Policies *by* C. R. McConnell and S. L. Brue. McGraw Hill., New York.
6. Economic Analysis *by* K.P.M. Sundharam and E. N. Sundharam. Sultan Chand and Sons., New Delhi.
7. Managerial Economics *by* R. L. Varshney and K. L. Maheshwari. Sultan Chand and Sons., New Delhi.

<b>Course:</b> Economic Analysis	<b>Author:</b> Anil Kumar
<b>Course Code:</b> MC-104	<b>Vetter:</b> Dr. Karam Pal
<b>Lesson:</b> 05	
<b>LAW OF DEMAND</b>	

**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.

### **Structure**

- 5.1 Introduction
- 5.2 Demand for a Commodity
- 5.3 The Law of Demand
- 5.4 The Market Demand for a Commodity
- 5.5 Changes in Demand
- 5.6 Self-Assessment Questions
- 5.7 Suggested Readings

## 5.1 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.

## **5.2 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.

### **5.2.1 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

### 5.2.2 DEMAND FUNCTION

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

$$\text{Dependent Variable} = f(\text{Independent Variables})$$

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 =  $f(\text{Determinants of the Demand})$

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

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

$P_x$  is the price of the commodity X,

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

$I$  is the income of the household, and

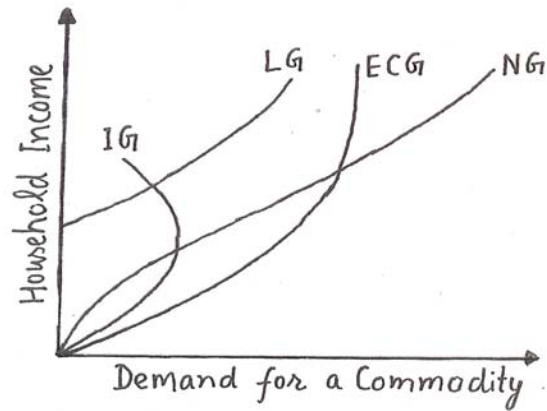
$T$  stands for tastes and preferences of the members of the household.

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.



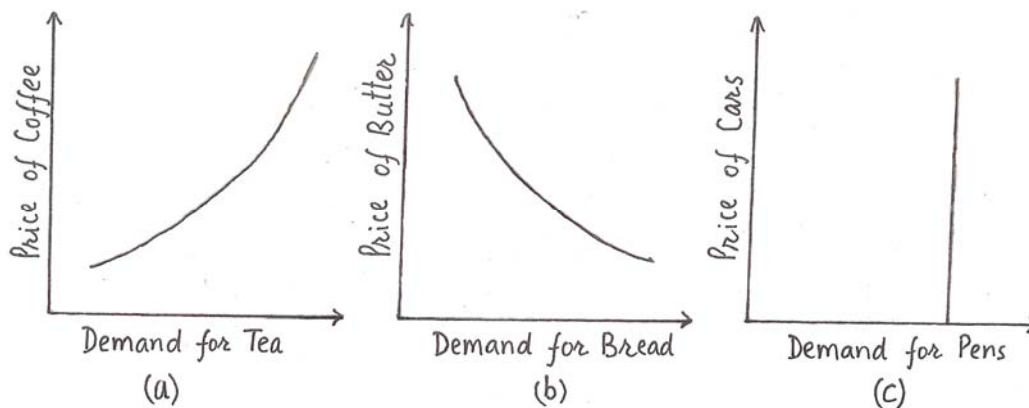
**Figure 5-1 Household Income and Demand for a Commodity**

- 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 5-2a).
- 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 5-2b).



**Figure 5-2 Prices of Other Commodities and Demand for a Commodity**

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

### 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.

### 5.3 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.

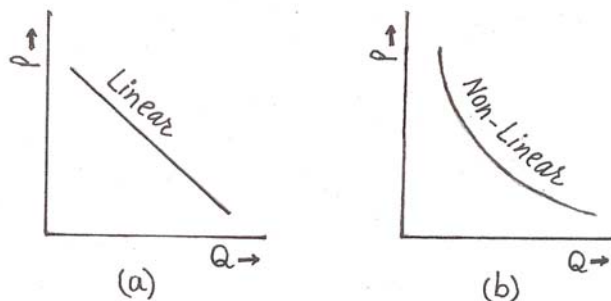
$$Qd_x = f(P_x) \quad I^\circ, P_1^\circ, \dots, P_n^\circ, T^\circ$$

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 5-3a).
- 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 5-3b).



**Figure 5-3 Demand Curves: (a) Linear (b) Non-linear or Curvilinear**

### 5.3.1 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

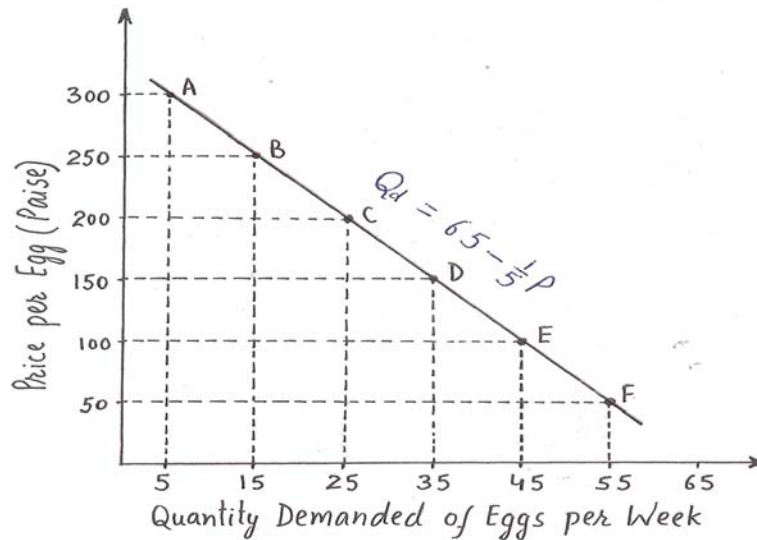
$Qd_e = 65 - \frac{1}{5}P_e$  for eggs. The demand schedule is shown in Table 5-1. In the first column are given alternate prices per egg and in the second column against each price is shown quantity demanded of eggs, during, say a week.

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

**Table 5-1 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 5-4 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 Samuelson**. 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.

## 5.4 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 from the following hypothetical example. Let us say, there are three households in the market for eggs. The demand functions of the households are:

$$\text{Household H}_1 \quad : Qd_e = 40 - \frac{1}{10} P_e$$

$$\text{Household H}_2 \quad : Qd_e = 65 - \frac{1}{5} P_e$$

$$\text{Household H}_3 \quad : Qd_e = 50 - \frac{1}{10} P_e$$

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<sub>1</sub>, H<sub>2</sub> and H<sub>3</sub>. By

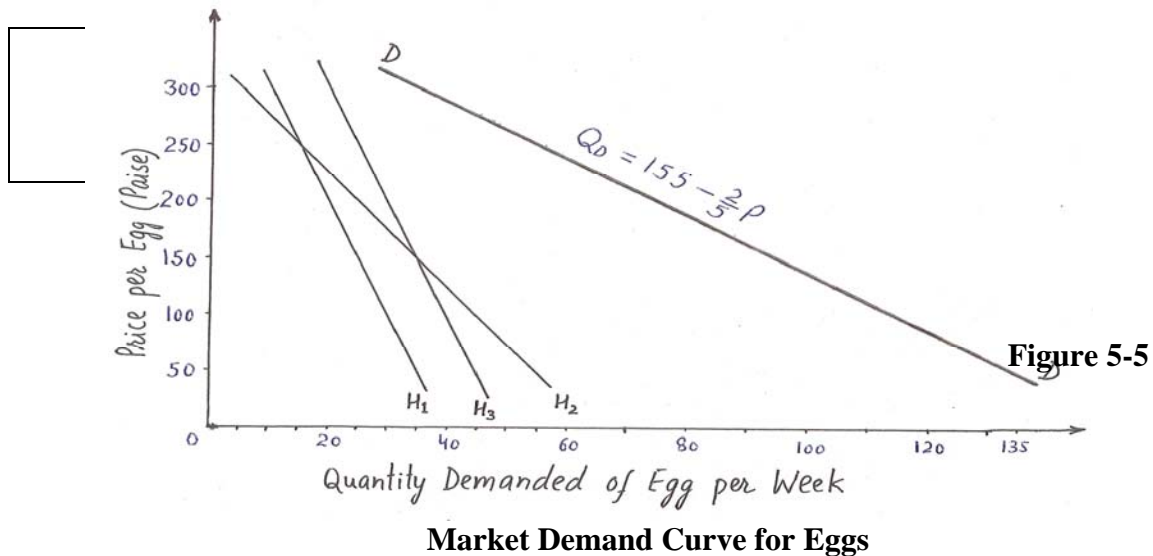


summing up quantities demanded by the three households against each price along the horizontal ( $OX$ ) axis, we get the market demand curve for eggs. This is done in Figure 5-5.

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.



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

$$QD_x = f(P_x, N, I, P_1, \dots, P_n, T, E_p, s)$$

The market demand function for eggs is

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

## 5.5 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

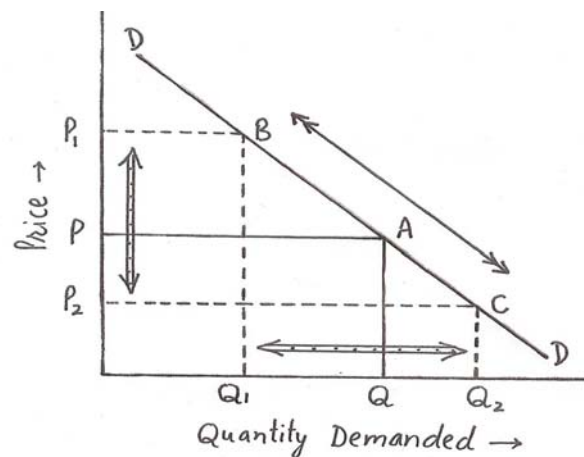
We use different expressions for the two types of changes in demand.

### (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 5-6 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

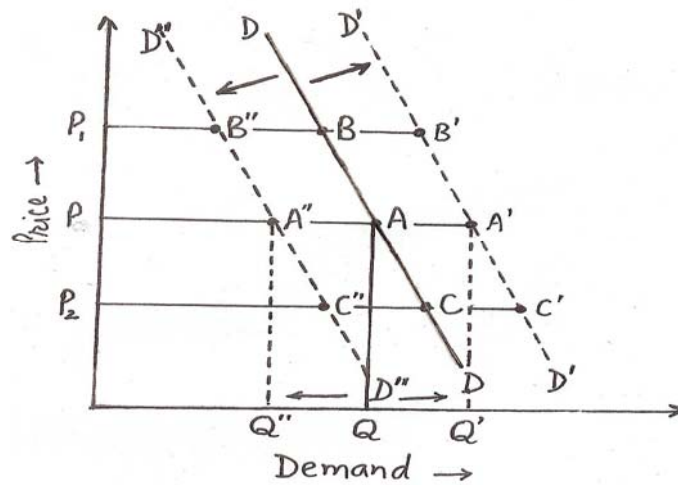
Expansion of demand means a rise in demand that result from a decrease in price (movement down the demand curve).

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 5-7 Shift of the Demand Curve**

In Figure 5-7, 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  $D''D''$ .

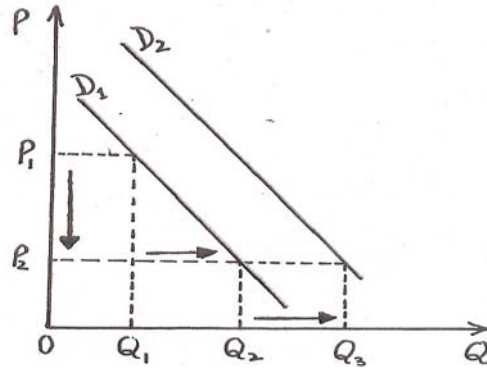
For these changes in demand due to change in determinants other than price, we use the expressions *increase* and *decrease* of demand to denote the shift of demand curve. Thus

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 5-8 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.



**Figure 5-8** Movements along the Demand Curve & Shift of the Demand Curve

## 5.6 SELF- ASSESSMENT QUESTIONS

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:
- (b) Demand function
  - (c) Demand schedule and demand curve
  - (d) Income and substitution effects of price change
  - (e) Giffen Paradox

## 5.7 SUGGESTED READINGS

1. Modern Microeconomics *by* A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. Micro Economic Theory *by* M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. Managerial Economics *by* D.N. Dwivedi. Vikas Publishing House., New Delhi.

4. Managerial Economics and Business Strategy *by* Michael P. Beye. IRWIN., Chicago.
5. Economics: Principles, Problems and Policies *by* C. R. McConnell and S. L. Brue. McGraw Hill., New York.
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11. Managerial Economics: Theory, Application and Cases *by* Edwin Mansfield. WW Norton., New York.

<b>Course:</b> Economic Analysis	<b>Author:</b> Anil Kumar
<b>Course Code:</b> MC-104	<b>Vetter:</b> Dr. Karam Pal
<b>Lesson:</b> 06	
<b>DEMAND ELASTICITY</b>	

**Objective:** The overall objective of this lesson is to provide the students an understanding of the different elasticities of demand, there by enabling them to appreciate the need and use of elasticities of demand for managerial decision-making.

### **Structure**

- 6.1 Introduction
- 6.2 Price Elasticity of Demand
- 6.3 Cross Price Elasticity of Demand
- 6.4 Income Elasticity of Demand
- 6.5 Elasticities in Managerial Decision Making
- 6.6 Self-Assessment Questions
- 6.7 Suggested Readings



## 6.1 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:

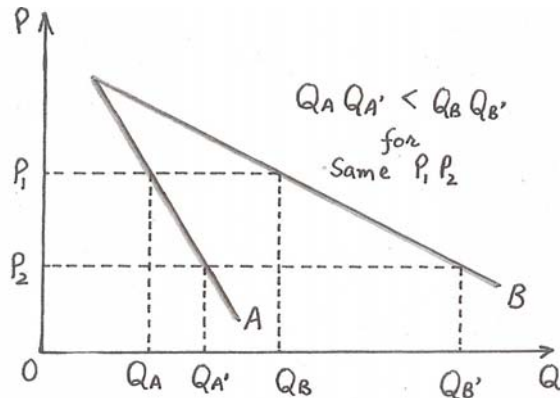
- a. The price elasticity of demand for the product and
- b. The price elasticity of demand for its substitutes.

Therefore, it is obvious that the understanding of different elasticities of demand is the basic prerequisite whenever a business 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. 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.

## 6.2 PRICE ELASTICITY OF DEMAND

Consider the two demand curves A and B, given in the Figure 6-1. 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  $Q_A Q_{A'}$ . In case of market B, the same fall in price leads to an expansion of demand by  $Q_B Q_{B'}$ . 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 6-1 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:

$$\begin{aligned}
 e_p &= \frac{\% \Delta Q}{\% \Delta P} && \text{ceteris paribus} \\
 &= \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100} \\
 &= \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} && \dots\dots\dots (6-1)
 \end{aligned}$$

Where  $P$  and  $Q$  are initial price and quantity demanded respectively.  $\Delta P$  and  $\Delta Q$  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*

### 6.2.1 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 
$$e_p = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q} \dots\dots\dots(6-2)$$

If the demand curve is linear

$$Q = a - bP$$

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

$$e_p = b \cdot \frac{P}{Q} \dots\dots\dots(6-3)$$

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

*Eq.(6-2)* and *Eq.(6-3)* 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 6-1

Consider the demand function for a commodity X

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

Calculate the price elasticity at the price of Rs2.

**Solution:** At  $P = 2$ , we have

$$\begin{aligned} Q &= 300 - 50(2) \\ &= 200 \end{aligned}$$

So price elasticity at  $P = 2$ ,

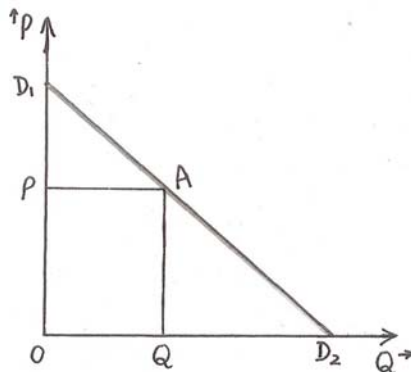
$$\begin{aligned} e_p &= b \cdot \frac{P}{Q} \\ &= 50 \cdot \frac{2}{200} \\ &= \frac{1}{2} \end{aligned}$$

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.(6-3).



**Figure 6-2** Point Price Elasticity

We have

$$e_p = b \cdot \frac{P}{Q}$$

From Figure 6-2, we see that  $b = \frac{QD_2}{AQ}$ ,  $P = 0P$  and  $Q = 0Q$

$$\begin{aligned} \text{So } e_p &= \frac{QD_2}{AQ} \cdot \frac{0P}{0Q} \\ &= \frac{QD_2}{0Q} \quad [\text{as } AQ = 0P] \\ &= \frac{PA \cdot \frac{AD_2}{D_1A}}{0Q} \quad [\text{as } \triangle AD_1PA \text{ and } \triangle AQD_2 \text{ are similar, so } \frac{QD_2}{PA} = \frac{AD_2}{D_1A} \text{ or } QD_2 = PA \cdot \frac{AD_2}{D_1A}] \\ &= \frac{AD_2}{D_1A} \quad [\text{as } PA = 0Q] \\ &= \frac{\text{Lower Segment of the Demand Curve}}{\text{Upper Segment of the Demand Curve}} \quad \dots\dots\dots(6-4) \end{aligned}$$

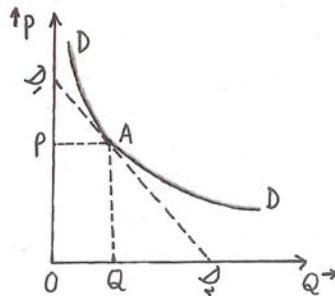
So we can obtain the point price elasticity of demand graphically by the ratio of the segments of the demand curve to the right and to the left of the particular point. We can also have another form of graphic measure of point price elasticity of demand.

We have

$$\begin{aligned} e_p &= \frac{AD_2}{D_1A} \\ &= \frac{AQ}{D_1P} \quad [\text{as } \triangle AQD_2 \text{ and } \triangle AD_1PA \text{ are similar, so } \frac{AD_2}{D_1A} = \frac{AQ}{D_1P}] \\ &= \frac{0P}{0D_1 - 0P} \quad [\text{as } AQ = 0P \text{ and } D_1P = 0D_1 - 0P] \\ &= \frac{P}{P_0 - P} \quad \dots\dots\dots(6-5) \end{aligned}$$

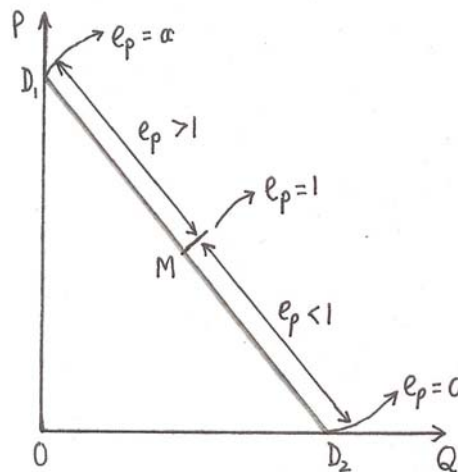
In other words, the point price elasticity of demand can also be obtained geometrically by dividing the price of the commodity ( $P$ ) at the particular point by  $P_0 - P$ , where  $P_0$  is the price at which the quantity demanded is zero (*i.e.* the price at which the demand curve crosses the vertical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

### Point Price elasticity on a Curvilinear Demand Curve



**Figure 6-3 Point Price Elasticity on a Curvilinear Demand Curve**

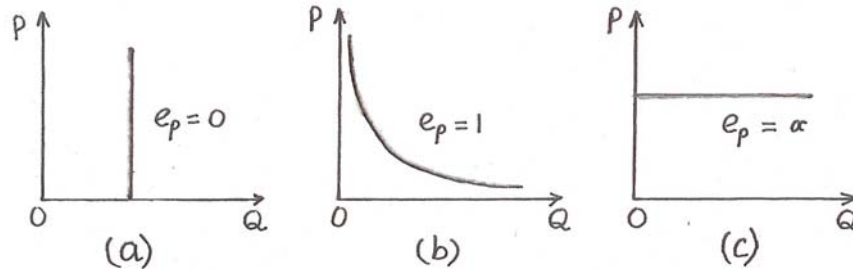
For a curvilinear (non-linear) demand curve, we draw a tangent to the demand curve at the point at which we want to measure the elasticity and then proceed as if we were dealing with a linear demand curve.



**Figure 6-4 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 6-4). 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<sub>1</sub> the  $e_p = \alpha$ , while at point D<sub>2</sub> the  $e_p = 0$ .



**Figure 6-5 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 6-5a).
- If  $e_p = 1$ , the demand has unitary elasticity (Figure 6-5b).
- If  $e_p = \alpha$ , the demand is perfectly elastic (Figure 6-5c).
- If  $0 < e_p < 1$ , we say that the demand is inelastic.
- If  $1 < e_p < \alpha$ , we say that the demand is elastic.

### 6.2.2 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.(6-1) 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

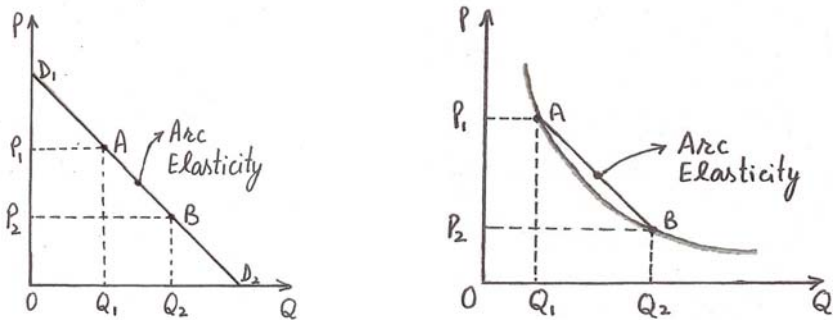
is because of the different values of the initial price ( $P$ ) and initial quantity ( $Q$ ) for the rise and fall of the price. Therefore, we use the average of the two prices and the average

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

$$e_p = \frac{\Delta Q}{\Delta P} \cdot \frac{\frac{P_1 + P_2}{2}}{\frac{Q_1 + Q_2}{2}} \quad \text{ceteris paribus}$$

$$= \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1 + P_2}{Q_1 + Q_2} \quad \dots\dots\dots(6-6)$$

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



**Figure 6-6 Arc Elasticity**

**Example 6-2**

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

$$\begin{aligned}
 e_p &= \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P_1 + P_2}{Q_1 + Q_2} \\
 &= \frac{78 - 60}{850 - 950} \cdot \frac{850 + 950}{78 + 60} \\
 &= -\frac{18}{100} \cdot \frac{1800}{138} \\
 &= -2.34
 \end{aligned}$$

This means that in the price range (850-950), a 1 percent change in price results, on the average, 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 6-3**

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

$$P_1 = 2500 \quad Q_1 = 8500 \quad Q_2 = 10500 \quad e_p = -2$$

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.

### 6.2.3 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

$$\begin{aligned}
 TR &= P \cdot Q \\
 MR &= \frac{d(TR)}{dQ} \\
 &= \frac{d(PQ)}{dQ} \\
 &= P + Q \frac{dP}{dQ} \\
 &= P \left( 1 + \frac{dP}{dQ} \cdot \frac{Q}{P} \right)
 \end{aligned}$$

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

So  $MR = P \left( 1 - \frac{1}{e_p} \right)$  .....(6-7)

From the relationship between  $e_p$  and  $MR$  in Eq (6-7), 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 6-1**  $e_p$ ,  $MR$  and  $TR$

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

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 6-1.

**Example 6-4**

Consider the demand function of a commodity X

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

- 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 6-1 and Figure 6-7.

**Table 6-1      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	$\infty$	0	--
5	50	5	250	4
4	100	2	400	2
3	150	1	450	0
2	200	$\frac{1}{2}$	400	-2
1	250	$\frac{1}{5}$	250	-4
0	300	0	0	-6

We have  $Q = 300 - 50P$

So

$$P = 6 - \frac{Q}{50}$$

Now

$$TR = PQ$$

$$= 6Q - \frac{Q^2}{50}$$

$$MR = \frac{d(TR)}{dQ}$$

$$= 6 - \frac{Q}{25}$$

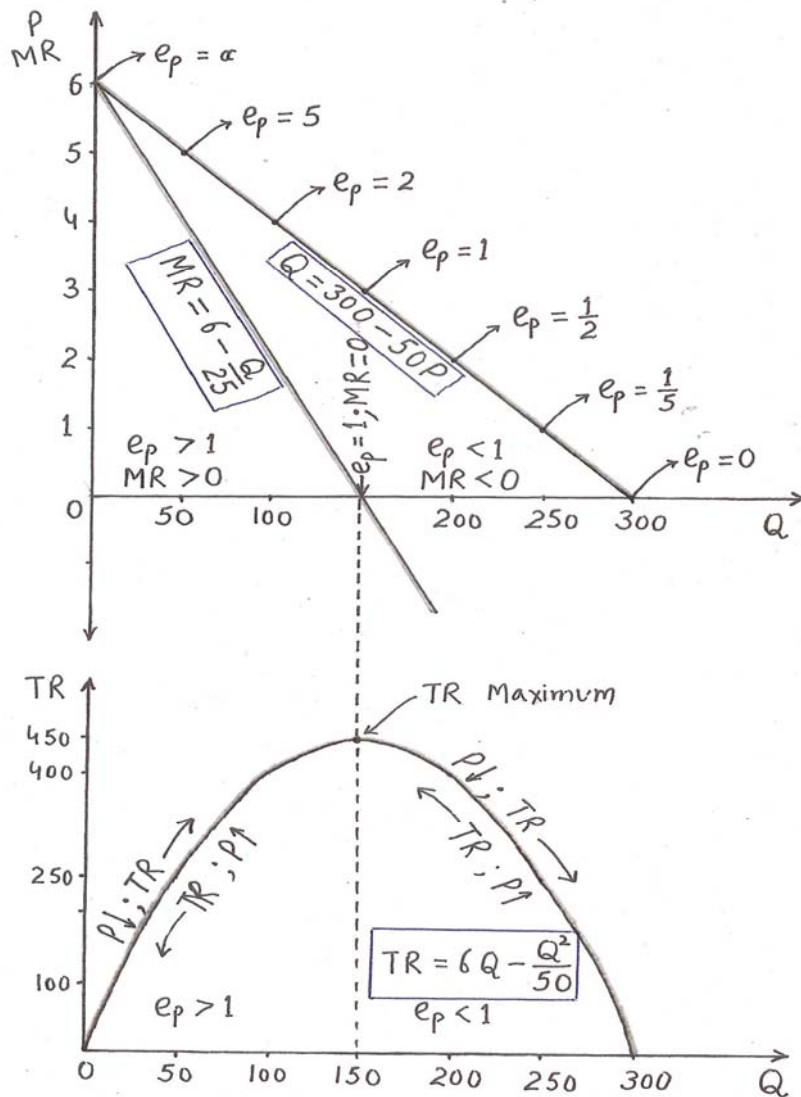


Figure 6-7 The Relationship between P, Q, MR, TR and  $e_p$

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.

### 6.3 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.

$$e_{xy} = \frac{\% \Delta Q_x}{\% \Delta P_y} \quad \text{ceteris paribus}$$

$$= \frac{\frac{\Delta Q_x}{Q_x} \times 100}{\frac{\Delta P_y}{P_y} \times 100}$$

$$= \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{P_y}{Q_x} \quad \dots\dots\dots (6.8)$$

#### 6.3.1 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:

$$e_{xy} = \frac{\partial Q_x}{\partial P_y} \cdot \frac{P_y}{Q_x} \quad \text{ceteris paribus} \quad \dots\dots\dots (6-9)$$

#### Example 6-5

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

$$\begin{aligned} Q_x &= 300 - 50(3) - 25(2) \\ &= 200 \end{aligned}$$

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

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

$$\begin{aligned} e_{xy} &= \frac{\partial Q_x}{\partial P_y} \cdot \frac{P_y}{Q_x} \\ &= 25 \cdot \frac{2}{200} \\ &= 1/4 \end{aligned}$$

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*.

### 6.3.2 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:

$$\begin{aligned} e_{xy} &= \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{\frac{P_y^2 + P_y^1}{2}}{\frac{Q_x^2 + Q_x^1}{2}} \\ &= \frac{Q_x^2 - Q_x^1}{P_y^2 - P_y^1} \cdot \frac{P_y^2 + P_y^1}{Q_x^2 + Q_x^1} \quad \text{ceteris peribus} \quad \dots\dots\dots(6-10) \end{aligned}$$

#### Example 6-6



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

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

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

So

$$\begin{aligned} e_{ct} &= \frac{Q_c^2 - Q_c^1}{P_t^2 - P_t^1} \cdot \frac{P_t^2 + P_t^1}{Q_c^2 + Q_c^1} \\ &= \frac{600 - 500}{90 - 80} \cdot \frac{90 + 80}{600 + 500} \\ &= 1.64 \end{aligned}$$

This means that a 1 percent change in price of tea in the price range (80-90); results, on the average, 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.

## 6.4 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.*

$$\begin{aligned}
 \text{So} \quad e_i &= \frac{\% \Delta Q}{\% \Delta I} && \text{ceteris paribus} \\
 &= \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta I}{I} \times 100} \\
 &= \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q} && \dots\dots\dots (6.11)
 \end{aligned}$$

### 6.3.1 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:

$$e_i = \frac{\partial Q}{\partial I} \cdot \frac{I}{Q} \quad \text{ceteris paribus} \quad \dots\dots\dots(6-12)$$

#### Example 6-7

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  $I = 6000$

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

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

$$= 1.50$$

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*.

### 6.3.2 Arc 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:

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

$$= \frac{Q_2 - Q_1}{I_2 - I_1} \cdot \frac{I_2 + I_1}{Q_2 + Q_1} \quad \text{ceteris peribus} \quad \dots\dots\dots(6-13)$$

#### Example 6-8

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

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

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

$$\begin{aligned} \text{So } e_i &= \frac{Q_2 - Q_1}{I_2 - I_1} \cdot \frac{I_2 + I_1}{Q_2 + Q_1} \\ &= \frac{7000 - 6000}{1.10 - 1.00} \cdot \frac{1.10 + 1.00}{7000 + 6000} \\ &= 1.615 \end{aligned}$$

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.

#### **6.4 ELASTICITIES 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 firm'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 6-9**

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.

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

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.

$$\% \Delta Q = e_p \% \Delta P \quad \text{The effect of price change}$$

$$\% \Delta Q = e_i \% \Delta I \quad \text{The effect of income change}$$

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

$$\% \Delta Q = e_a \% \Delta A \quad \text{The effect of change in advertisement expenditure}$$

So we have the forecasted sale for the next year

$$\begin{aligned} Q_2 &= Q_1 + Q_1(e_p \% \Delta P) + Q_1(e_i \% \Delta I) + Q_1(e_{ct} \% \Delta P_t) + Q_1(e_a \% \Delta A) \\ &= Q_1 \left[ 1 + (-2) \frac{10}{100} + (1.8) \frac{4}{100} + (0.8) \frac{7}{100} + (1.3) \frac{8}{100} \right] \\ &= Q_1 [1 - 0.200 + 0.072 + 0.056 + 0.104] \\ &= Q_1 [1.032] \\ &= 2,000,000 \times 1.032 \\ &= 2,064,000 \end{aligned}$$

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.

## 6.6 SELF- ASSESSMENT QUESTIONS

6. Define the concept of elasticity of demand. Discuss its significance in theory of demand.
7. “The concept elasticity is a versatile tool of economic analysis.” Discuss the validity of this statement with appropriate examples.
8. What do you understand by price elasticity of demand? How is it measured?
9. Discuss briefly the factors on which price elasticity of demand for a commodity depends.
10. What do you understand by point and arc price elasticities of demand? How are these measured?
11. A list of goods is given below. Will their 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 expectations

## **6.7 SUGGESTED READINGS**

1. *Modern Microeconomics* by A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. *Micro Economic Theory* by M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. *Managerial Economics* by D.N. Dwivedi. Vikas Publishing House., New Delhi.
4. *Managerial Economics and Business Strategy* by Michael P. Beye. IRWIN., Chicago.
5. *Economics: Principles, Problems and Policies* by C. R. McConnell and S. L. Brue. McGraw Hill., New York.
6. *Economic Analysis* by K.P.M. Sundharam and E. N. Sundharam. Sultan Chand and Sons., New Delhi.
7. *Managerial Economics* by R. L. Varshney and K. L. Maheshwari. Sultan Chand and Sons., New Delhi.

8. Managerial Economics *by* H. C. Peterson and W. C. Lewis. Prentice Hall of India Pvt. Ltd., New Delhi.
9. Economic Theory and Operations Analysis *by* W.L. Baumal. Prentice Hall of India Pvt. Ltd., New Delhi.
10. Principles of Economics *by* A. Marshall. Macmillan & Co., London.
11. Managerial Economics: Theory, Application and Cases *by* Edwin Mansfield. WW Norton., New York.

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<b>Course Code:</b> MC-104	<b>Vetter:</b> Dr. Karam Pal
<b>Lesson:</b> 07	
<b>DEMAND FORECASTING</b>	

**Objective:** The overall objective of this lesson is to give the readers an understanding of the need for demand forecasting and also of different techniques of demand forecasting.

### **Structure**

- 7.1 Introduction
- 7.2 Procedure to Prepare a Demand Forecast
- 7.3 Techniques of Demand Forecasting
- 7.4 Qualitative Techniques
- 7.5 Statistical Techniques
- 7.6 Econometric Models
- 7.7 Input-Output Forecasting
- 7.8 Self-Assessment Questions
- 7.9 Suggested Readings

## 7.1 INTRODUCTION

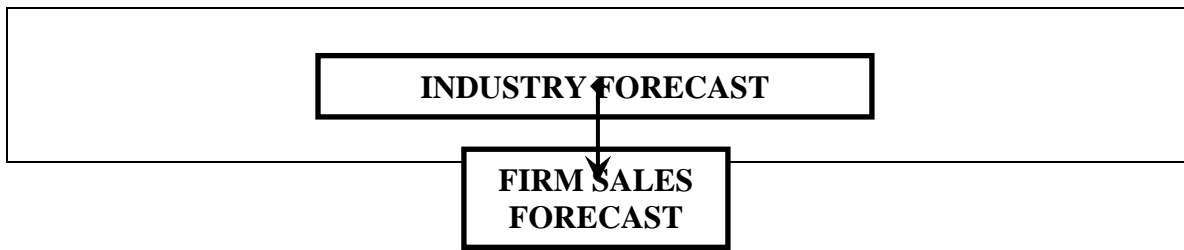
In today's highly complex and dynamic environment, most business decision is made in the face of risk and uncertainty. A firm is, in fact, always confronted with the question as to what would be the level of future economic activity in general and demand for its product in particular. It makes some 'forecast' or 'prediction' about the future situation to offset the risks and uncertainties involved in decision-making. A firm must decide how much of each product to produce, what price to charge, and how much to spend on advertising, and it must also plan for the growth of the firm. All these decisions are based on some forecast of the level of future economic activity in general and demand for the firm's product(s) in particular. The aim of economic forecasting is to reduce the risk or uncertainty that the firm faces in its short-term operational decision making and in planning for its long-term growth. Thus good forecasting becomes a key factor in firm success. The more unstable the demand, the more critical is forecast accuracy, and the more elaborate is forecasting procedure.

## 7.2 PROCEDURE TO PREPARE A DEMAND FORECAST

Firms generally use a three-stage procedure to prepare a demand and sales forecast (see Figure 7-1.) They prepare a macroeconomic forecast first, followed by an industry forecast, followed by a firm demand and sales forecast.

*Forecasting the demand and sales of firm's product usually begins with a macroeconomic forecast of the general level of economic activity for the economy as a whole or gross national product. The reason for this is that the demand and sales of most goods and services are strongly affected by business condition. For example, the demand and sales of new automobiles, new house, electricity, and most other goods and services rise and fall with the general level of economic activity. Thus, the macroeconomic forecast calls for projecting inflation, unemployment, interest rates, consumer spending, business investment expenditures, net exports, and other variables.*

**MACROECONOMIC FORECAST**



**Figure 7-1 A Three-Stage Procedure to Prepare a Demand and Sales Forecast**

The firm uses these macro forecasts of general economic activity as inputs for their micro forecast of the industry's and firm's demand and sales. The firm's demand and sales are usually forecasted on the basis of its historical market (industry) share and its planned marketing strategy (*i.e.*, the introduction of new products and models, changes in relative prices, and promotional effort). From its general sales forecast, the firm can forecast its sales by product line and region. These, in turn, are used to forecast the firm's operational needs for production (raw material, equipment, warehousing, workers), marketing (distributional net work, sales force, promotional campaign), finances (cash flow, profits, need for and cost of outside financing), and personnel throughout the firm.

The firm uses long-term forecasts for the economy and the industry to forecast expenditures on plant and equipment to meet its long-term growth plan and strategy.

**The Forecasts of Market Demand**

Firms can prepare as many as 90 different types of demand estimates or forecasts (see Figure 7-2). Demand can be forecasted for six different product levels, five different space levels, and three different time levels.



### **Figure 7-2 90 Different Types of Demand Estimates or Forecasts**

Each demand forecast serves a specific purpose. For example, a firm might forecast short-run demand for a particular product for the purpose of ordering raw material, planning production, and borrowing cash. Again, it might forecast regional demand for its major product line to decide whether to set-up a regional distribution center.

### **7.3 TECHNIQUES OF DEMAND FORECASTING**

The techniques of demand forecasting are many. These range from very naive ones that require little effort to very sophisticated ones that are very costly in terms of time and effort. Some forecasting techniques are basically qualitative, while others are quantitative. Some are based on examining only past values of the data series to forecast its future values; others involve the use of complex models based on a great deal of additional data and relationships. Some techniques, such as the barometric method, are more useful for short term (monthly or quarterly) forecasts, while others are more useful

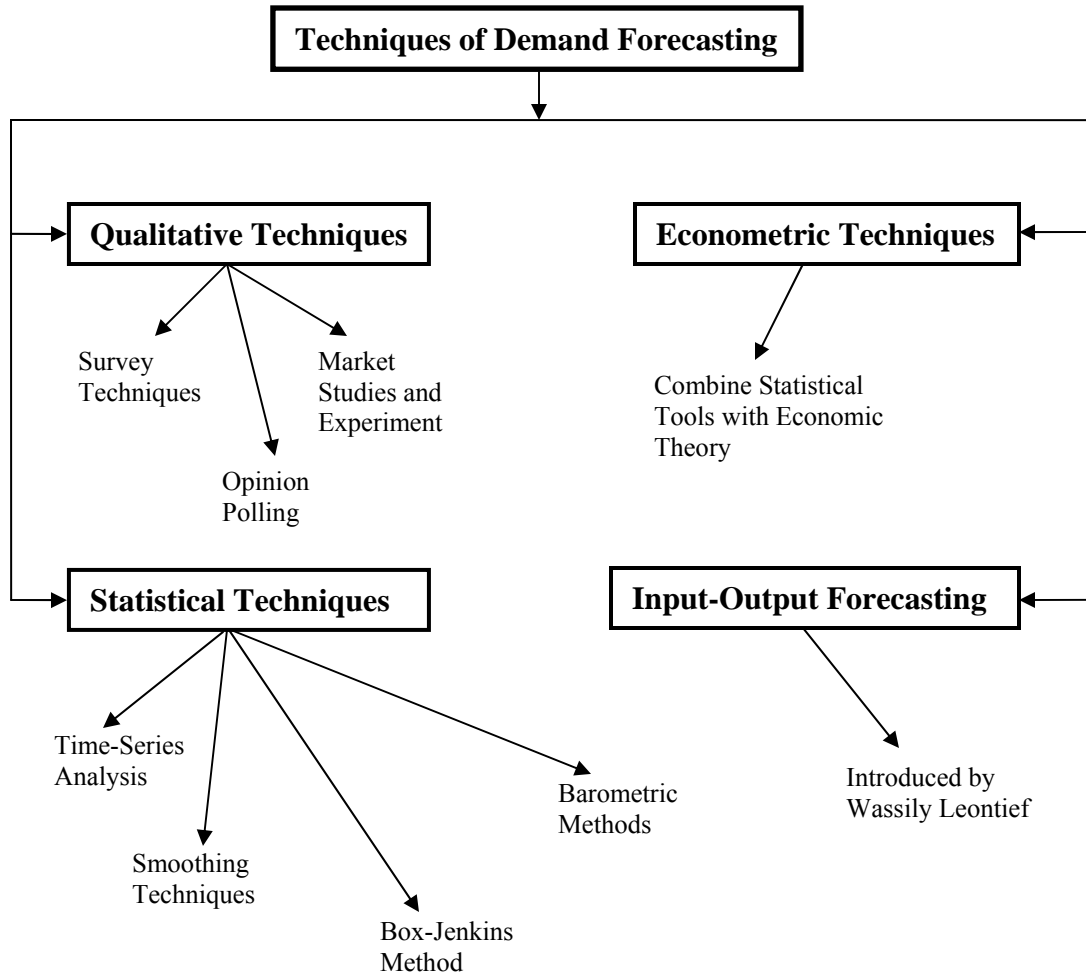
for long-term forecasting of one year or longer. Some may be more appropriate for forecasting at the macro level, while others are better for forecasting at the micro level.

The choice of a suitable technique or a combination of techniques is a matter of purpose, experience and expertise, and depends on

- ✓ the cost of preparing the forecast and the benefit that results from its use,
- ✓ the lead time in decision making,
- ✓ the time period of the forecast (short term or long term),
- ✓ the level of accuracy required,
- ✓ the quality and availability of the data, and
- ✓ The level of complexity of the relationships to be forecasted.

In general, the greater the level of accuracy required and the more complex the relationships to be forecasted, the more sophisticated and expensive will be the forecasting exercise.

The various techniques of demand forecasting that are discussed in this lesson, are shown in Chart 7-1



**Chart 7-1 Various Techniques of Demand Forecasting**

## 7.4 QUALITATIVE TECHNIQUES

Qualitative techniques are often used to make short-term forecasts when quantitative data are not available. These qualitative techniques can also be useful for supplementing quantitative forecasts that anticipate changes in consumer tastes or business expectations about future economic conditions. They can also be invaluable in forecasting the demand for a product that the firm intends to introduce. We will briefly discuss forecasting based on surveys, opinion polling, consumer clinics and market experiments.

### 7.4.1 SURVEY TECHNIQUES



*Survey techniques are generally used to make short-run forecast of demand. These techniques of demand forecasting involve direct interview of potential consumers to collect information about their intentions and future purchase plans. The rationale for forecasting based on surveys of economic intentions is that many economic decisions are made well in advance of actual expenditures. For example, businesses actually plan to add to plant and equipment long before expenditures are actually incurred. Consumers' decisions to purchase house, automobiles, TV sets, washing machines, furniture, vacations, education and other major consumption items are made months or years in advance of actual purchases. Similarly, government agencies prepare budgets and anticipate expenditures a year or more in advance. Surveys of economic intention, thus, can reveal and can be used to forecast future purchases of capital equipment, inventory changes, and major consumer expenditures.*

*Consumer Surveys may be in the form of:*

- a) Complete enumeration,*
- b) Sample survey, or*
- c) End – use method.*

**(a) The Complete Enumeration Method**

*Under this method, all of the potential consumers and users selected from the relevant market are surveyed. If m number of households in a city reports the quantity (q) they are willing to purchase of a commodity, then total probable demand (D<sub>p</sub>) may be calculated as:*

$$D_p = q_1 + q_2 + q_3 + \dots + q_m$$

$$= \sum_{i=1}^m q_i$$

where  $q_1, q_2, q_3$  etc. denote demand by the individual household 1,2,3, etc.

This method has certain **limitations**. It can be used successfully only in case of those products whose consumers are concentrated in a certain region or locality. In case of a widely dispersed market, this method may not be physically possible or may prove very costly in terms of both money and time. Besides, the demand forecast through this method may not be reliable for many reasons: (i) consumers, themselves may not know their actual demand in future and hence may be unable or unwilling to answer the query; (ii) even if they answer, their answer to hypothetical questions may be only hypothetical and not real; (iii) consumers' response may be biased according to their own expectations

about the market conditions; and (iv) their plans may change with a change in the factors not included in the questionnaire.

**(b) Sample Survey Method**

Under this method, only a few potential consumers and users selected from the relevant market through a sampling method are surveyed. Method of survey may be direct interview or mailed questionnaire to the sample-consumers. On the basis of the information obtained, the probable demand may be estimated through the following formula:

$$D_p = \frac{H_R}{H_S} (H \cdot A_p)$$

where  $D_p$  = probable demand forecast;  $H$  = census number of households from the relevant market;  $H_S$  = number of households surveyed or sample households;  $H_R$  = number of households reporting demand for the product;  $A_p$  = average expected consumption by the reporting households (= total quantity reported to be consumed by the reporting households / numbers of households).

This method is simpler, less costly and less time-consuming than the comprehensive survey method. This method is generally used to estimate short-term demand from business firms, government departments and agencies and also from the households who plan their future purchases. Business firms, government departments and other such organizations budget their expenditure at least one year in advance. It is, therefore, possible for them to supply a fairly reliable estimate of their future purchases. Also the households making annual or periodic budget of their expenditure can provide reliable information about their purchases.

The sample survey method is widely used to forecast demand. This method, however, has some **limitations** similar to those of complete enumerations or exhaustive survey method. The forecaster, therefore, should not attribute more reliability to the forecast than is warranted. Besides the sample survey method can be used to verify the demand forecast made by using quantitative or statistical methods.

Although some authors suggest that this method should be used to supplement the quantitative method of forecasting rather than to replace it, this method can be gainfully used where the market is localized. Sample survey method can be of greater use in forecasting where quantification of variables (*e.g.*, feelings, opinion, expectations, *etc.*) is not possible and where consumers' behavior is subject to frequent changes.

**(c) The End-Use Method**

The end-use method of demand forecasting has a considerable theoretical and practical value, especially in forecasting demand for inputs. Making forecasts by this method requires building up a schedule of probable aggregate future demand for inputs by consuming industries and various other sectors. In this method, technological, structural and other changes which might influence the demand are taken into account in the very process of estimation. This aspect of the end-use approach is of particular importance.

***Stages in the end-use method:*** The end-use method of demand forecasting consists of four distinct stages of estimation. In the ***first stage***, it is necessary to identify and list all the possible users of the product in question.

The ***second stage*** of this method involves fixing suitable technical 'norms' of consumption of the product under study. Norms have to be established for each and every end-use. Norms are usually expressed in physical terms either per unit of production of

the complete product or in, some cases, per unit of investment or per capita use. Sometimes, the norms may have to be on value basis. But value-based norms should be avoided as far as possible because it might be rather difficult to specify later the types and sizes of the product in question if value norms are used.

Having established the technical norms of consumption for the different industries and other end-uses of the product, the **third step** is the application of the norms. For this purpose, it is necessary to know the desired or targeted levels of output of the individual industries for the reference year and also the likely development in other economic activities which use the product and the likely output targets.

The **fourth and final stage** in the end-use method is to aggregate the product wise or use-wise content of the item for which the demand is to be forecasted. This aggregate result gives the estimate of demand for the product as a whole for the year in question. By the very nature of the process of estimation described here, it is obvious that the end-use approach results in what may be termed as a "derived" demand.

The end-use method has two exclusive advantages. **First**, it is possible to work out the future demand for an industrial product in considerable details by types and size. By probing into the present use-pattern of consumption of the product, the end-use approach provides every opportunity to determine the types, categories and sizes likely to be demanded in future.

**Second**, in forecasting demand by the end-use approach, it is possible to trace and pinpoint at any time in future as to where and why the actual consumption has deviated from the estimated demand. Besides, suitable revisions can also be made from time to time based on such examination.

## 7.4.2 OPINION POLLING

The opinion poll methods aim at collecting opinions of those who are supposed to possess knowledge of the market, *e.g.*, sales representatives, sales executives, professional marketing experts and consultants. The opinion poll methods include:

- a) Expert-opinion method,
- b) Delphi method, and
- c) Market studies experiments.

### (a) Expert-Opinion Method

Firms having a good network of sales representatives can put them to the work of assessing the demand for the product in the areas, regions or cities that they represent. Sales representatives, being in close touch with the consumers or users of goods, are supposed to know the future purchase plans of their customers, their reaction to the market changes, their response to the introduction of a new product, and the demand for competing products. They are, therefore in a position to provide at least an approximate, if not accurate, estimate of likely demand for their firm's product in their region or area. The estimates of demand thus obtained from different regions are added up to get the overall probable demand for a product. Firms not having this facility gather similar information about the demand for their products through the professional market experts or consultants, who can, through their experience and expertise, predict the future demand. This method is also known as *opinion poll method*.

Although this method too is simple and inexpensive, it has its own **limitations**. *First*, estimates provided by the sales representatives and professional experts are reliable only to the extent depending on their skill to analyze the market and their experience. *Second*,

demand estimates may involve the subjective judgment of the assessor which may lead to over or under-estimation. *Finally*, the assessment of market demand is usually based on inadequate information available to the sales representatives as they have only a narrow view of the market. The factors of wider implication such as change in GNP, availability of credit, future-prospects of the industry, *etc.*, fall outside their purview.

**(b) Delphi Method**

Delphi method of demand forecasting is an extension of the *simple expert opinion poll* method. This method is used to consolidate the divergent expert opinions and to arrive at a compromise estimate of future demand. The process is simple.

Under the Delphi method, the experts are provided information on estimates of forecasts of other experts along with the underlying assumptions. The experts may revise their own estimates in the light of forecasts made by other experts. The consensus of experts about the forecasts constitutes the final forecast. It may be noted that the empirical studies conducted in the USA have shown that unstructured opinions of the experts is the most widely used technique of forecast. This may appear a bit unusual in as much as this give the impression that sophisticated techniques, *e.g.*, simultaneous equations model and statistical methods are not the techniques which are used most often. However, the unstructured opinions of the experts may conceal the fact that information used by experts in expressing their forecasts may be based on sophisticated techniques. The Delphi technique can be used for cross-checking information on forecasts.

**7.4.3 MARKET STUDIES AND EXPERIMENTS**

An alternative method of collecting necessary information regarding demand is to carry out market studies and experiments on consumer's behavior under actual, though

controlled, market conditions. This method is known in common parlance as *market experiment method*. Under this method, firms first select some areas of the representative markets - three or four cities having similar features, viz., population, income levels, cultural and social background, occupational distribution, choices and preferences of consumers, then they carry out market experiments by changing prices, advertisement expenditure and other controllable variables in the demand function under the assumption that other things remain the same. The controlled variables may be changed over time either simultaneously in all the markets or in the selected markets. After such changes are introduced in the market, the consequent changes in the demand over a period of time (a week, a fortnight, or month) are recorded. On the basis of data collected, elasticity coefficients are computed. These coefficients are then used along with the variables of the demand function to assess the demand for the product.

Alternatively, market experiments can be replaced by *consumer clinics* or *controlled laboratory experiment*. Under this method, consumers are given some money to buy, in a stipulated store, goods with varying prices, packages, displays, etc. The experiment reveals the consumers' responsiveness to the changes made in prices, packages and displays, etc. Thus, the laboratory experiments also yield the same information as the market experiments. But the former has an advantage over the latter because of greater control over extraneous factors and its somewhat lower cost.

**Limitations:** The market experiment methods have certain serious limitations and disadvantages, which reduce the usability and reliability of this method.

*First*, a very important limitation of the experimental methods is that they are very expensive. Therefore, experimental methods cannot be afforded by small firms.

**Second**, being a costly affair, experiments are usually carried out on a scale too small to permit generalization with a high degree of reliability.

**Third**, experimental methods are based on short-term and controlled conditions which may not exist in an uncontrolled market. Hence the results may not be applicable to the uncontrolled long-term conditions of the market

**Fourth**, changes in socio-economic conditions during the field experiments, such as local strikes or lay-offs, advertising programme by competitors, political changes, and natural calamities may invalidate the results.

**Finally**, a big disadvantage of experimental methods is that tinkering with price increases may cause a permanent loss of customers to competitive brands that might have been tried.

Despite these limitations, however, the *market experiment method* is often used to provide an alternative estimate of demand and also "as a check on results obtained from statistical studies." Besides, this method generates elasticity coefficients, which are necessary for statistical analysis of demand relationships. For example, an experiment of this kind was conducted by Simmons Mattress Company (US). It put on sale two types of identical mattress-one with Simmons label and the other with an unknown name at the same price and then at different prices for determining the cross-elasticity. It was found that at the equal price, Simmons mattress sold 15 to 1; and at a price higher by 5 dollars it sold 8 to 1, and at a price higher by 25 per cent, it sold almost 1 to 1.



## 7.4 STATISTICAL TECHNIQUES

Statistical methods of demand forecasting utilize historical (time-series) and cross-section data for preparing long-term demand forecasting. Statistical techniques are considered to be superior one for demand forecasting for the following reasons:

- ✓ In the statistical methods, the element of subjectivity is minimum,
- ✓ Method of estimation is scientific, as it is based on the theoretical relationship between the dependent and independent variables,
- ✓ Estimates are relatively more reliable, and
- ✓ Estimation involves smaller cost.

Statistical techniques of demand forecasting includes

1. Time-series Analysis
2. Smoothing Techniques
3. Box-Jenkins Method
4. Barometric Method

### 7.5.1 TIME-SERIES ANALYSIS

Time-series analysis or the analysis of time-series data is one of the most frequently used forecasting methods. **Time-series data** refers to the values of a variable arranged chronologically by days, weeks, months, quarters, or years. The first step in time-series analysis is usually to plot past values of the variable that we seek to forecast (say, the sales of a firm) on the vertical axis and time on the horizontal axis in order to visually inspect the movement of the time series over time. Time-series analysis attempts to forecast future values of the time series by examining past observations of the data only. The assumption is that the time series will continue to move as in the past (*i.e.*, the past

pattern will continue unchanged or will be similar in the future). For this reason, time-series analysis is often referred to as "naive forecasting."

If we plot most economic time-series data, we discover that they fluctuate or vary over time. This variation is usually caused by secular trends, cyclical fluctuations, seasonal variations, and irregular or random influences. The total variation in the time series of sales is the result of all four factors operating together. Thus, the original sales data would show the seasonal and irregular variations superimposed on the cyclical fluctuations around the rising trend. Since cyclical swings or business cycles can be of different duration and can arise from a variety of cause that even today are not yet fully understood, they are usually examined separately with qualitative techniques. Similarly, irregular or random influences in time series, by their very nature, cannot be examined systematically or forecasted. Thus, we concentrate on forecasting the values of time-series data by using only the long-term trend and the seasonal variation in the data.

### **Trend Projection**

Trend projection involves projecting the past trend by fitting a trend line (or curve) to the time-series sales data either graphically, or more precisely, with the aid of statistical techniques. The form of the trend equation that can be fitted on the data is determined either by plotting the sales data and analyzing the pattern of points or by trying different form of trend equation for the best fit. When plotted, a time-series data may show various trends. The most common types of trend equations are (a) linear and (b) exponential trends.

#### **(a) Linear Trend**

When a straight line best project the past trend, it takes the form of

$$S_t = S_o + bt \quad \dots\dots\dots (7-1)$$

This line is fitted with the help of regression analysis.

Where  $S_t$  is the value of the time series to be forecasted for period  $t$ ,  $S_o$  is the estimated value of the time series (the constant of the regression) in the base period (*i.e.*, at time period  $t = 0$ ),  $b$  is the absolute amount of growth per period, and  $t$  is the time period in which the time series is to be forecasted.

For example, fitting a regression line to the electricity sales (consumption) data running from the first quarter of 1997 ( $t = 1$ ) to the last quarter of 2000 ( $t = 16$ ) given in Table 7-1, we get estimated regression Equation 7-2.

$$S_t = 11.90 + 0.394t \quad \dots\dots\dots (7-2)$$

Regression Equation 7-2 indicates that electricity sales in the city in the last quarter of 1996 (that is,  $S_o$ ) are estimated to be 11.90 million kilowatt-hours and increase at the average rate of 0.394 million kilowatt-hours per quarter.

**Table 7-1 Seasonal Demand for (Sales of) Electricity**

Time Period	Quantity	Calculations for Seasonal Adjustment	
		Forecasted Quantity $S_t = 11.90 + 0.394t$	Actual/Forecasted
1997-1	11	12.29	0.895
1997-2	15	13.87	0.865
1997-3	12	15.45	0.906
1997-4	14	17.02	<u>0.881</u>
Average = 0.887			
1998-1	12	12.69	1.182
1998-2	17	14.26	1.192
1998-3	13	15.84	1.136
1998-4	16	17.42	<u>1.148</u>
Average = 1.165			
1999-1	14	13.08	0.917
1999-2	18	14.66	0.887
1999-3	15	16.23	0.924
1999-4	17	17.81	<u>0.898</u>

			Average = 0.907
2000-1	15	13.48	1.039
2000-2	20	15.05	1.063
2000-3	16	16.63	1.022
2000-4	19	18.20	<u>1.044</u>
			Average = 1.042

Thus, based on the past trend, we can forecast electricity consumption (in million kilowatt-hours) in the city to be:

$$S_{17} = 11.90 + 0.394(17) = 18.60 \quad \text{in the first quarter of 2001}$$

$$S_{18} = 11.90 + 0.394(18) = 18.99 \quad \text{in the second quarter of 2001}$$

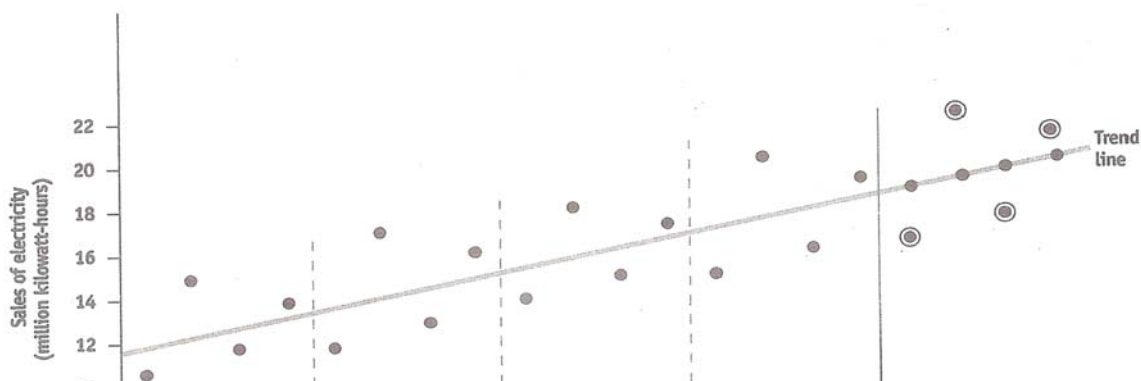
$$S_{19} = 11.90 + 0.394(19) = 19.39 \quad \text{in the third quarter of 2001}$$

$$S_{20} = 11.90 + 0.394(20) = 19.78 \quad \text{in the fourth quarter of 2001}$$

These forecasts are shown by the dots on the dashed portion of the trend line extended in to 2001 in Figure 7-3.

### Seasonal Variation

The forecasted values of electricity sales read off from the extended line in Figure 7-3 take into consideration only the long-run trend factor in the data. The data for year 1997 to 2000, however, show strong seasonal variation, with sales in the first and third quarters of each year consistently below the corresponding long-run trend values, while sales in second and fourth quarters are consistently above the trend values. By incorporating this seasonal variation, we can significantly improve the forecast of electricity sales in the city. We can do this with the ratio-to-trend method or with dummy variables. We will discuss the ratio-to-trend method.



### **Figure 7-3 Forecasting by Trend Projection**

#### **Ratio-to-Trend Method for Seasonal Adjustment**

To adjust the trend forecast for the seasonal variation by the ratio-to-trend method, we simply find the average ratio by which the actual value of the time series differs from the corresponding estimated trend value in each quarter during the 1997 to 2000 period and then multiply the forecasted trend value this ratio. Table 7-1(third and fourth columns) shows the calculations for the seasonal adjustment of the electricity sales forecasted for each quarters of 1997 from the extended trend line examined earlier. Multiplying the electricity sales forecasted earlier (from the simple extension of the linear trend) by the seasonal factors estimated in Table 7-1 (that is, 0.887 for the first quarters, 1.165 for the second quarters, and so on) we get, the following new forecasts based on both the linear trend and the seasonal adjustment:

$$S_{17} = 18.600(0.887) = 16.50 \quad \text{in the first quarter of 2001}$$

$$S_{18} = 18.99 (1.165) = 22.12 \quad \text{in the second quarter of 2001}$$

$$S_{19} = 19.39 (0.907) = 17.59 \quad \text{in the third quarter of 2001}$$

$$S_{20} = 19.78 (1.042) = 20.61 \quad \text{in the fourth quarter of 2001}$$

These forecasts are shown by the encircled points in Figure 7-3. Note that with the inclusion of the seasonal adjustment, the forecasted values for electricity sales closely replicate the past seasonal pattern in the time-series data along the rising linear trend.

**(b) Exponential Trend**

When sales (or any dependent variable) have increased over the past years at an increasing rate or at a constant percentage rate, then the appropriate trend equation to be used is an exponential trend equation of any of the following forms.

(i) 
$$S_t = S_0(1 + g)^t \quad \dots\dots\dots (7-3)$$

or its semi-logarithmic form

$$\log S_t = \log S_0 + t \log(1 + g) \quad \dots\dots\dots (7-4)$$

This form of trend equation is used when growth rate is constant.

(ii) Double-log trend of the form

$$S_t = S_0 t^b \quad \dots\dots\dots (7-5)$$

or its double logarithmic form

$$\log S_t = \log S_0 + b \log t \quad \dots\dots\dots (7-6)$$

This form of trend equation is used when growth rate is increasing.

(iii) Polynomial trend of the form

$$S_t = S_0 + bt + et^2 \quad \dots\dots\dots (7-7)$$

In these equations *a*, *b* and *c* are constants, and *e* = 2.718. Once the parameters of the equations are estimated, it becomes quite easy to forecast demand for the years to come.

The trend method is quite popular in business forecasting because of its simplicity. It is simple to apply because only time-series data on sales are required. The analyst is supposed to possess only a working knowledge of statistics. Since data requirement of

this method is limited, it is also inexpensive. Besides, the trend method yields fairly reliable estimates of the future course of demand.

**Limitations:** The *first* limitation of this method arises out of its assumption that the past rate of change in the dependent variable will persist in the future too. Therefore, the forecast based on this method may be considered to be reliable only for the period during which this assumption holds.

*Second*, this method cannot be used for short-term estimates. Also it cannot be used where trend is cyclical with sharp turning points of troughs and peaks.

*Third*, this method, unlike regression analysis, does not bring out the measure of relationship between dependent and independent variables. Hence, it does not yield the necessary information (*e.g.*, price and income elasticities), which can be used for future policy formulations. These limitations need to be borne in mind while making the use of this method.

## **7.5.2 SMOOTHING TECHNIQUES**

Other methods of naive forecasting are smoothing techniques. These predict values of a time series on the basis of some average of its past values only. Smoothing techniques are useful when the time series exhibit little trend or seasonal variations but a great deal of irregular or random variation. The irregular or random variation in the time series is then smoothed, and future values are forecasted based on some average of past observations.

We will discuss two smoothing techniques: moving averages and exponential smoothing.

### **(a) Moving Averages**

The simplest smoothing technique is the moving average. Here the forecasted value of a time-series in a given period (month, quarter, year, *etc.*) is equal to the average value of

the time series in a number of previous periods. For example, with a three-period moving average, the forecasted value of the series for the next period is given by the average value of the time series in the previous three periods. (See column 3 in Table 7-2) Similarly, with a five-period moving average, the forecast for the next period is equal to the average for the previous five periods (see column 4 in Table 7-2) and so on. The greater the number of periods used in the moving average, the greater is the smoothing effect because each new observation receives less weight. This is more useful the more erratic or random is the time-series data.

**Table 7-2 Forecasting by Moving Averages**

Time Period	Quantity	Three-Quarter Moving Average Forecast( $F$ )	Five-Quarter Moving Average Forecast( $F$ )
1997-1	11	--	--
1997-2	15	--	--
1997-3	12	--	--
1997-4	14	12.67	--
1998-1	12	13.67	--
1998-2	17	12.67	12.80
1998-3	13	14.33	14.00
1998-4	16	14.00	13.60
1999-1	14	15.33	14.40
1999-2	18	14.33	14.40
1999-3	15	16.00	15.60
1999-4	17	15.67	15.20
2000-1	15	16.67	16.00
2000-2	20	15.67	15.80
2000-3	16	17.33	17.00
2000-4	19	17.00	16.60
2001-1	--	18.33	17.40

**(b) Exponential Smoothing**

A serious criticism of using simple moving averages in forecasting is that they give equal weight to all observations in computing the average, even though intuitively we might expect more recent observations to be more important. Exponential smoothing overcomes



this objection and is used more frequency than simple moving averages in forecasting.

With exponential smoothing, the forecast for period  $t+1$  (that is,  $F_{t+1}$ ) is a weighted average of the actual and forecasted values of the time series in period  $t$ . The value of the time series at period  $t$  (that is,  $A_t$ ) is assigned a weight  $w$  between 0 and 1 inclusive, and the forecast for period  $t$  (that is,  $F_t$ ) is assigned the weight of  $1 - w$ . The greater the value of  $w$ , the greater is the weight given to the value of the time series in period  $t$  as opposed to previous periods. Thus the value of the forecast of the time-series in period  $t+1$  is

$$F_t = wA_t + (1-w)F_t \quad \dots\dots\dots (7-8)$$

For exponential smoothing, first it is necessary to assign a value to the initial forecast to get the analysis started. One way to do this is to let  $F_t$  equal to the mean value of the entire observed time-series data. We must also decide on the value of  $w$ . In general different values of  $w$  are tried, and the one that leads to the forecast with the smallest root-mean square error is actually used in forecasting. For example, column 3 in Table 7-3 show the forecast for the electricity consumption in the city, using  $w = 0.3$ .  $F_1$  (to get the calculations started) is the average electricity consumption in the city over the 16 quarters for which we have data.

**Table 7-3 Forecasting by Exponential Smoothing**

Time Period	Quantity	Forecast( $F$ ) with $w = 0.3$
1997-1	11	$F_1 = 244/6 = 15.250$
1997-2	15	$F_2 = (0.3)(11) + (1-0.3)(15.250) = 13.975$
1997-3	12	$F_3 = (0.3)(15) + (1-0.3)(13.975) = 14.283$
1997-4	14	$F_4 = (0.3)(12) + (1-0.3)(14.283) = 13.598$
1998-1	12	$F_5 = (0.3)(14) + (1-0.3)(13.598) = 13.719$
1998-2	17	$F_6 = (0.3)(12) + (1-0.3)(13.719) = 13.203$
1998-3	13	$F_7 = (0.3)(17) + (1-0.3)(13.203) = 14.342$
1998-4	16	$F_8 = (0.3)(13) + (1-0.3)(14.342) = 13.939$
1999-1	14	$F_9 = (0.3)(16) + (1-0.3)(13.939) = 14.557$
1999-2	18	$F_{10} = (0.3)(14) + (1-0.3)(14.557) = 14.390$
1999-3	15	$F_{11} = (0.3)(18) + (1-0.3)(14.390) = 15.473$

1999-4	17	$F_{12} = (0.3)(15) + (1-0.3)(15.473) = 15.331$
2000-1	15	$F_{13} = (0.3)(17) + (1-0.3)(15.331) = 15.832$
2000-2	20	$F_{14} = (0.3)(15) + (1-0.3)(15.832) = 15.582$
2000-3	16	$F_{15} = (0.3)(20) + (1-0.3)(15.582) = 16.907$
2000-4	19	$F_{16} = (0.3)(16) + (1-0.3)(16.907) = 16.635$
2001-1	--	$F_{17} = (0.3)(19) + (1-0.3)(16.635) = 17.345$

### 7.5.3 BOX-JENKINS METHOD

Suggested by G E P Box and G M Jenkins, this method of forecasting is used only for short-term predictions. Besides, this method is suitable for forecasting demand with only stationary time-series sales data. Stationary time-series data is one which does not reveal a long-term trend. In other words, Box-Jenkins technique can be used only in those cases in which time-series analysis depicts monthly or seasonal variation recurring with some degree of regularity.

**Steps in Box-Jenkins method:** As mentioned above, Box-Jenkins method can be applied only to stationary time-series data. Therefore, the *first step* in Box-Jenkins approach is to eliminate trend from the time series data. Trend is eliminated by taking first differences of time-series data, *i.e.*, subtracting observed value of one period from the observed value of the preceding year. After trend is eliminated, a stationary time-series is created. The *second step* in the Box-Jenkins approach is to make sure that there is seasonality in the stationary time-series. If a certain pattern is found to repeat over time, there is seasonality in the stationary time-series created. The *third step* involves use of models to predict the sales in the intended period. We give here a brief description of the Box-Jenkins models which are used in the same sequence.

**(i) Auto-regressive Model:** In a general autoregressive model, the behavior of a variable in a period is linked to the behavior of the variable in future period. The general form of the autoregressive model is given below.

$$S_t = a_1 S_{t-1} + a_2 S_{t-2} + \dots + a_n S_{t-n} + e_t \quad \dots \dots \dots (7-9)$$

This model states that the value of  $S_t$  in period  $t$  depends on the values of  $S$  in periods  $t - 1, t - 2 \dots t - n$ . The term  $e_t$  is the random portion of  $S_t$  not explained by the model. If estimated value of one or some of the coefficients-  $a_1, a_2, \dots a_n$  are different from zero, it reveals seasonality in data. This completes the second step.

The model (7-9), however, does not specify the relationship between the value of  $S_t$  and residuals ( $e$ ) of previous periods. Box-Jenkins method uses moving average method to specify the relationship between  $S_t$  and  $e_t$ , values of residuals in previous years. This is the third step. Let us now look at the moving average model of Box-Jenkins method.

**(ii) Moving Average Model:** The moving average model estimates  $S_t$  in relation to residuals ( $e$ ) of the previous years. The general form of moving average model is given below.

$$S_t = m + b_1 e_{t-1} + b_2 e_{t-2} + \dots + b_p e_{t-p} + e_t \quad \dots \dots \dots (7-10)$$

where  $m$  is mean of the stationary time-series and  $e_{t-1}, e_{t-2} \dots e_{t-p}$  are the residuals-the random components of  $S$  in  $t-1, t-2, t-p$  periods, respectively.

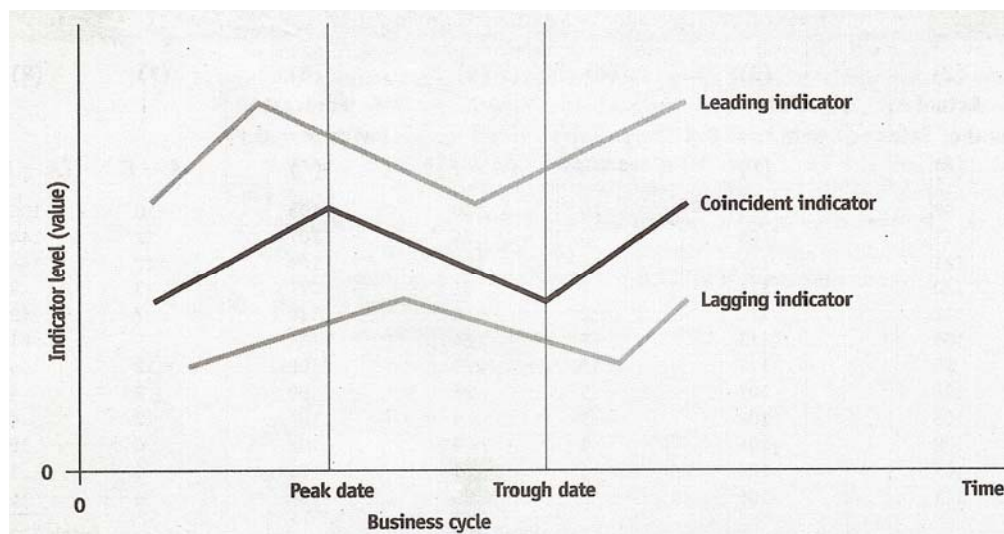
**(iii) Auto-regressive-Moving Average Model:** After moving average model is estimated, it is combined with autoregressive model to form the final form of the Box-Jenkins model, called autoregressive-moving average model, given below:

$$S_t = a_1 S_{t-1} + a_2 S_{t-2} + \dots + a_n S_{t-n} + b_1 e_{t-1} + b_2 e_{t-2} + \dots + b_p e_{t-p} + e_t \quad \dots \dots \dots (7-11)$$

Clearly, Box-Jenkins method of forecasting demand is a sophisticated and complicated method. Without the aid of computers it is rather an impracticable method.

#### 7.5.4 BAROMETRIC FORECASTING

Barometric forecasting, as conducted today, is primarily the result of the work conducted at the national Bureau of Economic Research (NBER) and Conference Board of U S the basic approach of this technique is to construct an index of relevant economic indicators.



**Figure 7-4 Relative Positions of Leading, Coincident and Lagging Indicators**

The economic indicators are time-series that may

- precede (lead) changes in the level of general economic activity-**Leading indicators**, or
- move in step or coincide with movements in general economic activity-**Coincident indicators**, or
- follow or lag movements in general economic activity-**Lagging Indicators**.

The relative positions of leading, coincident, and lagging indicators in the business cycle are shown graphically in Figure 7-4.

The index of leading economic indicators is used to forecast or anticipate short-term changes in economic activity or turning points in business cycle. The leading economic

indicators tend to precede changes in the level of general economic activity, in the same way as changes in the mercury in a barometer precede changes in weather conditions (hence the name “barometric methods”).

It may be noted at the outset that the barometric technique was developed to forecast the general trend in overall economic activities. This method can nevertheless be used to forecast demand prospects for a product, not the actual quantity expected to be demanded. For example, development and allotment of land by the Delhi Development Authority (DDA) to the Group Housing Societies (a lead indicator) indicates higher demand prospects for cement, steel, bricks and other construction materials.

The time series of various indicators are selected on the basis of the following criteria:

- ✓ Economic significance of the indicator: the greater the significance, the greater the score of the indicator.
- ✓ Statistical adequacy of time-series indicators: a higher score is given to an indicator provided with adequate statistics.
- ✓ Conformity with overall movement in economic activities.
- ✓ Consistency of series to the turning points in overall economic activity.
- ✓ Immediate availability of the series, and
- ✓ Smoothness of the series.

The problem of choice may arise because some of the indicators appear in more than one class of indicators. Furthermore, it is not advisable to rely on just one of the indicators. This leads to the usage of what is referred to as the diffusion index. A diffusion index copes with the problem of differing signals given by the indicators. A diffusion index is the percentage of rising indicators. In calculating a diffusion index, for a group of

indicators, scores allotted are 1 to rising series,  $\frac{1}{2}$  to constant series and zero to falling series. The diffusion index is obtained by the ratio of the number of indicators, in a particular class, moving up or down to the total number of indicators in that group. Thus, if three out of six indicators in the lagging series are moving up, the index shall be 50 per cent. It may be noted that the most important is the diffusion index of the leading series.

Leading indicators can be used as inputs for forecasting aggregate economic variables, GNP, aggregate consumers' expenditure, aggregate capital expenditure, *etc.* The only advantage of this method is that it overcomes the problem of forecasting the value of independent variable under the regression method. The major limitations of this method are: (i) it can be used only for short-term forecasting, and (ii) a leading indicator of the variable to be forecast is not always easily available.

## **7-6 ECONOMETRIC MODELS**

The econometric models are increasingly used to forecast the firm's demand and sales of a commodity as well as many other economic variables. The characteristic that distinguishes econometric models from other forecasting methods is that they seek to identify and measure the relative importance (elasticity) of the various determinants of demand or other economic variables to be forecasted. By attempting to *explain* the relationship being forecasted, econometric forecasting allows the manager to determine the optimal policies for the firm. This is to be contrasted with the other forecasting techniques examined in this lesson that forecast demand, sales, or other economic variables on the basis of their past patterns or on the basis of some leading indicator alone.

Econometric forecasting frequently incorporates or uses the best features of other forecasting techniques, such as trend and seasonal variations, smoothing techniques, and leading indicators. Econometric forecasting models range from single-equation models of the demand that the firm faces for product to large multiple-equation models describing hundreds of sectors and industries of the economy. Although the concern here is with forecasting demand for a firm's product, macro forecasts of national income and major sectors of the economy are often used as inputs or explanatory variables in simple single-equation demand models of the firm. Therefore, we discuss both types of forecasting in this section.

**Single-Equation Models**

The simplest form of econometric forecasting is with a single-equation model. The first step is to identify the determinants of the variable to be forecasted. For example, in forecasting the demand for coffee, the firm will usually postulate that demand ( $Q$ ) is a function of or depends on the price of coffee ( $P$ ), consumers' disposable income ( $I$ ), the size of population ( $N$ ), the price of tea ( $P_s$  - a substitute), the price of milk ( $P_c$  - a complement), and the level of advertising by the firm ( $A$ ). Thus, we can write the following demand equation to be estimated:

$$Q = a_0 + a_1P + a_2I + a_3N + a_4P_s + a_5P_c + a_6A + e \quad \dots\dots\dots (7-12)$$

Once the model has been estimated (*i.e.*, the values of the  $a$ 's determined) and evaluated, the firm must obtain forecasted values of the independent or explanatory variables of the model for the time period for which the dependent variable is to be forecasted. Thus, to forecast  $Q_{t+1}$  (*i.e.*, the demand faced by the firm in the next period), the firm must obtain

the values for  $P_{t+1}$ ,  $I_{t+1}$ ,  $N_{t+1}$ ,  $P_{St+1}$ ,  $P_{Ct+1}$  and  $A_{t+1}$ . By substituting these forecasted values of the independent variables into the estimated equation, we obtain the forecasted values of the dependent variable ( $Q_{t+1}$ ). The forecasted value of the macroeconomic variables of the model ( $Y_{t+1}$  and  $N_{t+1}$ ) are usually obtained from the Government agencies or from many private firms that specialize in making such forecasts. The micro variables in the model not under the control of the firm ( $P_{St+1}$  and  $P_{Ct+1}$ ) might be forecasted by time-series analysis or smoothing techniques, and the firm can experiment with various alternative forecasted values of the independent policy variables ( $P_{t+1}$  and  $A_{t+1}$ ) under its control.

**Multiple-Equation Models**

Although single-equation models are often used by firms to forecast demand or sales, economic relationships may be so complex that a multiple-equation model may be required. This is particularly the case in forecasting macro variables such as gross national product (*GNP*) or the demand and sales of major sectors or industries. Multiple-equation models may include only a few equations or hundreds of them. To show how multiple-equation models are used in forecasting, we start with a very simple three-equation (7-13, 7-14, and 7-15) model of the national economy that can be used to forecast *GNP*.

$$C_t = a_1 + b_1 GNP_t + \mu_{1t} \quad \dots\dots\dots (7-13)$$

$$I_t = a_2 + b_2 \pi_{t-1} + \mu_{2t} \quad \dots\dots\dots (7-14)$$

$$GNP_t = C_t + I_t + G_t \quad \dots\dots\dots (7-15)$$

where C = consumption expenditures

*GNP* = gross national product in year *t*



$I$  = investment

$\pi$  = profits

$G$  = government expenditures

$U$  = stochastic disturbance (random error term)

$t$  = current year

$t - 1$  = previous year

Variables  $C_t$ ,  $I_t$ , and  $GNP_t$  (the left hand variables) are called **endogenous variables**.

These are the variables that the model seeks to explain or predict from the solution of the model. **Exogenous variables**, on the other hand, are those determined outside the model.

In the above model,  $\pi_{t-1}$  and  $G_t$  are the exogenous variables. Their values must be supplied from outside the model in order to be able to estimate the model. When (as in the above model) some of the endogenous variables also appear on the right of the equals signs, this means that they both affect and are in turn affected by the other variables in the model (*i.e.*, they are simultaneously determined).

Equations 7-13 and 7-14 are called **structural (behavioral) equations** because they seek to explain the relationship between the particular endogenous variable and the other variables in the system. On the other hand, Equation 7-15 is a **definitional equation** or an identity and is always true by definition. Note that Equation 7-15 has no parameters or coefficients to be estimated. We will see that, given the value of the exogenous variables  $\pi_{t-1}$  and  $G_t$ , we can solve the system and estimate the values of the endogenous variables. A change in the value of an exogenous variable will affect directly the endogenous variable in the equation in which it appears and indirectly the other endogenous variables

in the system. For example, an increase in  $\pi_{t-1}$  leads to a rise in  $I_t$  directly (Equation 7-14). The induced increase in  $I_t$  then leads to an increase in  $GNP_t$  and, through it, in  $C_t$  as well. Since the endogenous variables  $C_t$ ,  $I_t$ , and  $GNP_t$  of the system are both determined by and in turn determine the value of the other endogenous variables in the model we cannot use the ordinary least-squares technique to estimate the parameters of the structural equations (the  $a$ 's and the  $b$ 's in Equations 7-13 and 7-14). More advanced econometric techniques are required to obtain unbiased estimates of the coefficients of the model.

By assuming that these coefficients are correctly estimated by the appropriate estimating technique, we can show how the above simple macro model can be used for forecasting the values of the endogenous variables. To do this, we substitute Equations 7-13 and 7-14 into Equation 7-15 (the definitional equation) and solve. This will give an equation for  $GNP_t$  that is expressed only in terms of  $\pi_{t-1}$  and  $G_t$ , (the exogenous variables of the system). Then by substituting the values of  $\pi_t$  (which is known in year  $t+1$ ) and the predicted or forecasted value of  $G_{t+1}$  into the solved equation, we get a forecast for  $GNP_{t+1}$ . That is, substituting Equation 7-13 into Equation 7-15, we get

$$GNP = a_1 + b_1GNP + I_t + G_t \quad \dots\dots\dots (7-16)$$

By then substituting Equation 7-14 into 7-16, we get

$$GNP_t = a_1 + b_1GNP_t + a_2 + b_2\pi_{t-1} + G_t$$

$$GNP_t(1-b_1) = a_1 + a_2 + b_2\pi_{t-1} + G_t \quad \dots\dots\dots (7-17)$$

Dividing both sides of Equation 7-17 by  $1 - b_1$  we finally obtain

$$GNP_t = \frac{a_1 + a_2}{1 - b_1} + \frac{b_2\pi_{t-1}}{1 - b_1} + \frac{G_t}{1 - b_1} \quad \dots\dots\dots (7-18)$$

Equation 7-18 is called a reduced-form equation because  $GNP_t$  is expressed only in terms of  $\pi_{t-1}$  and  $G_t$  (the exogenous variables of the model). By substituting into Equation 7-18 the value of  $\pi_t$  (which is known in year  $t + 1$ ) and the predicted value of  $G_{t+1}$ , we obtain the forecasted value for  $GNP_{t+1}$ . The reduced-form equations for  $C_t$  and  $I_t$  can similarly be obtained.

While the above simple macro model contains three endogenous and two exogenous variables, and two structural and one definitional equations, most large models of the economy contain hundreds of variables and equations. They require estimates of tens, if not hundreds, of exogenous variables and provide forecasts of an even greater number of endogenous variables, ranging from  $GNP$  to consumption, investment, and exports and imports by sector, as well as for numerous other real and financial variables. Firms usually obtain macro forecasts for the entire economy and its major sectors from firms specializing in making such forecasts and use these macro forecasts as inputs in their own specific forecasting of the demand and sales of the firm's product(s).

## **7-7 INPUT-OUTPUT FORECASTING**

Input-output analysis and forecasting, introduced by Wassily Leontief, has many uses and applications. They are used by firms to forecast the raw materials, labor, and capital requirements needed to meet a forecasted change in the demand for their products. Input-output analysis refers to the empirical study of the interdependence among the various industries and sectors of the economy. It shows the use of the output of each industry as inputs by other industries and for final consumption. For example, it shows how an increase in the demand for trucks will lead to an increase in the demand for steel, glass, tires, plastic, upholstery materials, and so on, and how the increase in the demand for

these products will in turn lead to an increase in the demand for the inputs required to produce them (including trucks). Input-output analysis allows us to trace through all these inter-industry input and output flows throughout the economy and to determine the total increase (direct and indirect) of all the inputs required to meet the increased demand for trucks.

The construction of such input-output tables is a time-consuming and expensive undertaking. Most firms using input-output tables for forecasting purposes rely on the input-output tables periodically constructed by the Government agencies.

### **Input-Output Tables**

Table 7-4 gives the input-output table for a simple economy composed of three industries: *A*, *B*, and *C*. It shows the flow of inputs and outputs among these three industries. It also shows the final demand for the output of each industry as well as the value added by each industry. The rows of Table 7-4 show the disposition of the output of each industry. For example, the first row shows that of the total output of Rs200 for industry *A*, Rs110 represents intermediate sales to firms in the same and other industries (Rs20 to firms in industry *A*, Rs60 to firms in industry *B*, and Rs30 to firms in industry *C*) to be used as inputs in the production activity of these industries, and Rs90 goes to consumers for final consumption.

**Table 7-4 Three-Sector Input-Output Flow Table**

Supplying Industry	Producing Industry			Final Demand	Total
	A	B	C		
A	20	60	30	90	200
B	80	90	20	110	300
C	40	30	10	20	100
Value Added	60	120	40	--	220

Total	200	300	100	220	820
-------	-----	-----	-----	-----	-----

On the other hand, the columns of the table indicate the input requirements of each industry, as well as the value added by the industry. For example, the first column indicates that industry *A* purchased Rs20 of its own output, Rs80 from industry *B*, and Rs40 from industry *C*, while Rs60 represents the value added (the profits, as well as the wages, interest payments, and taxes paid out) by industry *A*. Note that the total output of each industry (row total) equals the total costs of production, including value added (column total).

**Table 7-5 Direct Requirement Matrix**

Supplying Industry	Producing Industry		
	A	B	C
A	0.1	0.2	0.3
B	0.4	0.3	0.2
C	0.2	0.1	0.1

### **Direct Requirements Matrix**

By dividing the input requirements shown in each column of Table 7-4 by the column total, we get the *direct requirements matrix*. This is shown by Table 7-5. The coefficients in each column of Table 7-5 indicate the input requirements needed to produce each rupee of output by each industry. Thus, for each rupee of output, industry *A* requires inputs of Rs0.10 from industry *A*, Rs0.40 from industry *B*, and Rs0.20 from industry *C*. Hence, for industry *A* to increase its output by Rs100, it would require additional inputs of Rs10 from industry *A*, Rs40 from industry *B*, and Rs20 from industry *C*. But for industry *B* to increase output by Rs40, industry *B* would require additional inputs from

industries *A* and *C*, as well as from industry *B* itself. These additional indirect or secondary input requirements are not taken into consideration by the direct requirements matrix.

### **Total Requirements Matrix**

The total (direct and indirect) input requirements needed to produce one additional rupee of output by each industry is obtained from the *total requirements matrix*, given in Table 7-6. It is derived from the *direct requirements matrix* of Table 7-5. Thus, for industry *A* the total input requirements needed to produce each rupee of output are Rs1.47 from industry *A*, Rs0.96 from industry *B*, and Rs0.43 from industry *C*. Hence, for industry *A* to increase its output by Rs100, it requires additional inputs of Rs147 from industry *A*, Rs96 from industry *B*, and Rs43 from industry *C*.

**Table 7-6 Total Requirement Matrix**

Supplying Industry	Producing Industry		
	A	B	C
A	1.47	0.51	0.60
B	0.96	1.81	0.72
C	0.43	0.31	1.33

By multiplying the total requirement matrix by the final demand for each commodity (the column vector of final demand in Table 7-4), we get the total demand for each commodity (the column vector of total demand in Table 7-4). This is shown in Table 7-7.

**Table 7-7 Total Demand**

Total Requirement Matrix	Final Demand Vector	Total Demand Vector
1.47 0.51 0.60	90	200
0.96 1.81 0.72	110	300

0.43 0.31 1.33	20	100
----------------	----	-----

### Forecasting with Input-Output Tables

Suppose the econometric forecasts indicate that next year the final demand for the output of industry *A* will increase from Rs90 to Rs100. We can use the total requirement matrix for forecasting the new total output of industries *A*, *B* and *C*.

$$(1.47)(100) + (0.51)(110) + (0.60)(20) = 215$$

$$(0.96)(100) + (1.81)(110) + (0.72)(20) = 310$$

$$(0.43)(100) + (0.31)(110) + (1.33)(20) = 104$$

These forecasts are internally consistent and can be used to construct a new input-output table (see Table 7-8) showing the larger input demand of each industry that would result from the forecasted increase from Rs90 to Rs100 in the final demand of the output of industry *A*.

**Table 7-4 Revised Three-Sector Input-Output Flow Table**

Supplying Industry	Producing Industry			Final Demand	Total
	A	B	C		
A	22	62	31	100	215
B	86	93	21	110	310
C	43	31	10	20	104

While input-output analysis and forecasting are very useful, they do face serious shortcomings. *One* is that the direct and total requirement coefficients are assumed to be fixed and do not allow for input substitution in production. *Furthermore*, the reliability of the industry requirements forecasted by input-output tables depends on the reliability

of the econometric forecasts of the demand for the final commodities on which they are based.

## 7.8 SELF- ASSESSMENT QUESTIONS

1. What is forecasting? Why is it so important in the management of the firm?
2. What are different types of forecasting methods? How can the firm determine the most suitable forecasting method to use?
3. What are qualitative forecasts? What is their rationale and usefulness? Explain some important forms of qualitative forecasts.
4. (a) Explain the trend projection method of demand forecasting. What are the common trend forms used in the time-series analysis?  
(b) Explain the ratio-to-trend method for incorporating the past seasonal variation in the data into a trend forecast.
5. What are smoothing techniques? When are smoothing techniques useful in forecasting the value of a time-series?
6. Explain Barometric method of demand forecasting.
7. What is econometric forecasting? How is it conducted? What are its advantages over other forecasting techniques?
8. What would be the appropriate variable for estimating demand for (a) steel (b) tea (c) sugar (d) petrol (e) toy by regression method?
9. An Economic Research center has published data on GDP and demand for washing machines:

Year:	1992	1993	1994	1995	1996	1997	1998
-------	------	------	------	------	------	------	------



GDP (billion Rs):	20	22	25	27	30	33	35
Washing Machines:	5	6	8	8	9	10	12

(Million Units)

Forecast the demand for washing machines in the years 1999 and 2000.

The Research center has projected GDP for 1999 and 2000 at Rs 38 billion and at Rs 40 billion, respectively.

10. “The concept of elasticity of demand and demand forecasting are versatile tools of economic analysis”. Discuss the validity of this statement.
11. What short note
  - (a) Market studies and experiments for demand forecasting
  - (b) Opinion polling for demand forecasting
  - (c) Lead indicators
  - (d) Input output forecasting

## 7.9 SUGGESTED READINGS

1. Modern Microeconomics *by* A. Koutsoyiannis. ELBS, The Macmillan Press Ltd., London.
2. Micro Economic Theory *by* M. L. Jhingan. Vrinda Publications (P) Ltd., Delhi.
3. Managerial Economics *by* D.N. Dwivedi. Vikas Publishing House., New Delhi.
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6. Economic Analysis *by* K.P.M. Sundharam and E. N. Sundharam. Sultan Chand and Sons., New Delhi.

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8. *Managerial Economics* by H. C. Peterson and W. C. Lewis. Prentice Hall of India Pvt. Ltd., New Delhi.
9. *Economic Theory and Operations Analysis* by W.L. Baumal. Prentice Hall of India Pvt. Ltd., New Delhi.
10. *Principles of Economics* by A. Marshall. Macmillan & Co., London.
11. *Managerial Economics: Theory, Application and Cases* by Edwin Mansfield. WW Norton., New York.

**COURSE: ECONOMIC ANALYSIS**

**COURSE CODE: MC-104**

**LESSON: 08**

**AUTHOR: Dr. S. S. Kundu**

**VETTER: Dr Karam Pal**

**CONSUMER BEHAVIOUR: CARDINAL ANALYSIS**

**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 behaviour.

**STRUCTURE:**

- 8.1 Introduction
- 8.2 Meaning of Utility
- 8.3 The Law of Diminishing Marginal Utility
- 8.4 Cardinal and Ordinal Concepts of Utility
- 8.5 Analysis of Consumer Behaviour: Cardinal Utility Approach
- 8.6 Summary
- 8.7 Self-Test Questions
- 8.8 Suggested Readings

**8.1 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.

**8.2 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 have 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.

### **8.2.1 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 from 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

$$TU_n = U_x+U_y+U_z$$

### **8.2.2 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..  $\Delta TU$ ) 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  $\Delta Q$  = 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:

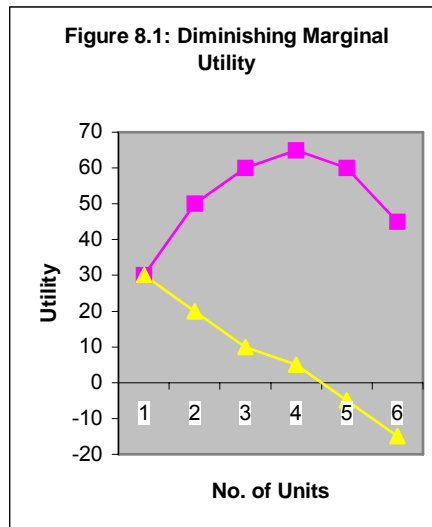
$$MU \text{ of } n\text{th unit} = TU_n - TU_{n-1}$$

### **8.3 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 8.1 and graphically in Figure 8.1.

Table 8.1: 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.*

### **8.3.1 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.

## **8.4 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.

### **8.4.1 CARDINAL UTILITY**



The concept of cardinal utility implies that utility can be assigned a cardinal number like 1, 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.

#### **8.4.2 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.

### *8.5 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 from  $n$  items can be expressed

as

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

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

### 8.5.1 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,

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

Consumer's equilibrium in a single commodity model is graphically illustrated in

Figure 8.2 as follows.

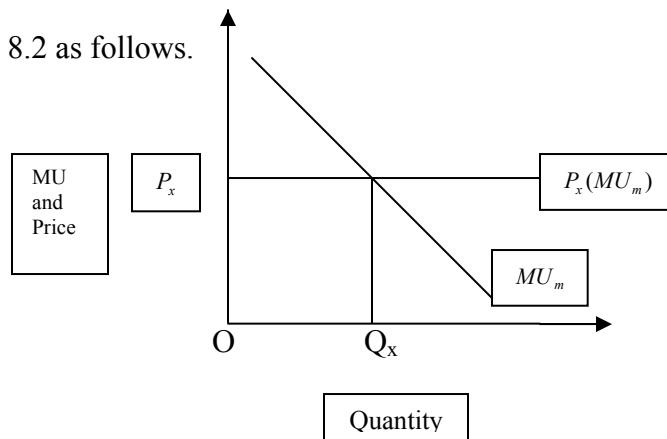


Figure 8.2: Consumer's Equilibrium

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 condition 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.

**(i) 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

$$MU_x = P_x(MU_m) \quad \text{and} \quad MU_y = P_y(MU_m)$$

Given these conditions, the consumer is in equilibrium where

$$\frac{MU_x}{P_x(MU_m)} = I = \frac{MU_y}{P_y(MU_m)} \dots\dots\dots(8.1)$$

Since, according to assumption (6), MU of each unit of money (or each rupee) is constant at I, Equation (8.1) can be rewritten as

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} \dots\dots\dots(8.2)$$

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y} \dots\dots\dots(8.3)$$

Equation (8.2) 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

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B} = \dots\dots = \frac{MU_Z}{P_Z} = MU_m \dots\dots\dots(8.4)$$

Equation (8.4) 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.

## **8.6 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.

## **8.7 SELF-TEST QUESTIONS**

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.*



## 8.8 SUGGESTED READINGS

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**COURSE: ECONOMIC ANALYSIS**

**COURSE CODE: MC-104**

**LESSON: 09**

**AUTHOR: Dr. S. S. Kundu**

**VETTER: Dr Karam Pal**

**CONSUMER BEHAVIOUR: ORDINAL ANALYSIS**

**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.

**STRUCTURE:**

- 9.1 Introduction
- 9.2 Ordinal Utility Approach
- 9.3 Properties of Indifference Curve
- 9.4 Budgetary Constraint and The Budget Line
- 9.5 Consumer's Equilibrium
- 9.6 Effects of Change in Income on Consumer Demand
- 9.7 Cardinal Approach Versus Ordinal Utility Approach
- 9.8 Summary
- 9.9 Self-Test Questions
- 9.10 Suggested Readings

**9.1 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, modern 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.

## 9.2 *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.

### 9.2.1 **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 assumes 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.

### 9.2.2 MEANING AND NATURE OF INDIFFERENCE CURVE

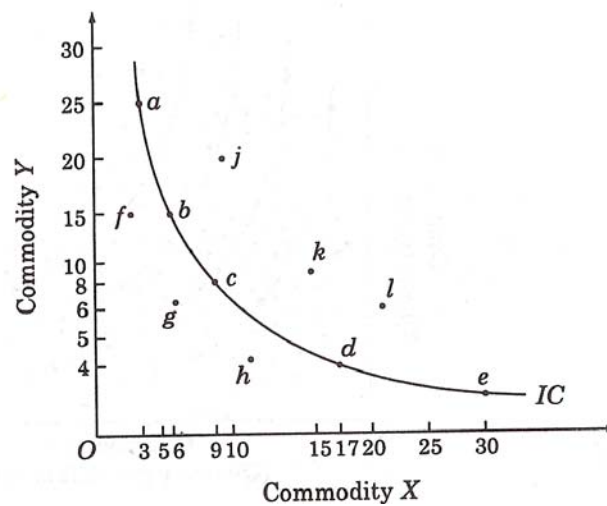
An indifference curve may be defined as the locus of points. Each point represents a different combination of two substitute goods, which yield the same utility or level of satisfaction to the consumer. Therefore, he/she is indifferent between any two combinations of goods when it comes to making a choice 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 9.1. All these combinations yield the same level of satisfaction.

*TABLE 9.1: 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 9.1 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 9.1 are plotted and joined by a smooth curve (as shown in Figure 9.1).

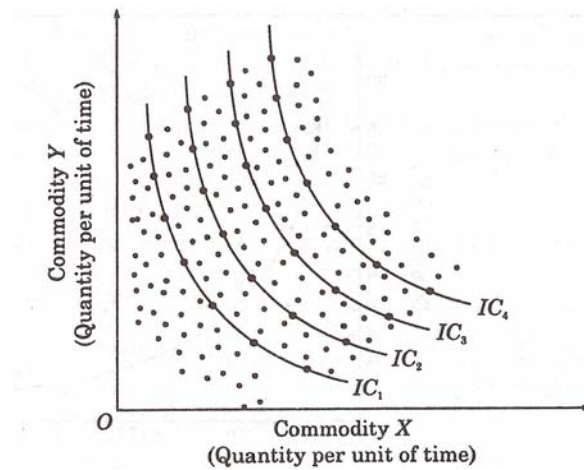


### **Figure 9.1: Indifference Curve**

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.

9.2.3 **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 9.1. As such, an indifference curve below the one given in Figure 9.1 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 9.2.



**Figure 9.2. : 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.

#### **9.2.4 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 9.1 are presented in Table 9.2.

Table 9.2: The Diminishing MRS between Commodities X and Y

Indifference Points	Combinations Y + X	Change in Y (- $\Delta Y$ )	Change in X ( $\Delta X$ )	$MRS_{y,x}$ ( $\Delta Y/\Delta X$ )
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 9.2 shows, when the consumer moves from point *a* to *b* on his indifference curve (Figure 9.1) 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

$$MRS_{y,x} = \frac{\Delta Y}{\Delta X} = \frac{-7}{3} = -2.3$$

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.

### 9.2.5 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



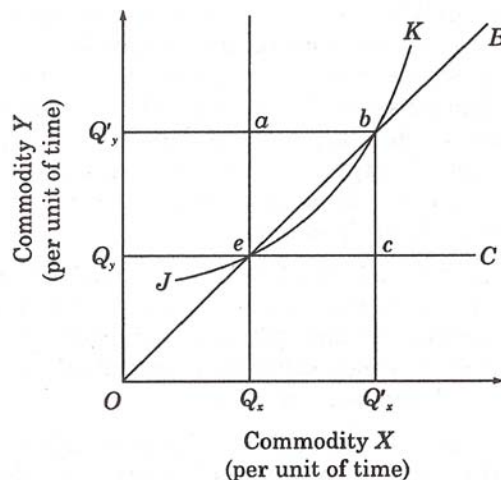
MRS. Since goods are not perfect substitutes, the subjective value attached to the additional quantity (i.e., subjective MU) of a commodity decreases fast in relation to the other commodity whose total quantity is decreasing. Therefore, when the quantity of one commodity (X) increases and that of the 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 9.1), 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 9.2). 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.

### **9.3 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.

**9.3.1 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. 9.1. 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. 9.3 through inconsistent indifference curves.



### Figure 9.3: 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  $Q_yC$ .

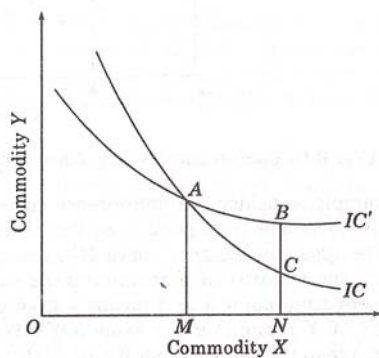
**9.3.2 Indifference Curves are Convex to Origin:** Indifference curves are not only negatively sloped, but are also convex to the origin. The convexity of the indifference curves implies two properties: (a) the two commodities are imperfect substitutes for one another, and (b) the marginal rate of substitution (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.

### 9.3.3 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 intersect, it would mean negation of consistency or transitivity assumption in consumer's preferences.



#### Figure 9.4: Intersecting Indifference Curves

Let us now see what happens when two indifference curves,  $IC$  and  $IC^1$ , intersect each other at point  $A$  (Fig. 9.4). 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  $A$ ,  $B$  and  $C$  represent three different combinations of commodities  $X$  and  $Y$ . Let us call these combinations as  $A$ ,  $B$  and  $C$ , 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,

$$ON \text{ of } X + BN \text{ of } Y = ON \text{ of } X + CN \text{ of } Y$$

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

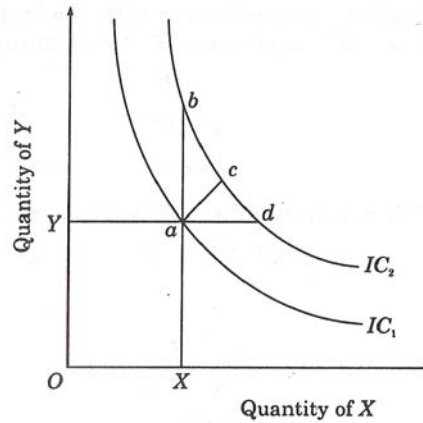
$$BN \text{ of } Y = CN \text{ of } Y$$

But, Figure 9.4 shows  $BN > CN$ . Therefore, combinations  $B$  and  $C$  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.

#### 9.3.4 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 9.5, 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 9.5.



**Figure 9.5: 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  $Y$  are 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<sub>1</sub>).

## 9.4 BUDGETARY CONSTRAINT AND THE BUDGET LINE

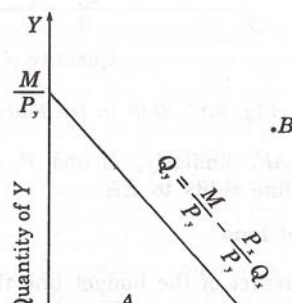
Given the indifference map, a utility maximizing consumer would like to reach the highest possible indifference curve on his indifference map. But the consumer is assumed to have a limited income. The limitedness of income acts as a constraint on how high a consumer can ride on his indifference map. 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 9.6.



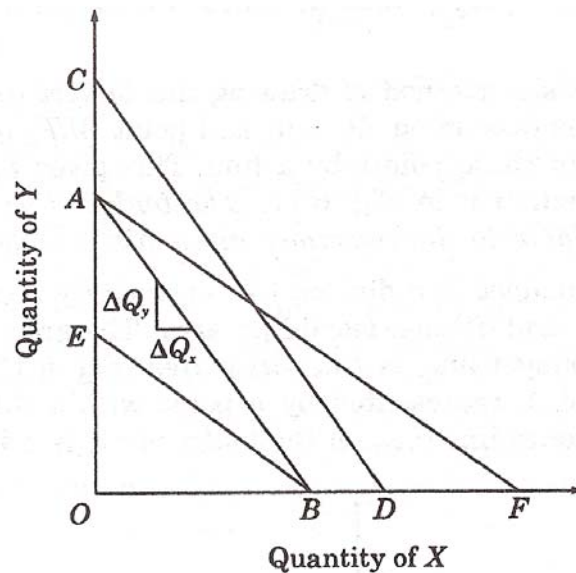
### Figure 9.6: Budget Line and Budget Space

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  $Q_y = 0$ ) and to join these points by a line. This gives the same budget line as given by the equation in Figure 9.6. 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 9.6). 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 9.7.



**Fig. 9.7: 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  $EB$ .

**9.4.1 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 9.8, 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. 9.8 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.*

## 9.5 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 9.8. The indifference curves IC<sub>1</sub>, IC<sub>2</sub> and IC<sub>3</sub> 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<sub>2</sub> 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 9.8: Equilibrium of the Consumer**

We know that between any two points on an indifferent curve,  $\Delta Y \cdot MU_y = \Delta X \cdot MU_x$  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 9.8, 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,

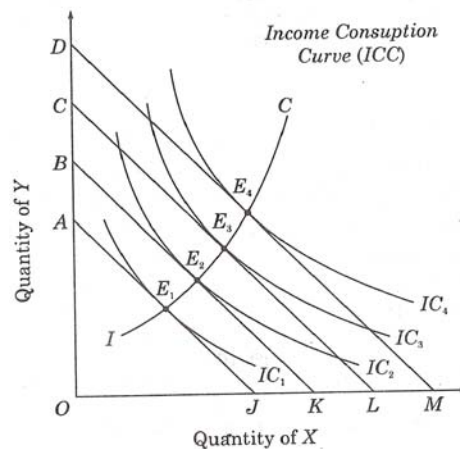
given his budgetary constraint and the prices. At equilibrium point E, the consumer consumes  $OQ_x$  of X and  $OQ_y$  of Y, which yield him the maximum satisfaction. Although, the necessary condition is also satisfied on two other points, J and K (i.e., the points of intersection between the budget 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  $IC_1$ , 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 9.8, it can be proved that the level of satisfaction at point E is greater than that on any other point on  $IC_1$ . 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 9.8 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.

## 9.6 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 9.7, 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 9.9.



**Figure 9.9: 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 9.9. If these points of equilibrium are joined by a curve, we get the path of increase in consumption resulting from the increase in income. This curve is called the income consumption curve (ICC). 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.

### **9.6.1 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 9.9, 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 9.10 (a) and (b) present the case of negative income effect. In Figure 9.10 (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. 9.10 (b), income-effect on Y is negative as Y is considered to be an inferior commodity. Consumption of Y decreases with increase in income.

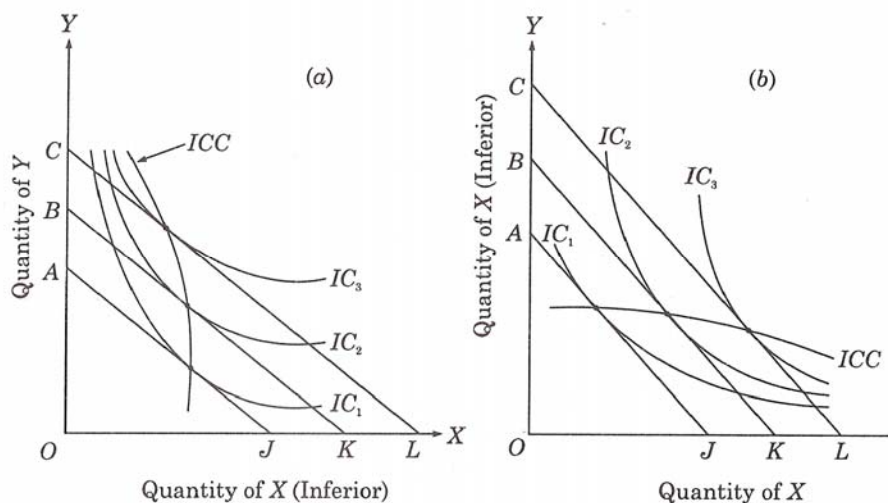
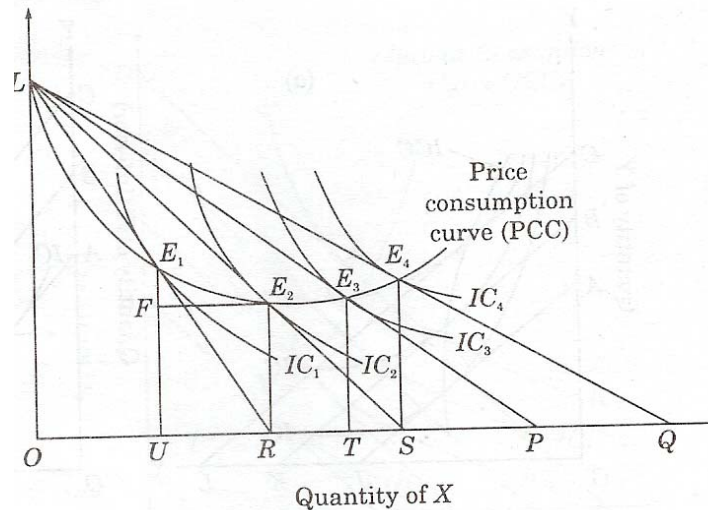


Figure 9.10: Income consumption curve of normal goods

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'.

### 9.6.2 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 9.11.



**Figure 9.11: 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.



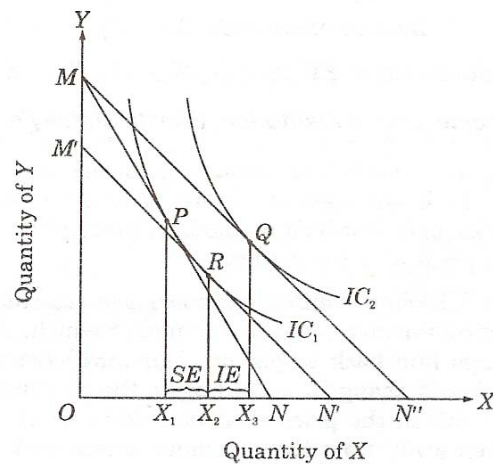
This is the price-effect on the consumption of commodity X. As shown in Figure 9.11, with a successive fall in the price of X, consumer's equilibrium shifts from  $E_2$  to  $E_3$  and from  $E_3$  to  $E_4$ . By joining the points of equilibrium  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$ , we get a curve 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 9.11 that the quantity of X consumed goes on increasing whereas that of Y first decreases and then increases.

### **9.6.3 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 9.12. 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 9.12: 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  $IC_1$ . 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 9.12, 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 substitution effects is depicted in Figure 9.13.

**Figure 9.13: 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.

$$\begin{aligned} \text{Substitution Effect: } PE - IE &= SE \\ &= X_1X_3 - X_2 - X_3 = X_1 - X_2 \end{aligned}$$

In Figure 9.13, the movement from  $P$  to  $R$  and the consequent increase in the quantity purchased of  $X$  (i.e.,  $X_1 - X_2$ ) 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.

#### **9.6.4: Comparison of Hicksian Approach and Slutskian Approach**

The comparison of Hicksian and Slutskian approaches is depicted in Figure 9.14. 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 9.14. 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 9.14 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.

## **9.7 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

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

If cross-elasticity has a positive sign, it means X and Y are 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 ( $\Delta P_x$ ) on quantity demanded ( $\Delta Q_y$ ) without compensating for the change in real income caused by the change in the price of the commodity (i. e.,  $\Delta P_x$ ). 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 Y are 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 is cardinally measurable in terms of money and that utility of money remains constant. Neither 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.

## **9.8 SUMMARY**

According to the classical economists, the concept of cardinal utility was used and they 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, modern 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.

## **9.9 SELF-TEST QUESTIONS**

6. *What do you mean by utility and the concept of ordinal utility?*
7. *Define the law of diminishing marginal utility.*
8. *What is the meaning of consumer equilibrium with reference to ordinal approach?*
9. *What is an indifference curve? What are its properties or characteristics? What role does it play in consumer analysis?*
10. *Define the marginal rate of substitution. What is the law behind the diminishing marginal rate of substitution?*

## **9.10 SUGGESTED READINGS**

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5. Marshall, A., *Principles Of Economics*, 8th Edn., London, Macmillan & Co., 1920

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## **Lesson -10**

### **Production Function**

#### **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.

#### **Structure**

##### **10.1 Production Process**

##### **10.2 Inputs**

##### **10.3 Production Function**

###### **10.3.1 The Marginal Productivity of Factors of Production**

###### **10.3.2 The Marginal Rate of Substitution and the Elasticity of Substitution**

##### **10.4 Behaviour of Production Function**

###### **10.4.1 Law of Variable Proportions- Behaviour of Short Run Production Function**

###### **10.4.2 The law of Diminishing Returns**

###### **10.4.3 Important of the stage of Production**

##### **10.5 Summary**

##### **10.6 Questions**

##### **10.7 Suggested Readings**

### **Production Function**

## **10.1 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.

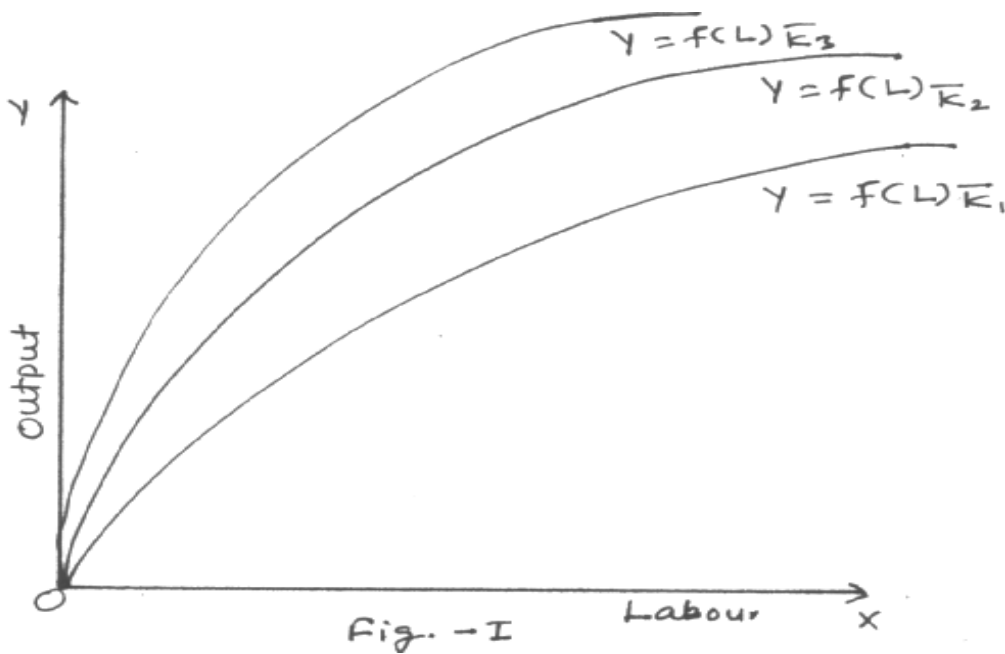
## **10.2 Inputs**

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.

## **10.3 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



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

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

Where Y is the quantity of output for a production unit and inputs are represented as I<sub>1</sub>, I<sub>2</sub> ----- I<sub>n</sub>. 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:

**10.3.1 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

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

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.

**10.3.2 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 case output (Y) depends upon capital (k) and labour (L) so

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

The marginal rate of substitution 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.

#### **10.4 Behaviour 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.

#### **10.4.1 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	API	MPI
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

$$AP_L = \frac{Y}{L} = \frac{f(L/K)}{L} \dots\dots\dots(vii)$$

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).

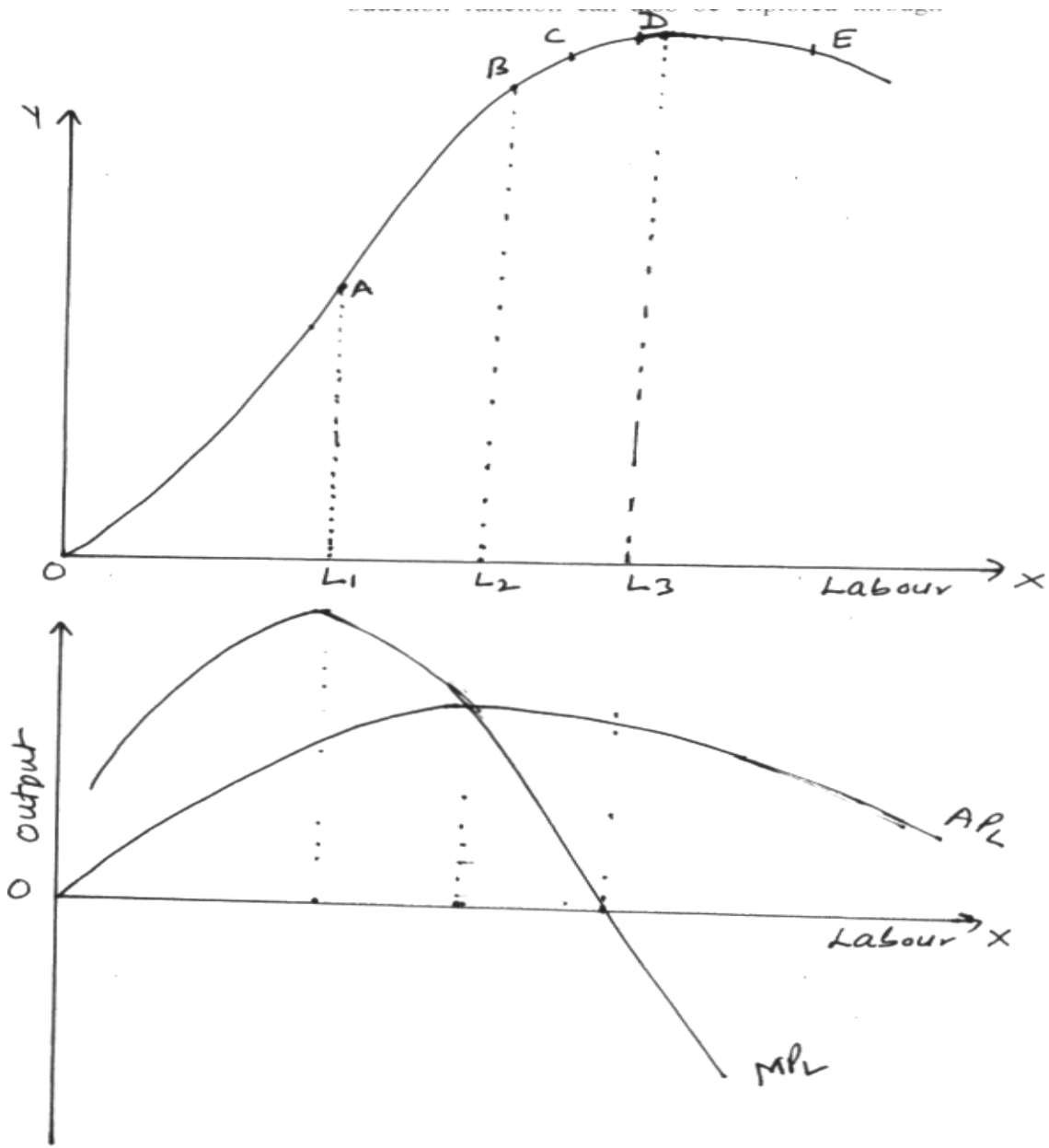


Fig -(ii)

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.

#### **10.4.2 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.

### **10.4.3 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<sup>nd</sup> 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<sup>rd</sup> 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.

### **Summary:**

***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.

### 10.6 Self Assessment Questions

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.

### 10.7 Suggested Readings

Duan, Joel	: Managerial Economics
Koutsayiannis, A.	: Modern Micro Economics, Macmillan
Mote, Paul and Gupta	: Managerial Economics: Concept and Cases, Tata McGraw Hill
Young, Karts	: Managerial Economics.
Landsburg Steven E	: Price Theory and Applications, Dryden.
Salvatore S.	: Managerial Economics, McGraw

<b>Class</b>	<b>M.Com( 1<sup>st</sup> Year)</b>	<b>Author</b>	<b>Dr. Ved Pal</b>
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## **Lesson -11**

### **Economies of Scale**

#### **Objectives:**

The objective of this chapter is to know how the firm approaches the problem of efficient resource allocation in production to meet its objective. The problem of efficient resource allocation in production may be approached through different methods which include (a) maximizing production for a given outlay on labour and capital (b), minimizing the outlay on labour and capital inputs necessary to produce a specified rate of output or (c) produce the output rate that maximizes profit. In this chapter you will learn how scale economies happen in production process and their major causes. The other possible causes of economies of scale are also explained in next chapter related to cost concepts.

#### **Structure**

##### **10.0 Introduction**

##### **11.1 Production Isoquants**

###### **11.1.1 Linear Isoquant**

###### **11.1.2 Input – Output Isoquant**

###### **11.1.3 Kinked Isoquant**

##### **11.2 Economic Region of Production and Ridge Lines**

##### **11.3 Elasticity of Factor Substitution**

##### **11.4 Laws of Production**

##### **11.5 Reasons for Scale Economies**

##### **11.6 Optimal Input Combination**

##### **11.7 Factor Substitution with a Change in Factor Price**

###### **11.8.1 Total Factor-price Effect**

###### **11.8.2 Separation of Substitution and Output Effects**

###### **11.8.3 Substitute Factors**

###### **11.8.4 Complementary Factors**

##### **11.8 Summary**

##### **11.9 Self Assessment Questions**

##### **11.10 Suggested Readings**

## 11.0 Introduction

If all the factors of production are variable a different set of analytical techniques must be applied to determine the optimal input rates. The situation of variability of all the factors of production prevails in long run, so the short run production is a special case of long run production function. To study the long run behaviour of production process, it is assumed that the entrepreneur is a price taker or quantity adjusted and his objective function is to maximize his profits. But he has now more degree of freedom, although his profit maximizing objective is restricted by the state of development of technology, and the extent of his technological knowledge, he is however assumed to be fully aware of latest available technology.

There are three ways the firm may approach the problem of efficient resource allocation in production which includes (a) maximizing production for a given outlay on labour and capital (b), minimizing the outlay on labour and capital inputs necessary to produce a specified rate of output or (c) produce the output rate that maximizes profit.

The first two problems are called constrained optimization problems. In the problem (a) the constraint is a fixed outlay for capital and labour. In problem (b), the constraint is specified rate of output that must be produced. In problem (c) the firms seeks that output level that will maximize profit, there is no constraint on either the budget available for production or output level to be produced.

These problems in economics are handled by techniques using the concept of production isoquants and production isocosts.

## 11.1 Production Isoquants

Suppose the production ( $Y$ ) depends upon capital ( $K$ ) and labour ( $L$ ), then production surface is a three dimensional device for depicting our three variable problem of  $Y = f(K,L)$ . The equal product contours called isoquants of this production surface are similar to indifference curve of a consumer. So an isoquant is a curve in input space showing all possible combinations of inputs physically capable of producing a given level of output. The entire three dimensional production surfaces can be exactly depicted by a two dimensional isoquant map, the quantity of output being represented by distance of isoquant from the origin. Thus an isoquant represents different input combinations, or input ratios that may be used to produce a specified output. For movements along an isoquant, the level of output remains constant and the input ratio changes continuously. So an isoquant curve is locus of points representing various combinations of two inputs- capital and labour – yielding the same output. It includes all the technically efficient methods for producing a given level of output. With the assumption (i) there are two factors of production viz labour ( $L$ ) and capital ( $K$ ) to produce the output ( $Y$ ) (ii) two inputs can substitute each other but at diminishing rate and (iii) the technology of production if given, the production isoquants can be shown as in fig (i)

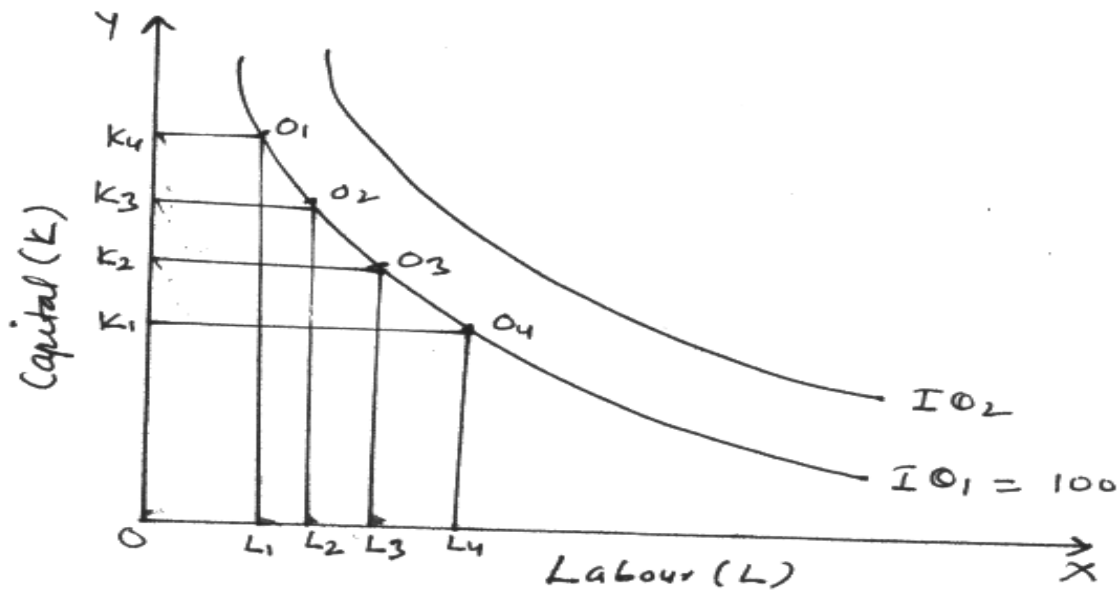


Fig - I

Fig.-(i)

In the fig.(i) the curve  $IQ_1$ , is an isoquant which represents a fixed quantity 100 units of product Y. This quantity of output can be produced with a number of labour-capital combinations. For example the points  $O_1$ ,  $O_2$ ,  $O_3$  and  $O_4$  on the isoquant  $IQ_1$ , show four different combinations of inputs K and L all yielding the same output (Y) 100 units. The movements from  $O_1$  to  $O_4$  in the isoquant indicate decreasing quantity of K and increasing number of L. It implies substitution of labour for capital such that all the input combinations yield the same quantity of Y i.e.  $IO = 100$ .

Like indifference curves an isoquant is (a) negatively sloped (b) does not cross out the higher or lower isoquants indicating different quantities of output and (c) is convex to origin. The first property signifies that if one input is reduced in quantity than

in order to maintain the same level of output, the quantity of other input has to be increased. Secondly, isoquants cannot cut each other, though they need not be parallel. The intersection or tangency between any two isoquants implies that a given quantity of a commodity can be produced with smaller as well as larger input combination.

Thirdly, an isoquant is convex to the origin. The degree of convexity of the curve indicates the relative ease or otherwise, with which one factor can be substituted for the other when the total output is kept constant. This is called the marginal rate of technical substitution (MRTS). In our case where K and L are inputs the marginal rate of technical substitution of labour for capital ( $MRTS_{LK}$ ) measures the reduction in capital per unit increase in the labour that is just sufficient to maintain a constant level of output. The  $MRTS_{LK}$  at a point on an isoquant is equal to the negative of the slope of the isoquant at that point. It is also equal to the ratio of the marginal product of labour ( $MP_L$ ) to the marginal product of capital ( $MP_K$ ) thus:

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

The total differential of the production function is:

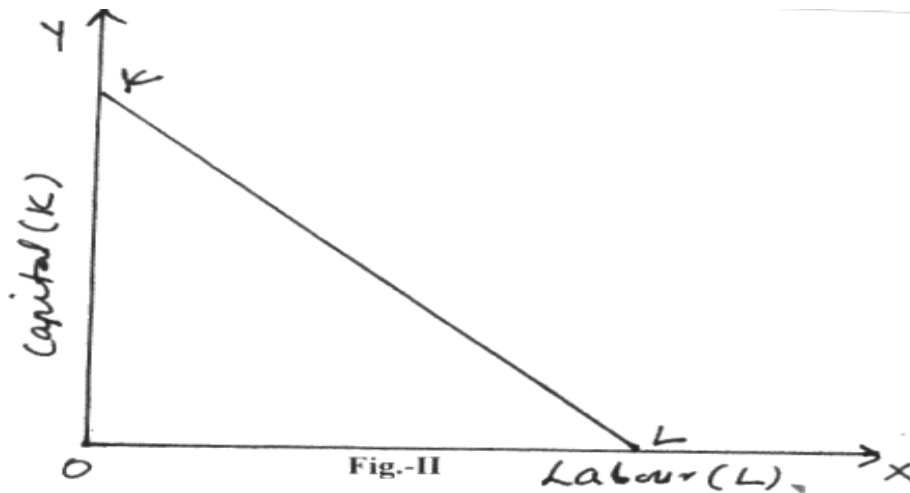
$$dy = \frac{\partial f}{\partial K} dK + \frac{\partial f}{\partial L} dL = 0 \text{-----(ii)}$$

$$MRTS_{LK} = -\frac{dL}{dK} = \frac{\partial f / \partial L}{\partial f / \partial K} = \frac{MP_L}{MP_K} \text{-----(iii)}$$

Marginal rate of technical substitution determines the shape of the isoquants which may be as under.

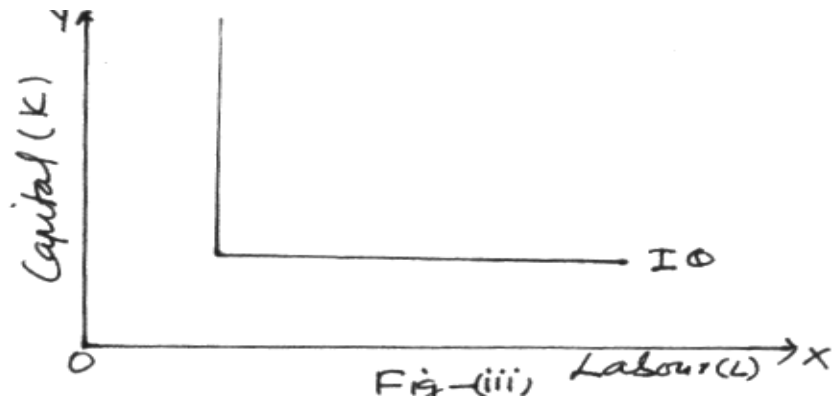
### 11.1.1 Linear Isoquant

An isoquant assumes linear shape when there is a perfect substitutability of factors of production. In this case a product can be produced by using only capital, or only labour or by an infinite combination of K and L. The shape of this type of isoquant is given as in fig (ii).



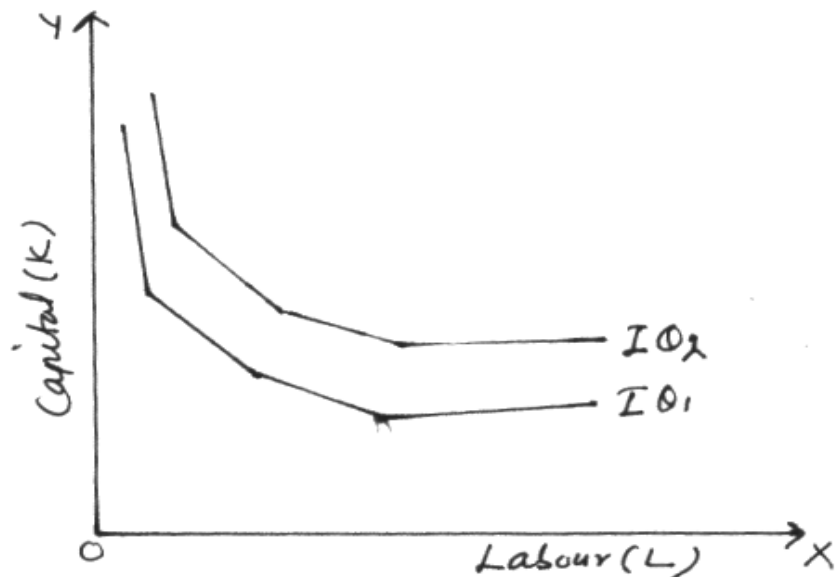
### 11.1.2 Input – Output Isoquant

It assumes strict complementarities of factors of production. It happens where marginal rate of substitution between factors of production is zero. In this case there is only one method of production for any one commodity. The isoquant takes the shape of a right angle fig-(iii). This type of isoquant is also called Leontief isoquant after Leontief who invented the input-output analysis.



### 11.1.3 Kinked Isoquant

In this case there is limited substitutability of K and L. There are only few processes for producing any one commodity and substitutability of the factors is possible only at kinks. Fig-(iv) This form is also called activity analysis isoquant or linear programming isoquants because it is basically used in linear programming.



**Fig-IV**

Among the above stated shapes of isoquant, kinked isoquants are more realistic. Engineers, managers, and production executives consider the production process as discrete rather than in a continuous way. However, traditional economic theory considers

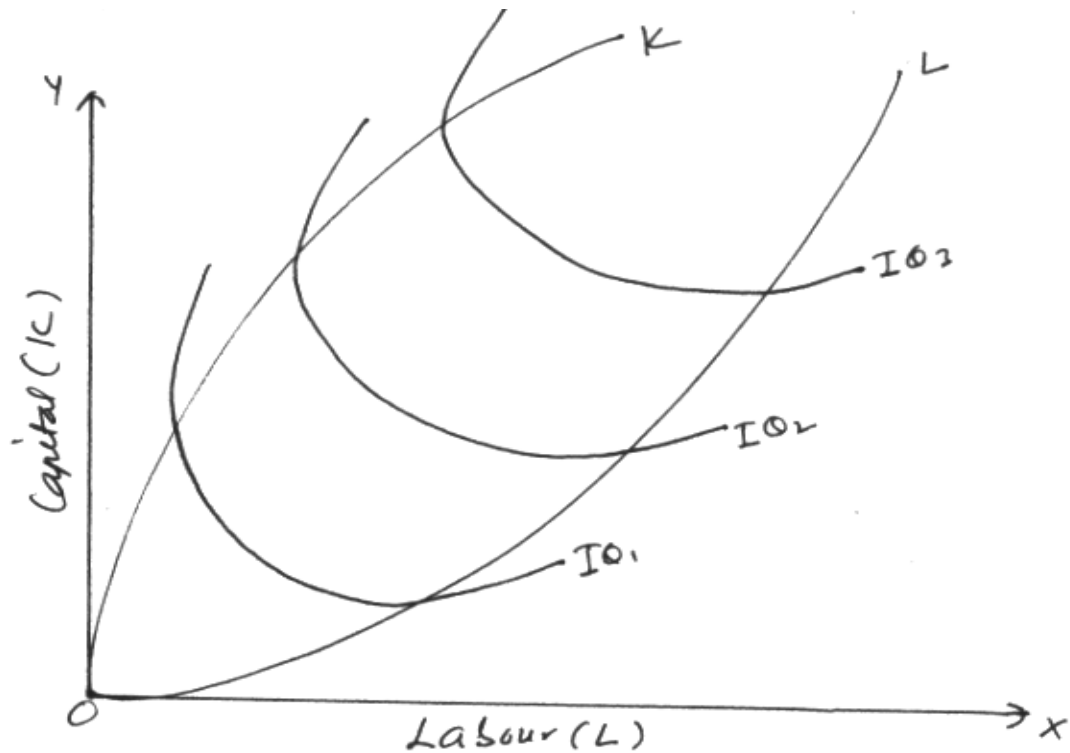


the continuous isoquant because they are mathematically simpler to handle by the simple rules of calculus. To make theory close to reality, here we consider the continuous isoquant as an approximation to the more realistic form of kinked isoquant because as we increase the number of processes the kinks come closer and closer, until at the limit the isoquant becomes a smooth curve.

### **11.2 Economic Region of Production and Ridge Lines**

As usual, the isoquants are negatively sloped over a range of input values in the economically relevant region, they don't intersect each other and the higher the isoquants the greater the level of output.

The isoquants are however positively sloped i.e. bend back upon themselves outside the relevant economic region. The economically relevant region is enclosed



within two ridge lines OK and OL. These lines. The upper ridge line implies that MP of capital is zero. The lower ridge line implies that MP of labour is zero. Production techniques are only efficient inside the ridge lines, so economic theory concentrates on efficient ranges of output, that is ranges over which the marginal product of factors are diminishing but positive. Outside the ridge lines the marginal products of factors are negative and methods of production are inefficient, since they require more quantity of both factors for producing a given level of output. Such inefficient methods are not considered by the theory of production, since they imply irrational behaviour of the firm. The condition of positive but declining marginal products of the factors defines the range of efficient production.

**11.3 Elasticity of Factor Substitution** The marginal rate of technical substitution refers only to the slope of an isoquant and it is negative and decreases along isoquant. It measures how inputs are substituted for another but its measurement depends on the units of the measurement of the factors of production.

In economics there is a better method for measurement of factor substitutability which is known as elasticity of factor substitution. The elasticity of substitution ( $\sigma$ ) is defined as the percentage change in capital labour ratio (K/L) divided by the percentage change in the marginal rate of technical substitution (MRTS).

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

or

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

Since all along an isoquant, K/L and MRTS move in the same direction, the value of  $\sigma$  is always positive. Besides, the elasticity of substitution is a pure number independent of the units of the measurement of K and L, since both the numerator and the denominator are measured in the same units.

### 11.4 Laws of Production

The laws of production describe the technically possible way of increasing the level of production. In previous chapter we have discussed the variation in output due to the changes in one factor of production while keeping other factor of production constant also known as law of diminishing returns.

Output can be increased by changing all factors of production. It can happen in long run when a firm has enough time to change its factor of production. The magnitude of the change in the rate of output relative to the change in the scale is termed as laws of return to scale also known as long run analysis of production.

In general, there is no reason to expect that output will always change in proportion to the change in inputs. Output might increase more than in proportion (increasing return to scale) or less than in proportion (decreasing returns to scale). Returns to scale are formally classified as follows. Given the general production function

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

If both inputs are changed by same factor  $\lambda$ , output will change by  $h$ .

That is

$$h Y = f(\lambda K, \lambda L) \text{-----(vi)}$$

If  $h = \lambda$ , the production function is said to be characterized by constant returns to scale because the change in output is proportional to the change in both inputs. If  $h < \lambda$ , there are decreasing return to scale and if  $h > \lambda$  returns to scale are increasing.

Constant, increasing and decreasing returns to scale can be shown by the spacing of the isoquants is fig.(v, vi, vii)

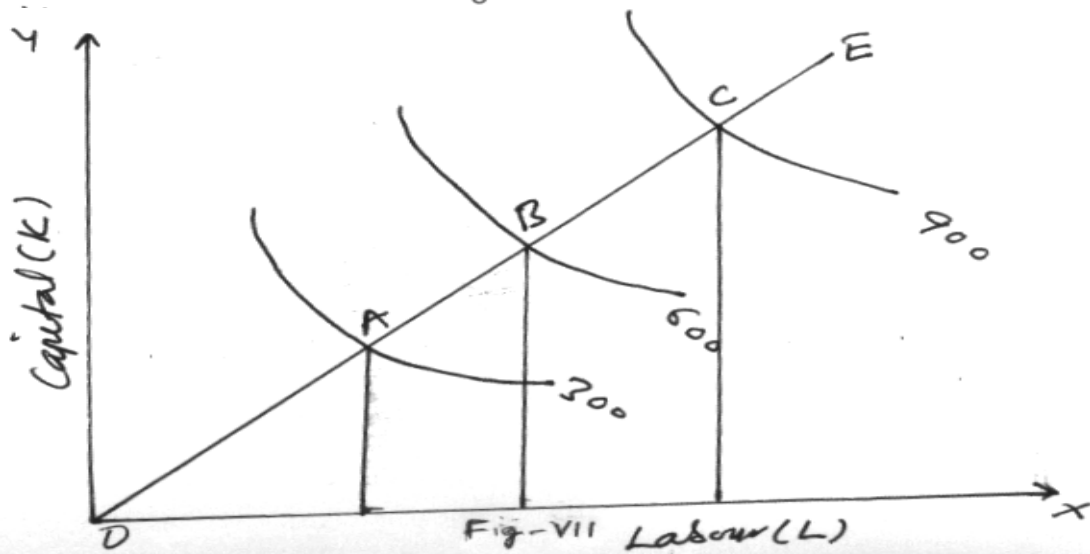
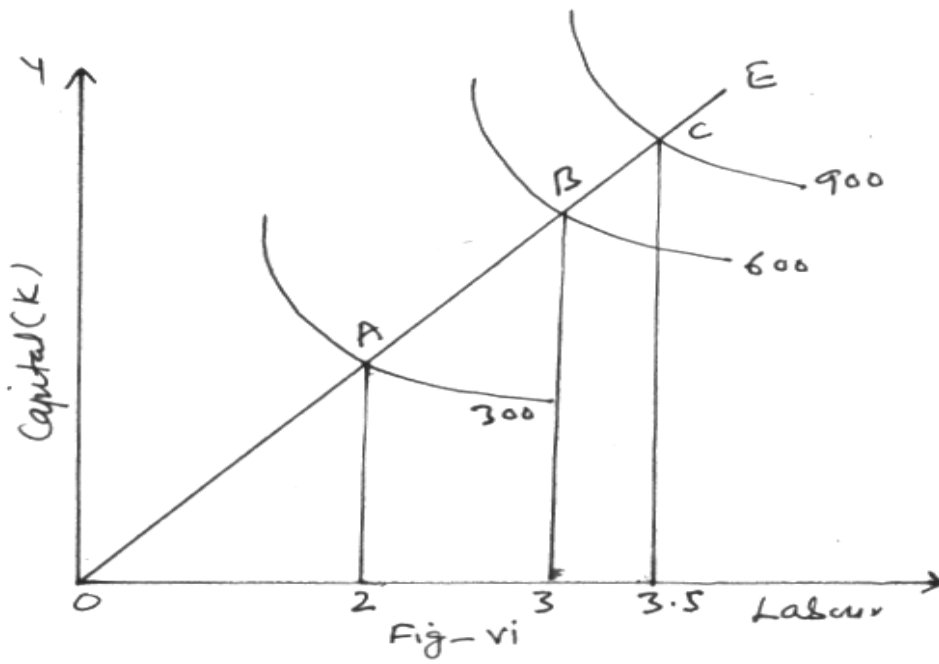
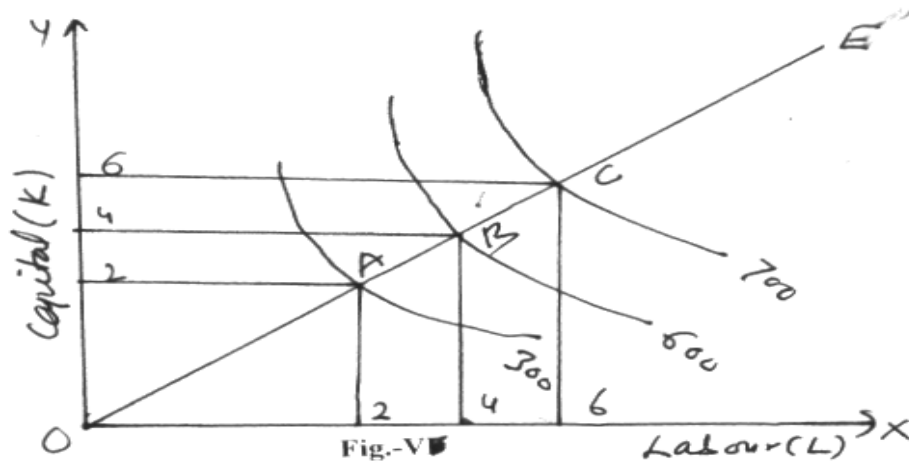
The Fig-v shows constant returns to scale, there doubling inputs from 2L and 2K to 4L and 4K double the output from 300 (points A along ray OE) to 900 (point C). Thus OA = AB=BC along ray OE and we have constant return to scale. The fig.-vi shows increasing return to scale. Here output can double or tripled by less than doubling or tripling the

quantity of inputs. Thus  $OA > OAB > BC$  along ray OE and the isoquants are compressed closer together. Finally, the fig-vii shows decreasing return to scale. In this case, in order to double and triple output more than double and triple the quantity of inputs are required. Thus  $OA < AB < BC$  and the isoquants move farther and farther apart. Note that in all the three cases, the capital-labour ratio remains constant at  $K/L = 1$  along ray OE.

### **11.5 Reasons for Scale Economies**

Constant returns to scale make sense. We would expect two similar workers using identical machines to produce twice as much output as one worker using one machine. Similarly, we would expect the output of two identical plants employing an equal number of workers of equal skill to produce double the output of a single plant. Nevertheless, increasing and decreasing returns to scale are also possible.

Increasing returns to scale arise because, as the scale of operation increases, a greater division of labour and specialization can take place and more specialized and productive



machinery can be used. With a large scale of operation, each worker can be assigned to perform only one repetitive task rather than numerous ones. Workers become more proficient in the performance of the single task and avoid the time lost in moving from one machine to another. The result is higher productivity and increasing returns to scale. At higher scales of operation, more specialized and productive machinery can also be used. For example, using a conveyor belt to unload a small truck may not be justified, but it greatly increases efficiency in unloading a whole train or ship. In addition, some physical properties of equipment and machinery also lead to increasing returns to scale. Thus, doubling the diameter of a pipeline more than doubles the flow, doubling the weight of a ship more than doubles its capacity to transport cargo, and so on. Firms also need fewer supervisors, fewer spare parts, and smaller inventories per unit of output as the scale of operation increases.

Decreasing returns to scale arise primarily because, as the scale of operation increases, it becomes even more difficult to manage the firm effectively and coordinate the various operations and divisions of the firm. The channels of communication become more complex, and the number of meetings, the paper work, and telephone bills increase more than proportionately to the increase in the scale of operation. All of this makes it increasingly difficult to ensure that the managers' directives and guidelines are properly carried out. Thus, efficiency decreases (this is sometimes referred to as 'managerial diseconomies'). Decreasing returns to scale must be clearly distinguished from diminishing returns. Decreasing returns to scale refers to the long-run situation when all inputs are variable. On the other hand, diminishing returns refers to the short-run

situation where at least one input is fixed. Diminishing returns in the short run is consistent with constant, increasing, or decreasing returns to scale in the long run.

### 11.6 Optimal Input Combination

A profit maximizing firm seeks to minimize its costs for a given output or to maximize its output for a given total cost. Isoquant tells that a given output can be produced with different input combination. Given the input prices, however only one of input combination meets the least cost criterion.

To determine the optimal combination of inputs is to add information on the cost of these inputs. This cost information is introduced by a function called a production isocost. Assuming two factors of production capital and labour and their per unit price of  $w$  and  $r$  respectively, the total expenditure on  $K$  and  $L$  input is

$$C = rK + wL \text{----- (1)}$$

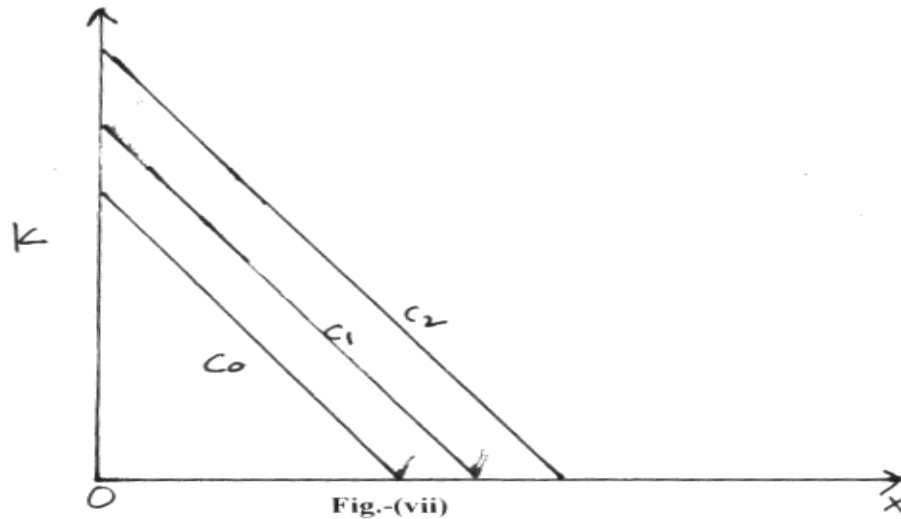
For any given cost  $C_o$ , the isocost line defines all combinations of capital and labour inputs that can be purchased for  $C_o$

Rewrite equation (1) by solving for  $K$  as a function of  $L$

$$K = \frac{C_o}{r} - \frac{w}{r} L \text{-----(2)}$$

Equation (2) is an equation for a straight line where  $C_o/r$  is the vertical intercept and  $-w/r$  is the slope. The ratio  $-r/w$  is the rate at which labour can be exchanged for capital in the market. It can be shown through fig-viii



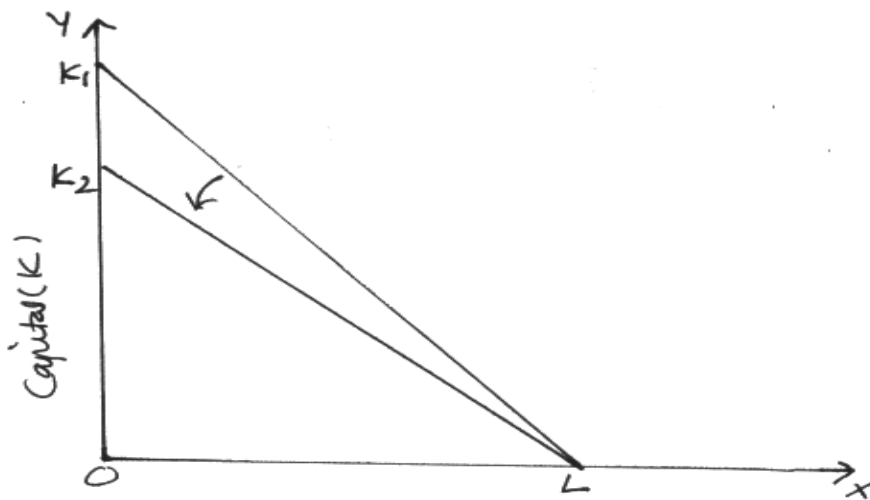


If budget constraint is increased from  $C_0$  to  $C_1$  and then  $C_2$ , the isocost line will shift outward but remain parallel to the  $C_0$ . because in all the cases the ratio of input prices ( $w/r$ ) remains same.

Now, consider how isocost line shifts if an input price changes instead of budget amount. Initially assuming budget amount is  $C_0$  and that  $r$  is variable, then equation of Isocost line is

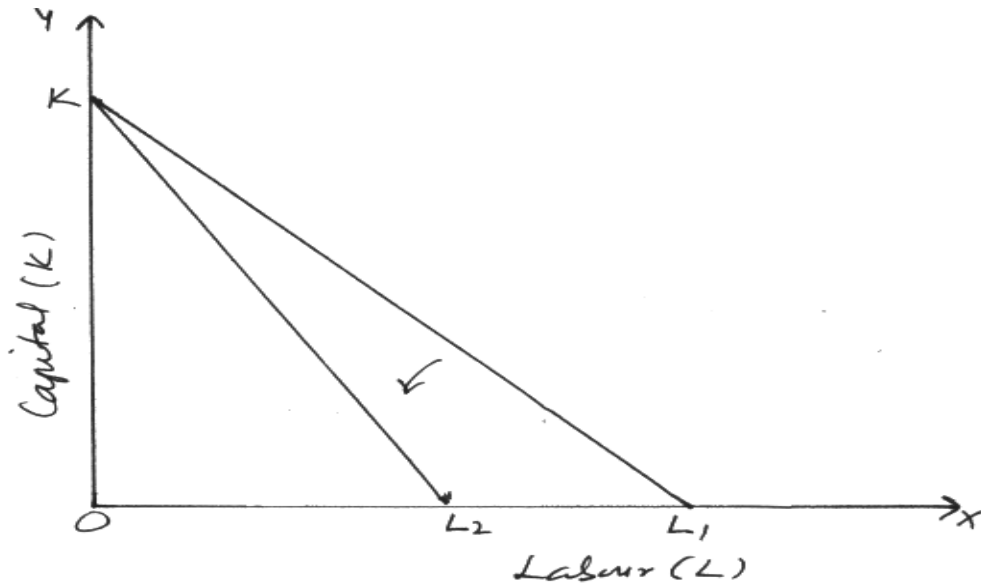
$$K = \frac{C_0}{r} - \frac{w}{r} L$$

If  $r$  increases than slope of the isocost line will decreases and it will move towards on vertical axis. It means now with given budget  $C_0$ , at higher rate of capital the firm can purchase less amount of capital with the budget as shown in fig -ix



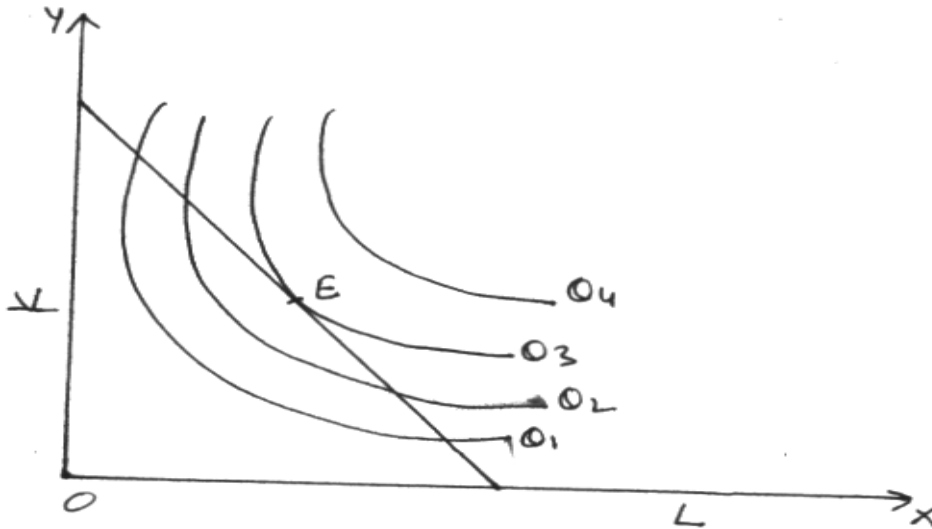
**Fig.-(ix)**

On the other hand if  $w$  increases then the isocost line will be become steeper and it will more toward an horizontal axis as shown in fig -x



**Fig.-(x)**

So isocost line shows the different possibilities of combining the inputs available in the market for a firm. On the other hand the isoquant shows the technical possibilities of combining the inputs. To find the optimal combination of the inputs in light of the objectives of the firm, the technical information (isoquants) is combined with the market data as input prices (Isocostline). It implies that lease-cost combination exists at a point where isoquant is tangent to the isocost as shown in fig-xi.



**Fig.-(xi)**

At the tangent point  $MRTS_{LK}$  is equal to ratio of input prices. Which may written as

$$MRTS_{LK} = \frac{w}{r}$$

$$\Rightarrow \frac{MP_L}{MP_K} = \frac{w}{r}$$

$$\Rightarrow \frac{MP_L}{w} = \frac{MP_K}{r}$$

It is the equilibrium point of the firm and this situation is only attained when the isocost line is tangent to the highest possible isoquant.

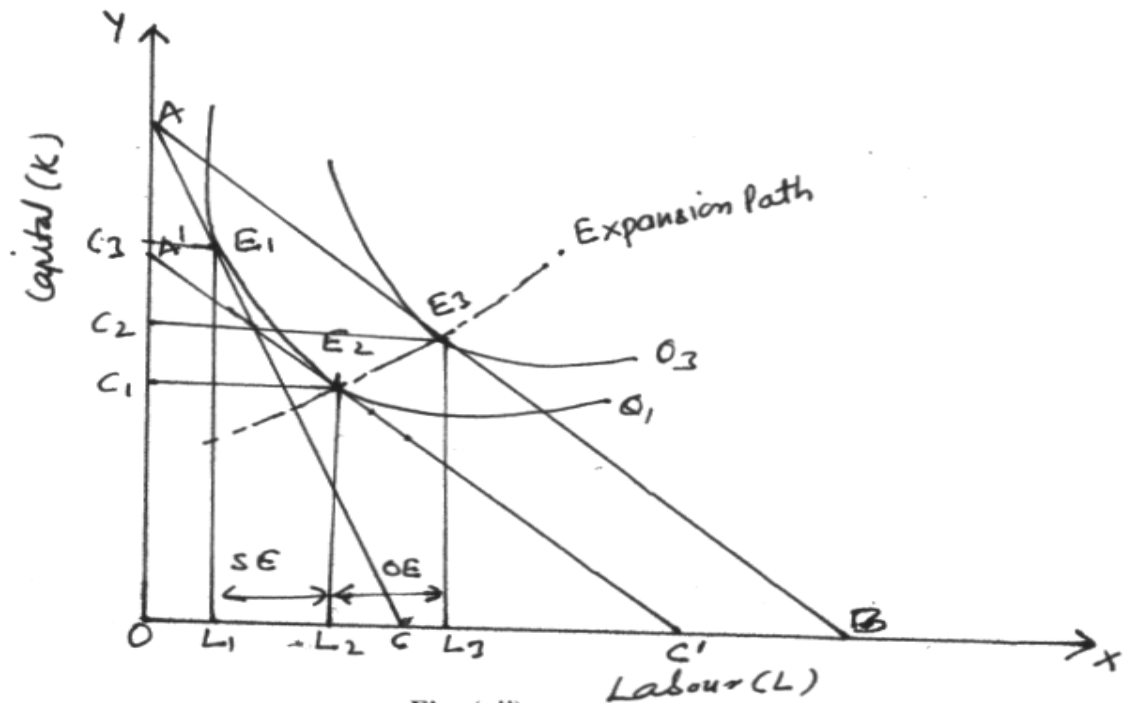
### **11.7 Factor Substitution with a Change in Factor Price**

In the above analysis, we took the prices of the two factors, labour and capital, as constant. If now the price of one factor falls while keeping the price of the other factor constant, the cost-minimizing firm will substitute the cheaper factor for the other

relatively dearer factor. This is the substitution effect in production. When the price of a factor falls, its demand will rise and output will increase. This is the output effect. Thus the total effect of a fall in the price of one factor alone is the combination of an output effect and a substitution effect. These are known as dual effects in the theory of production.

### **11.8.1 Total Factor-price Effect**

Assuming there are two factors, labour(L) and capital(K) and these are homogeneous in nature, price of capital is constant, total outlay by the firm remains fixed and the firm produces only one product(Y). Given these assumptions, the total factor-price effect is illustrated in fig-xii where the original isocost line is AB and the firm is in equilibrium at point E1 on the isoquant 200. To produce 200 units of the product, it uses  $OC_3$  units of capital and  $OL_1$  units of labour. When the price of labour (wage rate) falls, the price of capital (interest rate) remaining constant, the isocost line AB rotates counterclockwise to the line AC. The firm is now in equilibrium at point E3 where the new isocost line AB is tangent to a higher isoquant 300. To produce this higher level of output, the firm increases the units of



**Fig.-(xii)**

labour from  $OL_1$  to  $OL_3$  or by  $L_1L_3$ . If we join the equilibrium points  $E_1$  and  $E_3$  by a line, this is called the factor-price curve which shows the factor-price effect. The factor-price effect is the combined result of an output effect and a substitution effect.

### 11.8.2 Separation of Substitution and Output Effects

To separate the substitution effect and the output effect from the total factor-price effect, we shift the isocost line  $AB$  down and parallel to it till it is tangent to the isoquant  $Q_1$  in fig-xii. Such an isocost line is  $A^1C^1$  which shows that when the price of labour falls and labour becomes cheaper than before, the total outlay of the firm is reduced. The firm is now in equilibrium at point  $E_2$  which reflects the new set of relative factor prices where labour is relatively cheaper than capital. Since labour has become cheaper than capital, the firm substitutes labour for capital. As a result, it moves from point  $E_1$  to point  $E_2$  on

the same isoquant 200. This movement is the result of substitution effect whereby the firm substitutes  $L_1L_2$  units of labour for  $C_1C_3$  units of capital. Thus  $L_1L_2$  is the substitution effect of the fall in the price of labour.

As it is assumed that the total outlay of the firm remains unchanging therefore, now the isocost line  $A^1C^1$  shifts up to the higher isocost line  $AC$  and is tangent to the higher isoquant 300 at point  $E_3$ . This point reflects the new set of relative factor prices. In fact, the cost-outlay line  $AC$  shows that when the price of labour falls, it leads to an increase in the real total outlay of the firm because labour has become cheaper than before. As a result, the firm moves from a lower level of output at point  $E_2$  on the isoquant 200 to a higher level  $E_3$  on the isoquant 200 along the expansion path. In this way, the firm uses larger quantities of the two factors  $C_1C_2$  of capital and  $L_2L_3$  of labour respectively due to the output effect or the expansion effect. Thus  $L_2L_3$  is the output effect of the fall in the price of labour.

The above analysis reveals that the total price effect of a fall in the price of labour as measured in terms of the increase in the use of labour by the firm is  $L_1L_3$  which equals the substitution effect  $L_1L_2$  plus the output effect  $L_2L_3$ . Thus  $L_1L_3 = L_1L_2 + L_2L_3$ .

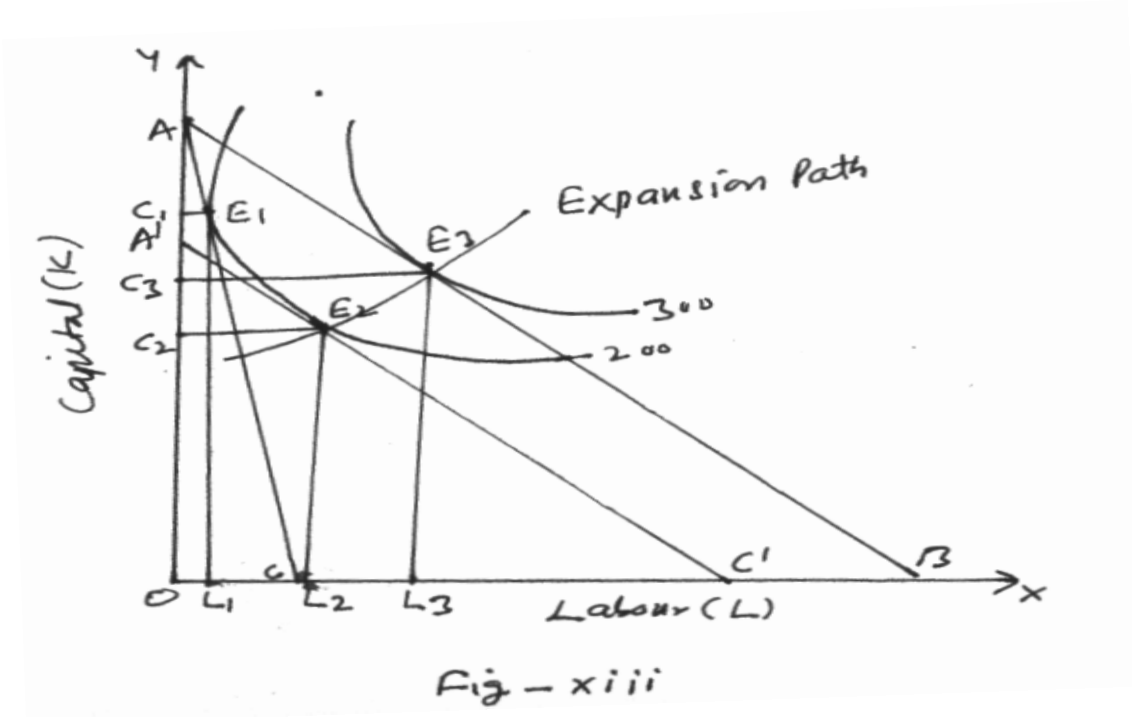
**11.8.3 Substitute Factors:** We now take the case of two factors which are substitutes for each other. If the price of one substitute falls, the quantity demanded of the other decreases. In the above fig-xii labour and capital are substitutes. With the fall in the price (wage) of labour, less of capital and more of labour is used. It is shown by the movement of the firm from point  $E_1$  to  $E_3$  or by the slope of the price-factor curve. When the two factors are substitutes, the substitution effect is greater than the output effect, as the price

of one substitute falls. In terms of the above fig-xii, the firm substitutes  $L_1L_2$  units of labour for  $C_1C_3$  units of capital with the fall in the price of labour. Thus  $L_1L_2$  units of labour for  $C_1-C_3$  units of capital with the fall in the price of labour. Thus  $L_1L_2$  is the substitution effect. At the same time, its output level increases from  $E_2$  to  $E_3$  along the expansion path. Thus  $L_2L_3$  is the output effect which is the result of the use of more units of labour  $L_2L_3$  and  $C_2C_3$  less units of capital. (Note that in the case of the substitution effect, the reduction in the units of capital used by the firm is  $C_1C_3$  which is greater than that in the case of the output effect,  $C_2C_3$ ). It is evident from the fig-xii that when the two factors are substitutes and there is a fall in the price of one factor, the substitution effect  $L_1L_2 > L_2L_3$  the output effect.

**11.8.4 Complementary Factors:** If the two factors are complementary to each other, a fall in the price of one factor leads to the increases in the quantity of the other also. This is shown in fig-xiii where a fall in the price of labour leads to the use of more units of both labour and capital. This is clear from the upward steep slope of the expansion path. When the firm moves from point  $E_2$  to  $E_3$ , it uses  $C_1C_3$  more units of capital and  $L_2L_3$



more



units of labour in order to produce more output. Thus  $L_2L_3$  is the output effect of a fall in the price of labour. On the other hand, the firm uses  $C_1C_2$  more units of capital and  $L_1L_2$  when the firm moves from point  $E_1$  to  $E_2$  on the isoquant 200. It is evident from the figure that when labour and capital are complementary, the output effect of a fall in the price of labour  $L_2L_3 > L_1L_2$  the substitution effect.

Thus it is concluded that to produce the optimal output, the producer will employ various factors so as to make the least-cost combination. A change in the price of one factor will effect its quantity in two ways. Firstly, he will substitute a factor that has become cheaper in place of the one that has become dearer. Secondly, as the price of a factor falls, the marginal productivity derived from the last rupee spend on it increases. Therefore, the producer must spend on that factor which has become cheaper by withdrawing it from other uses to secure the new least-cost combination. But if the two factors are

complementary to each other he will spend equally on the two, when the price of one falls

### **11.8 Summary**

*A Production Isoquant* is a curve in input space showing all possible combinations of inputs physically capable of producing a given level of output. An isoquant assumes linear shape when there is a perfect substitutability of factors of production. Input-output isoquant assumes strict complementarities of factors of production. It happens where marginal rate of substitution between factors of production is zero.

*Economic region of production and ridge lines* are locus of point of isoquants where marginal production of factor are zero.

*Laws of Production* describe the technically possible way of increasing the level of production. Output can be increased by changing all factors of production. It can happen in long run when a firm has enough time to change its factor of production. Output might

increase more than in proportion (increasing return to scale) or less than in proportion (decreasing returns to scale)

*Increasing returns to scale* arise because, as the scale of operation increases, a greater division of labour and specialization can take place and more specialized and productive machinery can be used. With a large scale of operation, each worker can be assigned to perform only one repetitive task rather than numerous ones. Workers become more proficient in the performance of the single task and avoid the time lost in moving from one machine to another. The result is higher productivity and increasing returns to scale.

*Decreasing returns to scale* arise primarily because, as the scale of operation increases, it becomes even more difficult to manage the firm effectively and coordinate the various operations and divisions of the firm. The channels of communication become more complex, and the number of meetings, the paper work, and telephone bills increase more than proportionately to the increase in the scale of operation.

*Factor Substitution with a Change in Factor Price* :The total effect of a fall in the price of one factor alone is the combination of an output effect and a substitution effect.

### **11.9 Self Assessment Questions**

1. What do you mean by production function? What is the difference between a short run and a long-run production function?
2. Distinguish between returns to factor and returns to scale. What will be the return to a factor if the returns to scale are increasing, constant and diminishing?
3. What is production function? Explain how does a producer achieve an optimum or a least Cost combination of factors of production?
4. What is an iso-product curve? Explain the isoquant approach to the analysis of the equilibrium conditions of a firm.

5. Write notes on: Factor Elasticity of Substitution, Marginal Rate of Technical Substitution, and Choice of Optimal Expansion Path. Distinguish between production function and production process.

**11.107 Suggested Readings**

Duan, Joel	: Managerial Economics
Koutsayiannis, A.	: Modern Micro Economics, Macmillan
Mote, Paul and Gupta	: Managerial Economics: Concept and Cases, Tata McGraw Hill
Young, Karts	: Managerial Economics.
Landsburg Steven E	: Price Theory and Applications, Dryden.
Salvatore S.	: Managerial Economics, McGraw

<b>Class</b>	<b>M.Com( 1<sup>st</sup> Year)</b>	<b>Author</b>	<b>Dr. Ved Pal</b>
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## **Lesson -12**

### **Cost Concepts**

**Objectives:** 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.

### **Structure**

#### **12.1 The Economic Concept of Cost**

##### **12.1.1 Opportunity Cost**

##### **12.1.2 Accounting Cost**

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

##### **12.1.4 Social Costs and Private Cost of Production**

##### **12.1.5 Marginal, Incremental and Sink Costs**

#### **12.2 The Behaviour of Cost Function**

##### **12.2.1 Firm's Short-Run Cost Curves**

##### **12.2.2 Firm's Long Run Cost Curves**

#### **12.3 Economies and Diseconomies of Scale**

##### **12.3.1 Real Economies of Scale**

##### **12.3.2 Diseconomies of Scale**

#### **12.4 Break-even Analysis**

#### **12.5 Summary**

#### **12.6 Self Assessment Questions**

#### **12.7 Suggested Readings**

## **12.1 The Economic 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.

### **12.1.1 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.

### **12.1.2 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 forgone 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.

### **12.1.3 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 an 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.

#### **12.1.4 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.

#### **12.1.5 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.

## **12.2 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.

### **12.2.1 A. 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:

$$TC = TFC + TVC$$

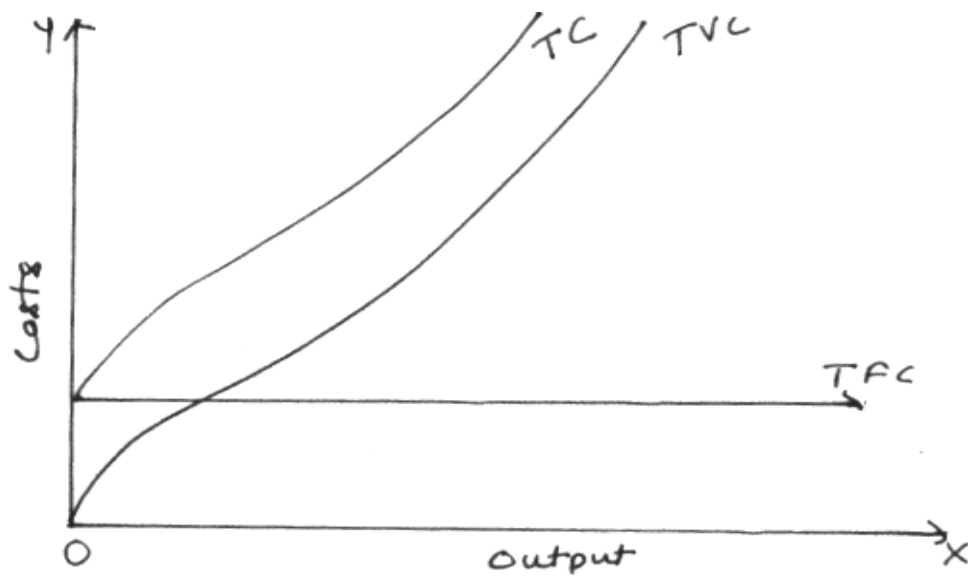
**Total costs or TC:** Total costs are the total expenses incurred by a firm in producing a given quantity of a commodity. They include payments for rent, interest, wages, taxes and expenses on raw materials, electricity, water, advertising, etc.

**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. The



**Fig.-(i)**

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:

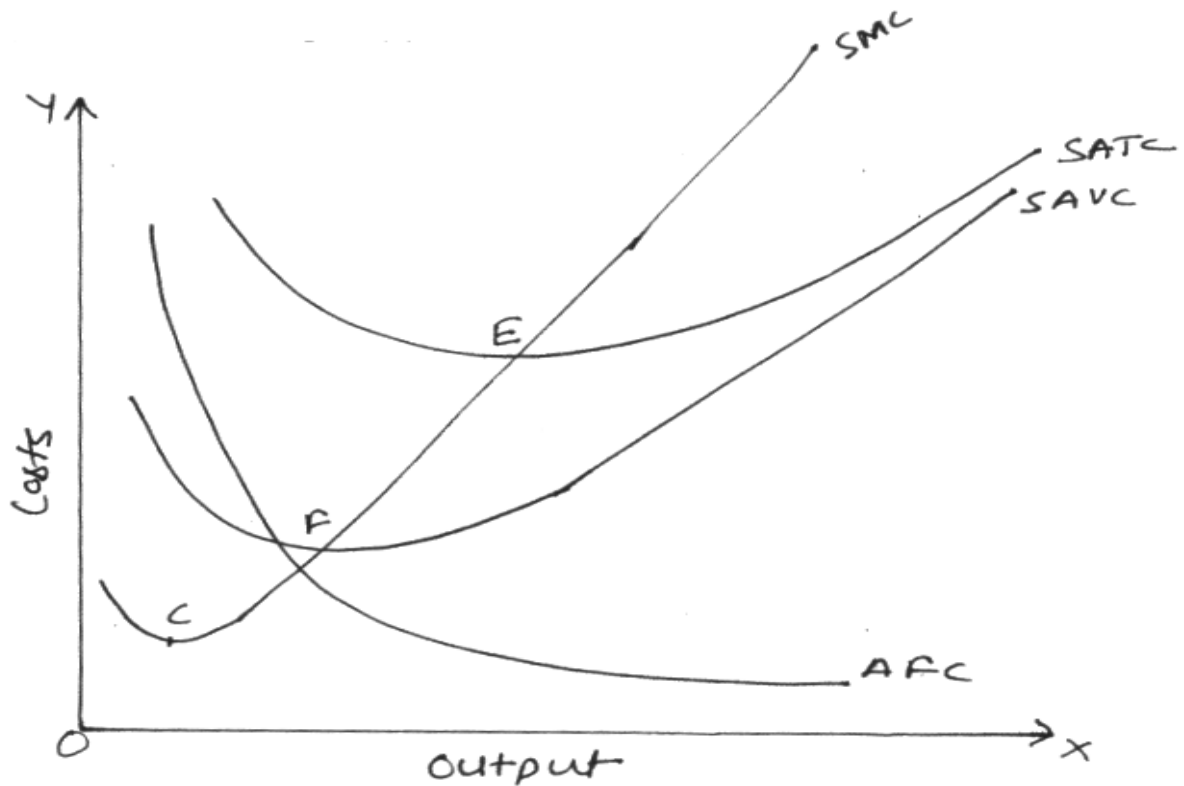
$$SAVC = \frac{TVC}{Q}$$

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:

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

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:

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

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.

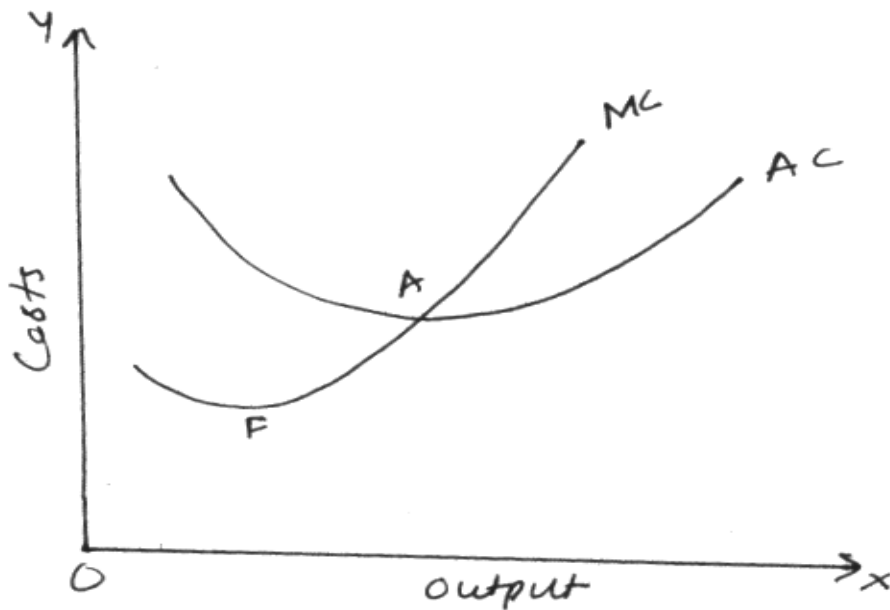
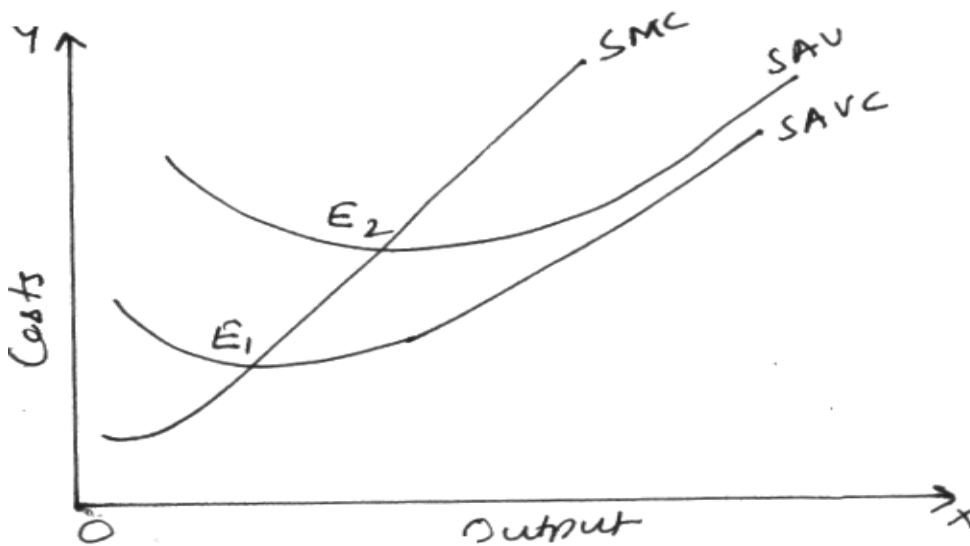


Fig.-(iii)

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



**Fig.-(iv)**

of the SAVC curve to the left of the minimum point of the SAC curve. 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.

### **12.2.2 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).

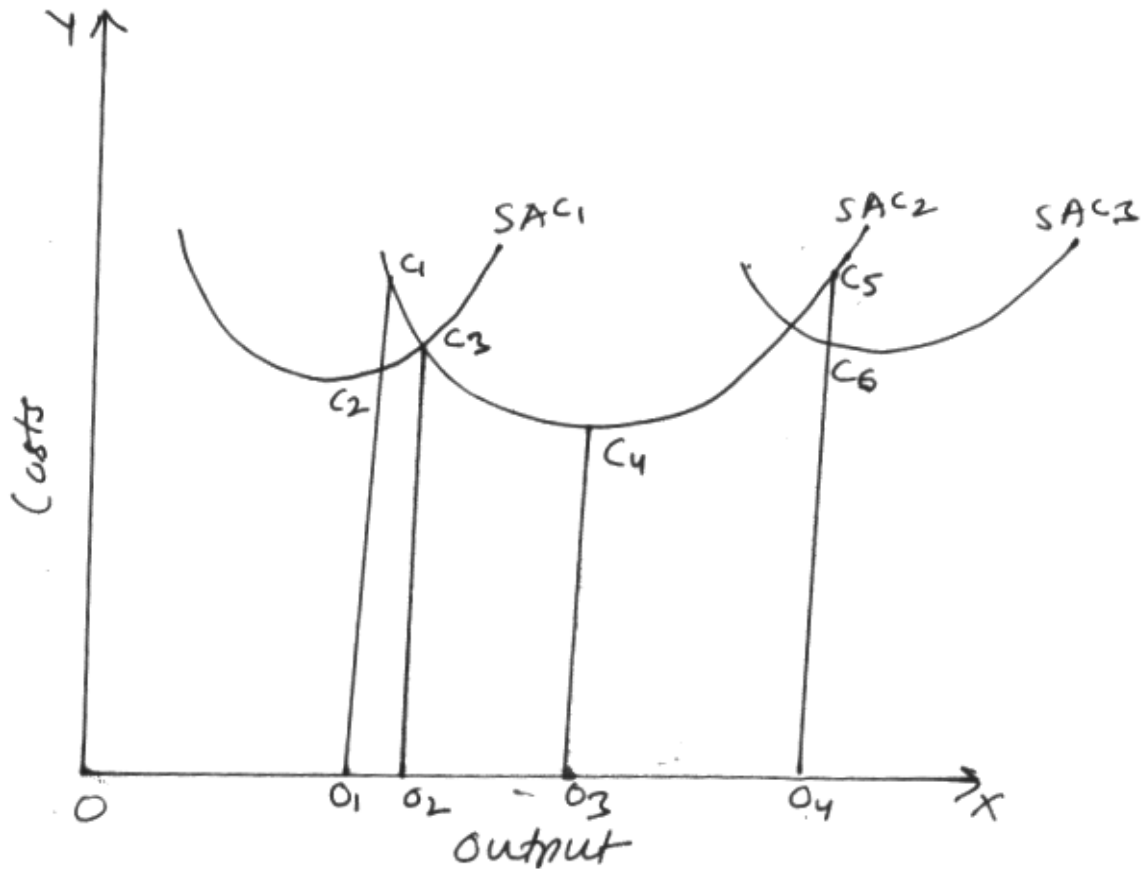


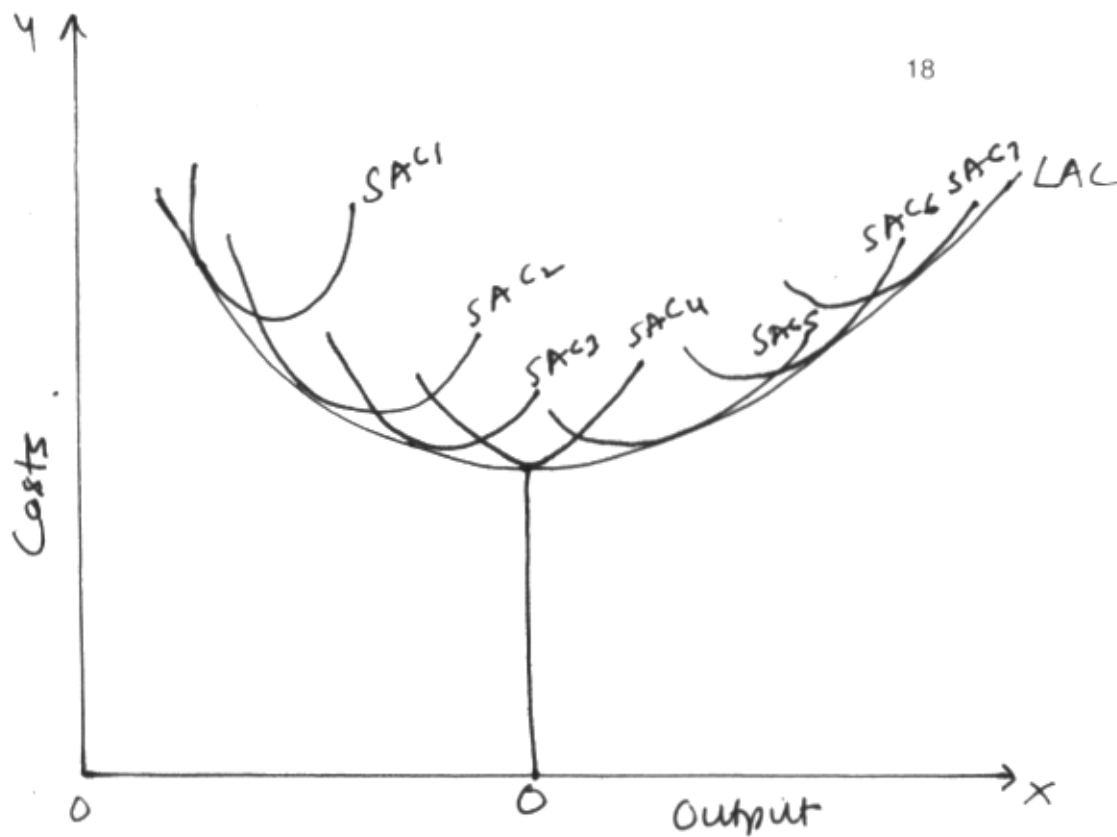
Fig - v

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 form 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



**Fig.-(vi)**

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.

The long-run marginal cost (LMC) curve of the firm is derived from the SAC curves, as illustrated in Figure-(vii) where the SAC<sub>1</sub>, SAC<sub>2</sub> and SAC<sub>3</sub> curves are enveloped by the LAC curve at points C<sub>2</sub>, C<sub>3</sub> and C<sub>4</sub> respectively. Draw perpendiculars C<sub>2</sub>O<sub>1</sub>, C<sub>3</sub>O<sub>2</sub> and C<sub>4</sub>O<sub>3</sub> from these

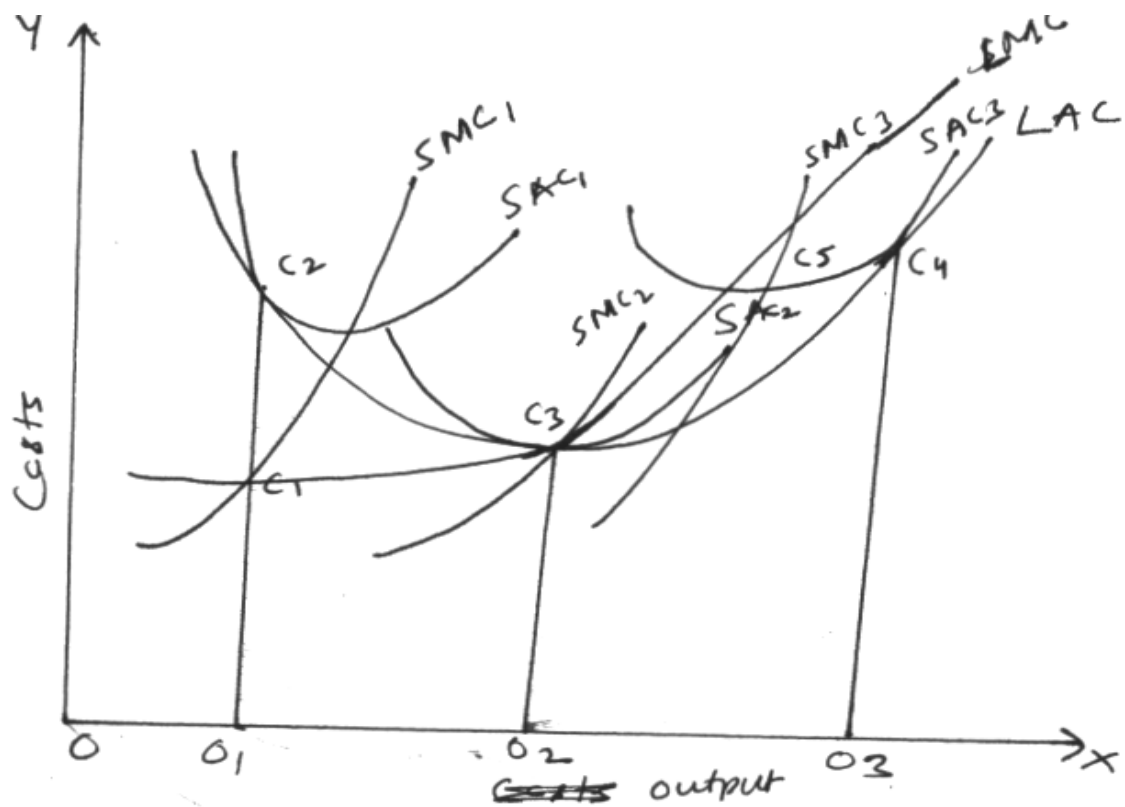


Fig VII

respective points on the X-axis. When the points C<sub>1</sub>, C<sub>3</sub> and C<sub>5</sub> where the curves SMC<sub>1</sub>, SMC<sub>2</sub> and SMC<sub>3</sub> cut these vertical lines, are joined, they trace out the LMC curve. The LMC curve intersects the curves SAC<sub>2</sub> and LAC at the minimum point C<sub>3</sub> 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<sub>3</sub>,  $LAC > LMC$  and to its right  $LMC > LAC$ .

### **12.3 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:

**12.3.1 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.

**12.3.2 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

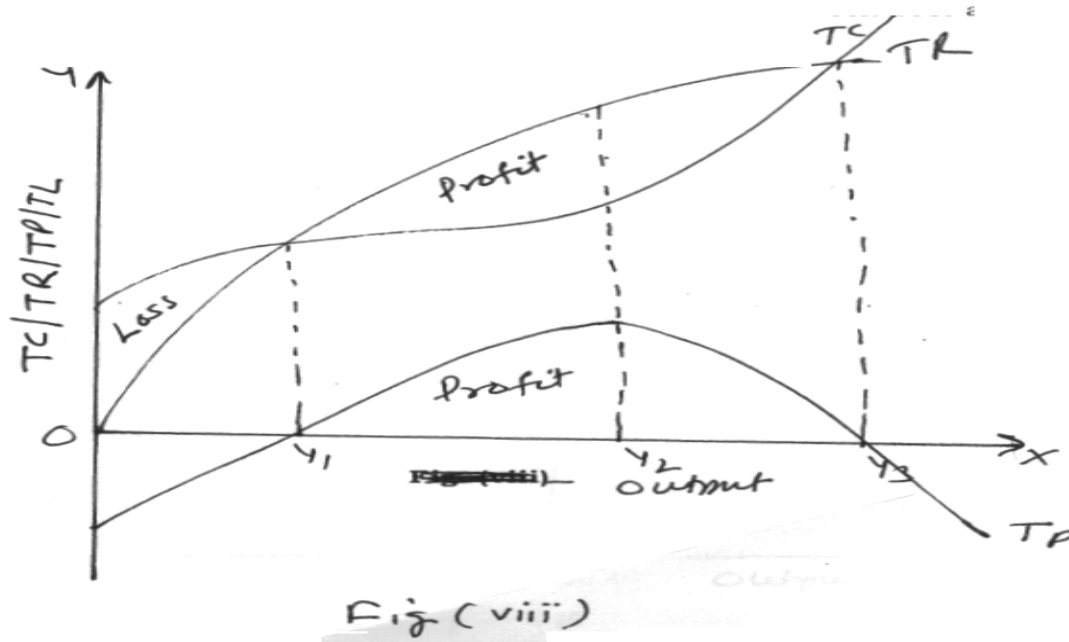
arise due to the higher scale of production and lead to rise in cost of production. These economies may be classified into two categories- (i) Internal diseconomies (ii) External diseconomies.

**Internal Diseconomies:** These diseconomies are exclusive and internal to a firm. When a firm becomes very large a limit of economies of scale may be 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.

#### **12.4 Break-even Analysis:**

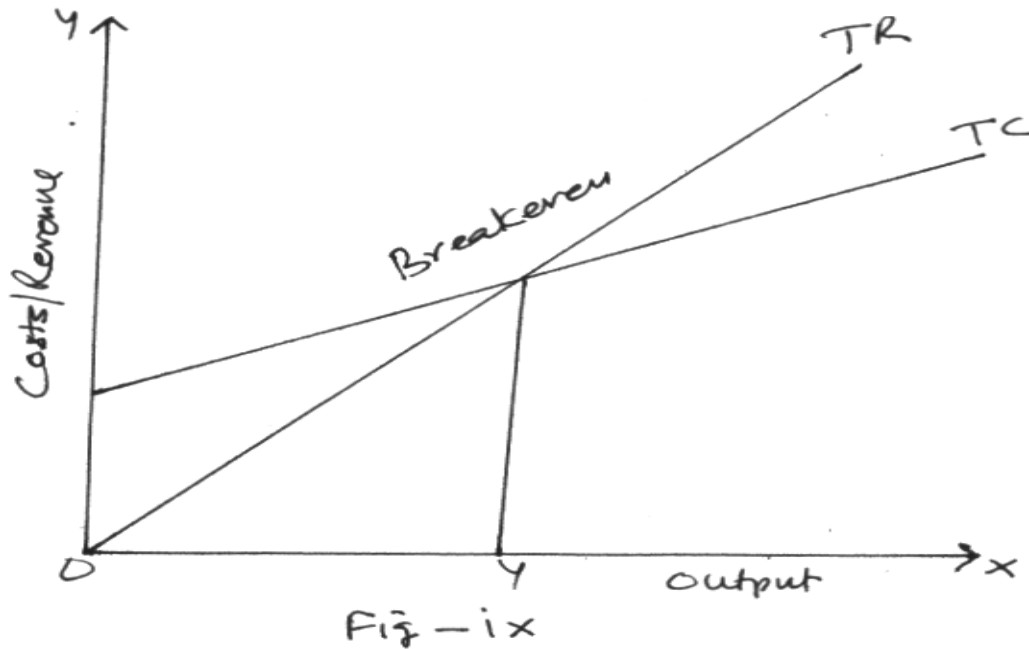
Many of the planning activities that take place within a firm are based on anticipated level of output. The study of the interrelationship among firm's sales, costs and operating profits at various level of output levels is known as cost-volume profit analysis or break even analysis. This analysis is 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;



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)



Here TR is a straight line assuming that firms charge 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.

$$TR = TC.$$

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

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

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

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

## 12.5 Summary

*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*: accountants 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.

## **12.6 Self Assessment Questions**

1. Discuss the nature of the short-run and long-run average cost curves. Why is the long-run 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?

## 12.7 Suggested Readings

- Duan, Joel : Managerial Economics  
Koutsayiannis, A. : Modern Micro Economics, Macmillan  
Mote, Paul and Gupta : Managerial Economics: Concept and Cases,  
Tata McGraw Hill  
Young, Karts : Managerial Economics.  
Landsburg Steven E : Price Theory and Applications, Dryden.  
Salvatore S. : Managerial Economics, McGraw



<b>Class</b>	<b>M.Com( 1<sup>st</sup> Year)</b>	<b>Author</b>	<b>Dr. Ved Pal</b>
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## **Lesson -13**

### **Price Determination: Perfect Competition and Monopoly**

**Objectives:** 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.

### **Structure**

#### **13.0 Introduction**

##### **13.0.1 Types of Market**

#### **13.1 Perfect Competitive Market**

##### **13.1.1 Price Determination in the Perfect Competitive Market**

##### **13.1.2 Effect of Change in Demand on the Price**

##### **13.1.2 Effect of the Change of the Supply on the Price**

##### **13.1.3 Equilibrium of the Firm and Industry in the Perfect Competitive Market**

##### **13.1.4 Equilibrium of the Firm in the Short Run**

##### **12.1.5 Long Run Equilibrium of the Firm in Perfect Competition Market**

##### **13.1.6 Equilibrium of the Industry**

##### **13.1.7 Short Run Equilibrium of the Industry**

##### **13.1.8 Long Run Equilibrium of the Industry**

#### **13.2 Monopoly**

##### **13.2.1 Price and Equilibrium Determination under Monopoly**

##### **13.2.2 Short Run Equilibrium of the Monopolist**

##### **13.2.3 Long Run Equilibrium of the Monopolist**

##### **13.2.4 Monopoly Power**

##### **13.2.5 Lerner's Method**

##### **13.2.6 Bain's Method to Measure the Monopoly Power**

#### **12.3 Monopoly and Price Discrimination**

##### **13.3.1 Types of Price Discrimination**

##### **13.3.2 Conditions of Price Discrimination**

### 13.3.3 When the Price Discrimination is Beneficial

### 13.3.4 Social Effects of Price Discrimination

### 13.3.5 Harmful Effects of the Price Discrimination

## 13.4 Summary

## 13.5 Self Assessment Questions

## 13.6 Suggested Readings

## 13.0 Introduction

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.

### 13.0.1 Types of Market:

On the basis of the competition markets can be divided into three forms.

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.

### **13.1 Perfect Competitive Market**

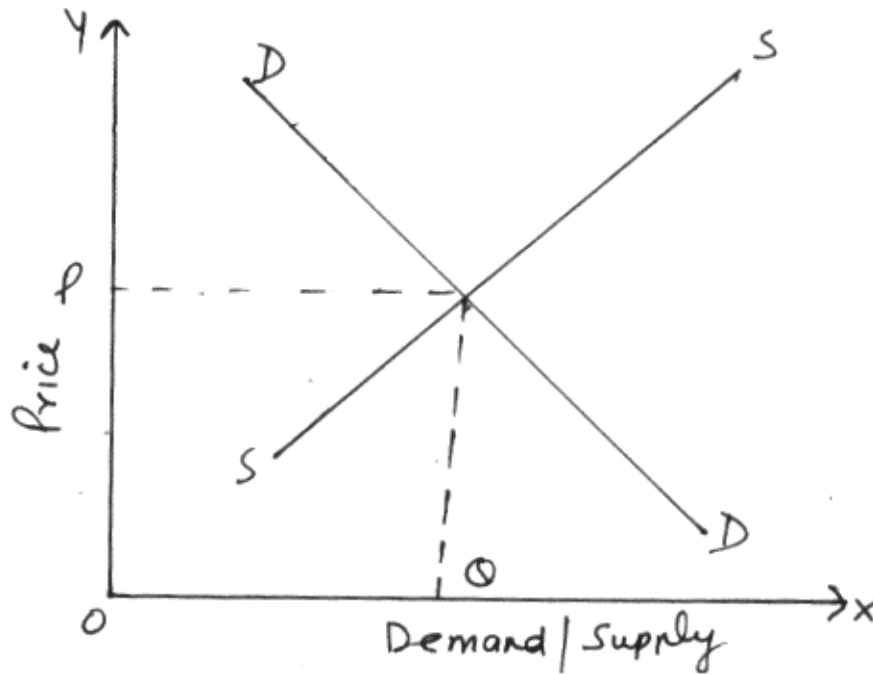
Perfect competitive market is that market where large numbers of are many sellers and buyers producing homogeneous product but the size of the sellers and buyers is so small that they can not change the demand and supply of the product. In this market the price of the commodity is determined by the industry 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.

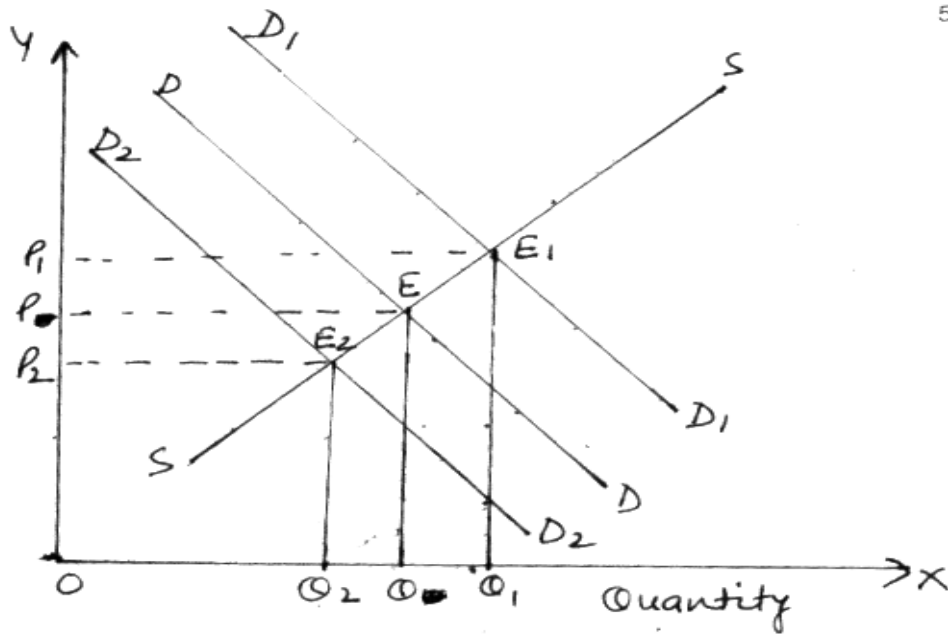
**13.1.1 Price Determination in the Perfect Competitive Market:** In this market the price of the commodity is determined by the industry. The industry determines the price of the commodity at the point where the market demand and supply of the commodity becomes equal to each other. We can show it with 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



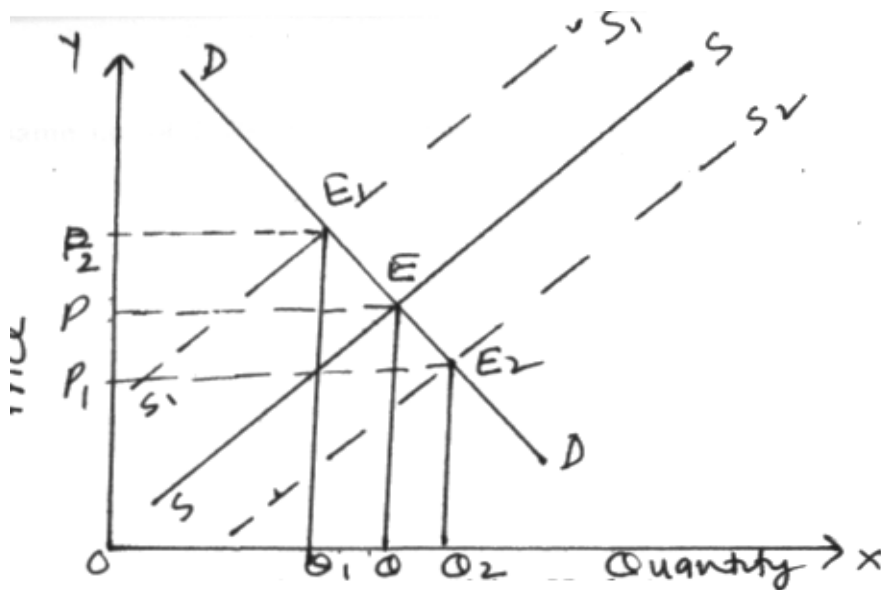
**Fig.-I**

**13.1.2 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  $OP$ .

**13.1.2 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

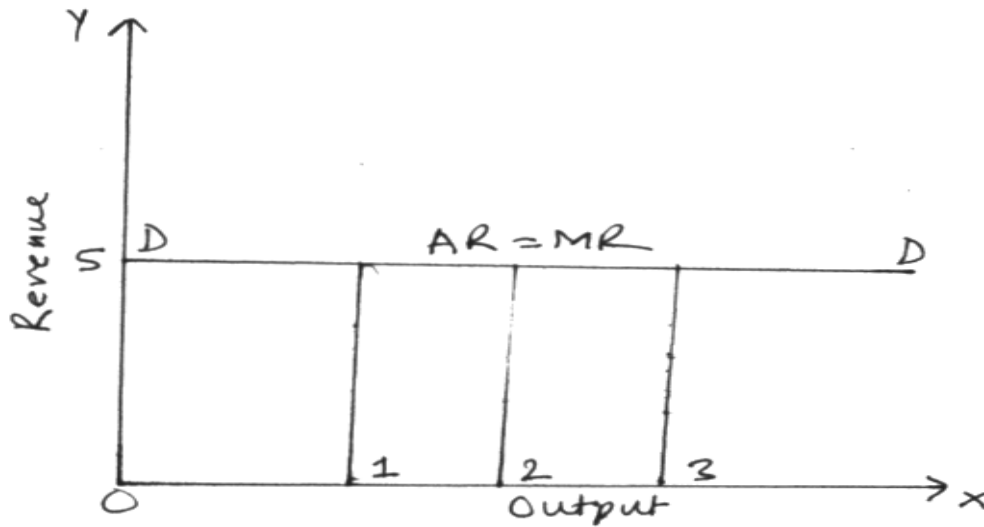


6

**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 then AR i.e. price is 5 Rs. If the demand increases and two or three units of the commodity are sold then 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.

### 13.1.3 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 satisfied 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.

$$\pi = TR - TC = \text{Maximum.}$$

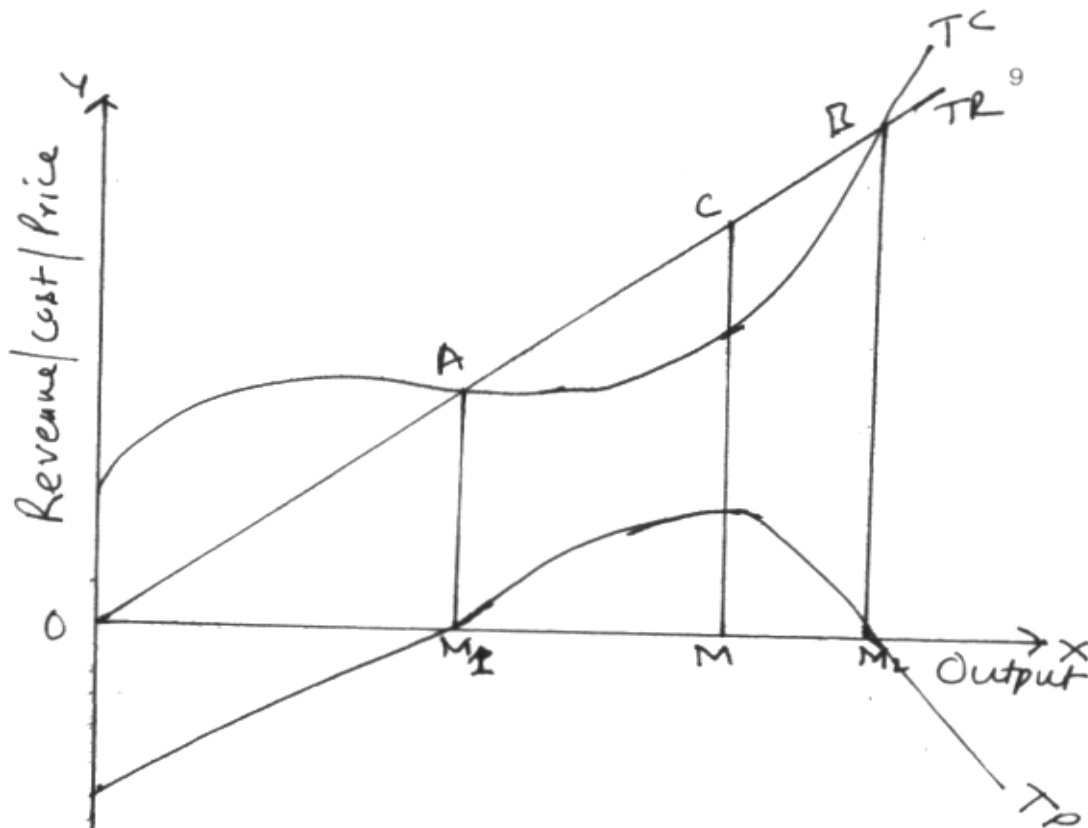
$$\pi = \text{Total profit}$$

$$TR = \text{Total revenue}$$

$$TC = \text{Total cost.}$$

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.

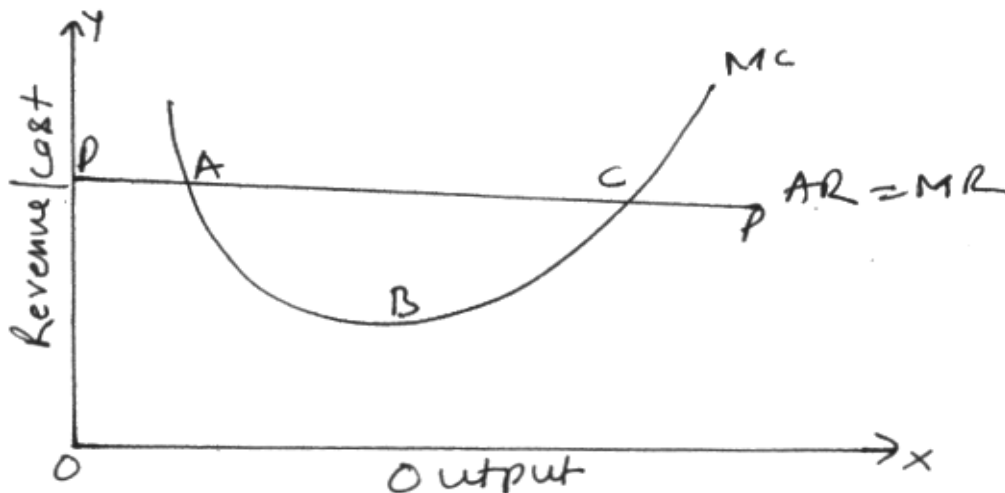
To determine the equilibrium position a firm has to compare its marginal revenue and marginal cost. A firm increases its production till its marginal revenue is more than its marginal cost i.e. till  $MR > MC$ . A firm wants to decrease its production when its marginal revenue MR is less than its marginal 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:



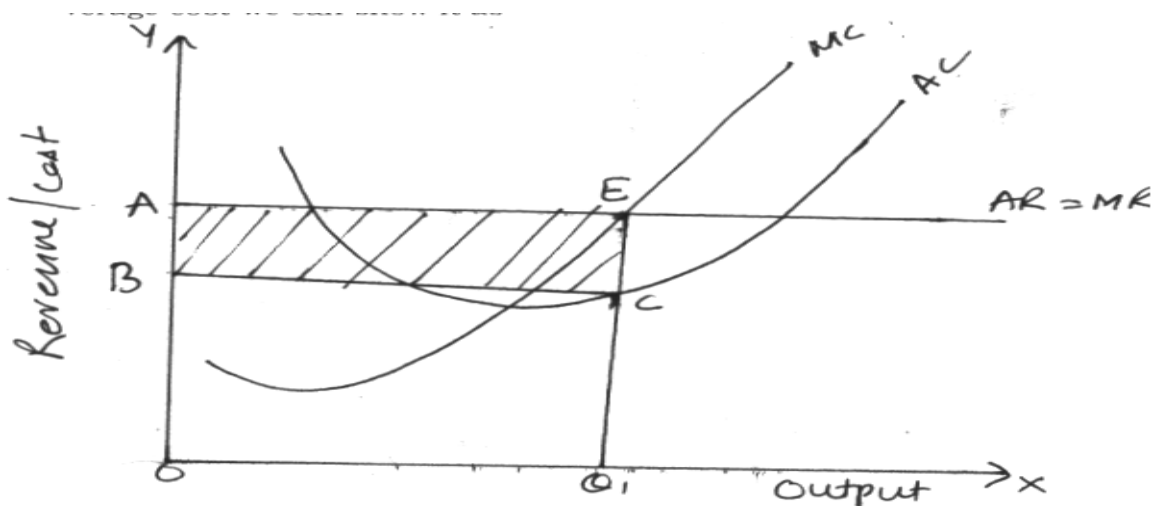
In the above diagram PP curve is the average (AR) and marginal (MR) revenue curve, which is parallel to X-axis. MC is the firms marginal cost curve which slopes downward first and after point B it starts increasing. The marginal cost curve cuts the marginal revenue curve at point A and C. Point A is 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.

### 13.1.4 Equilibrium of the Firm in the Short Run:

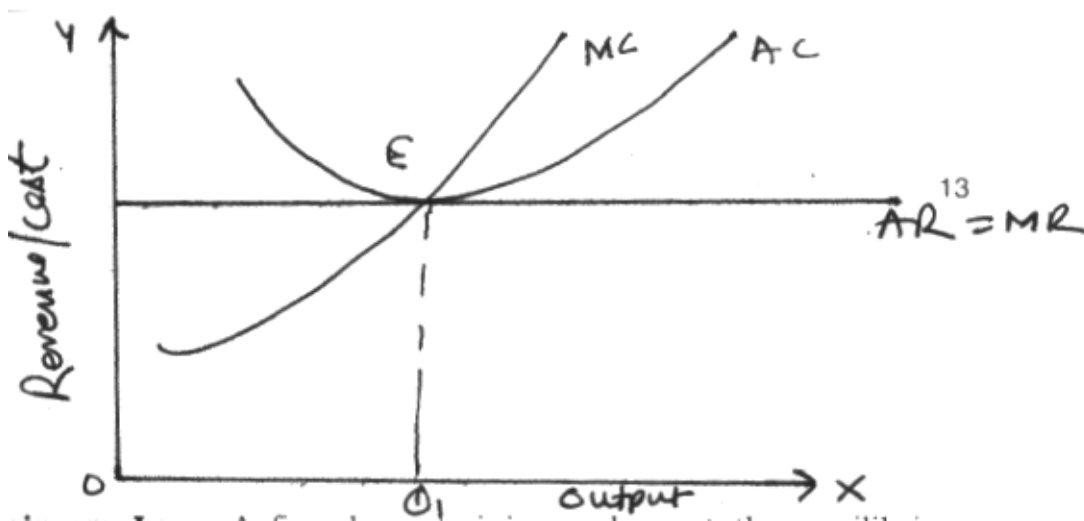
Short run is the time period in which the firm can increase its production by increasing its variable factor only. So in the short run the scale of the production remains constant i.e. in the short run no firm can enter or leave the industry. In the short run equilibrium position a firm may be in three 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



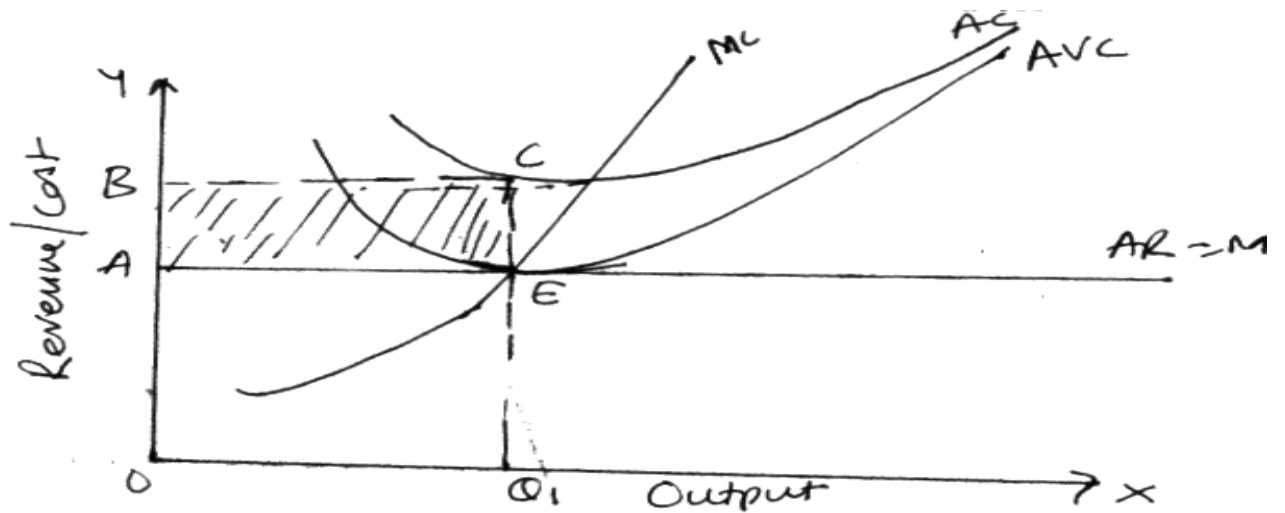
2. **Normal Profit:** A firm acquire normal profit at the equilibrium position when the average cost at the equilibrium production will be equal to the price determined by the industry it can be shown as.



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.

$$\text{When } AC - AR = FC$$

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.

### 13.1.5 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:

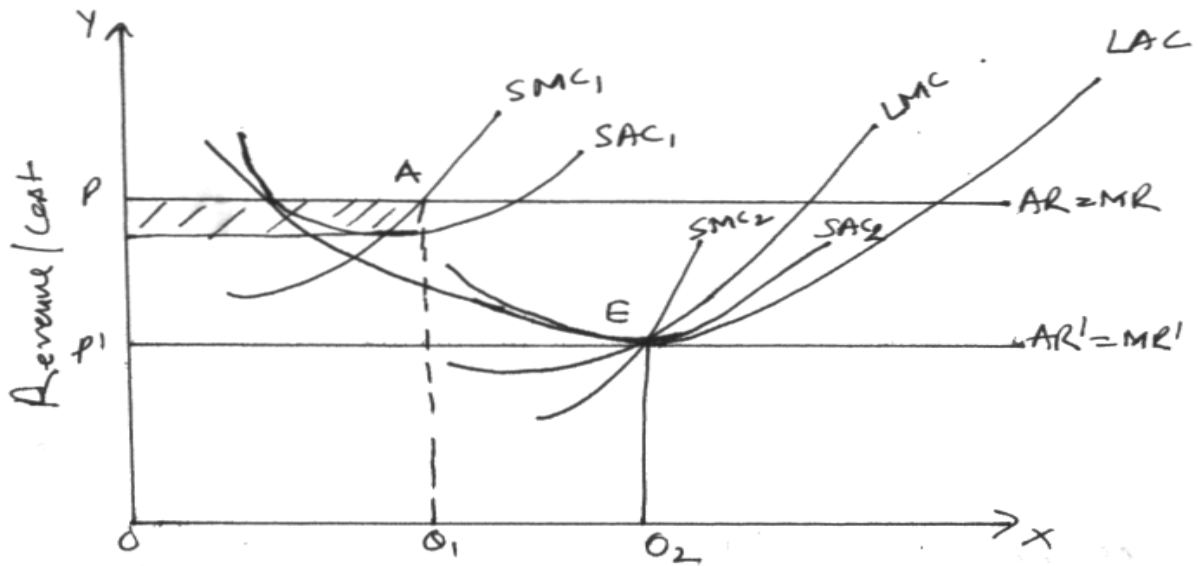
A firm will be in equilibrium in the long run when

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  $LMC = SMC = MR = AR = SAC = LAC$ .

### **13.1.6 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.

### 13.1.7 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.

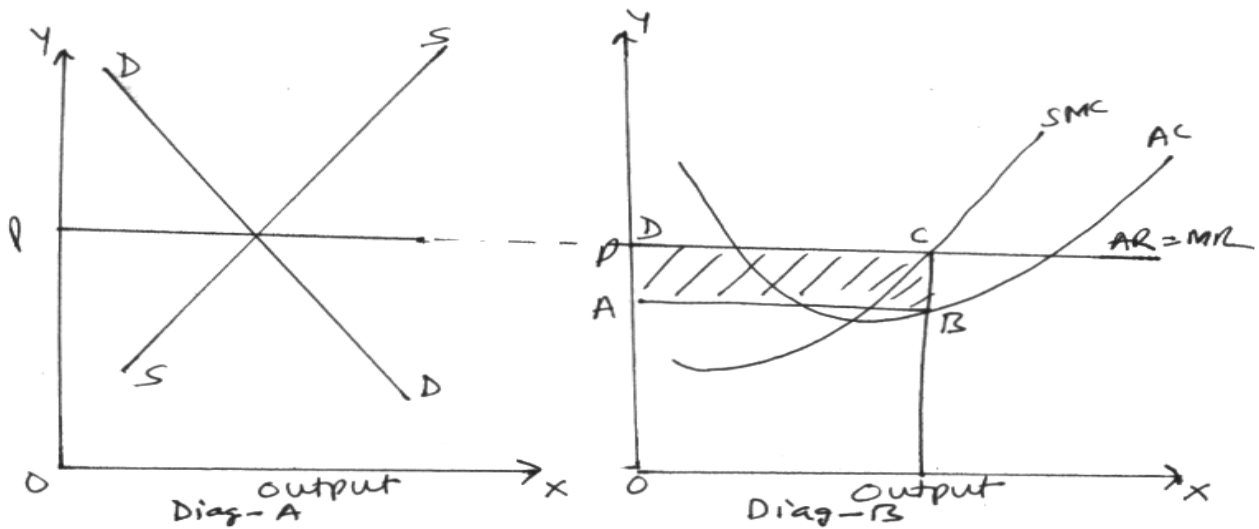
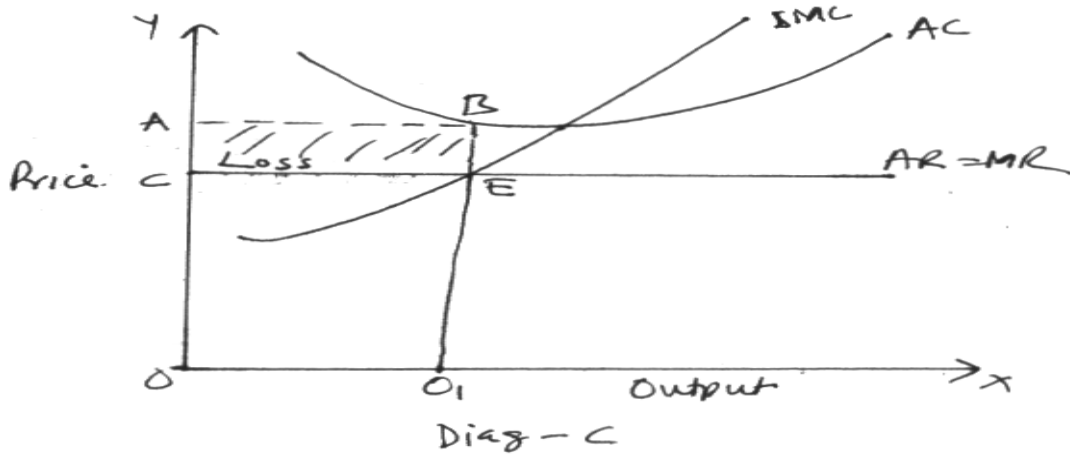
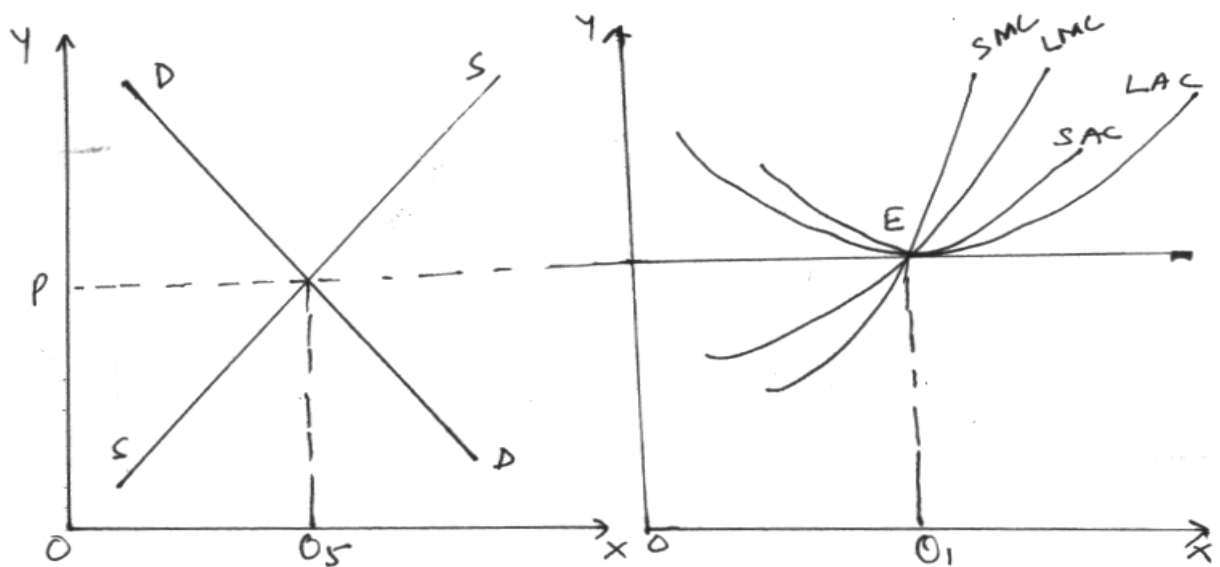


Diagram (C) is showing that at equilibrium price firms are incurring losses so there will be a tendency to decrease the supply in the long run. So the industry will be in perfect equilibrium only in the long run.



**13.1.8 Long Run Equilibrium of the Industry-**

In the long run the industry will be in equilibrium when it testifies these conditions.



1. Each firm 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.  $LAC = LAR$ .

### **13.2 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.

### **13.2.1 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.

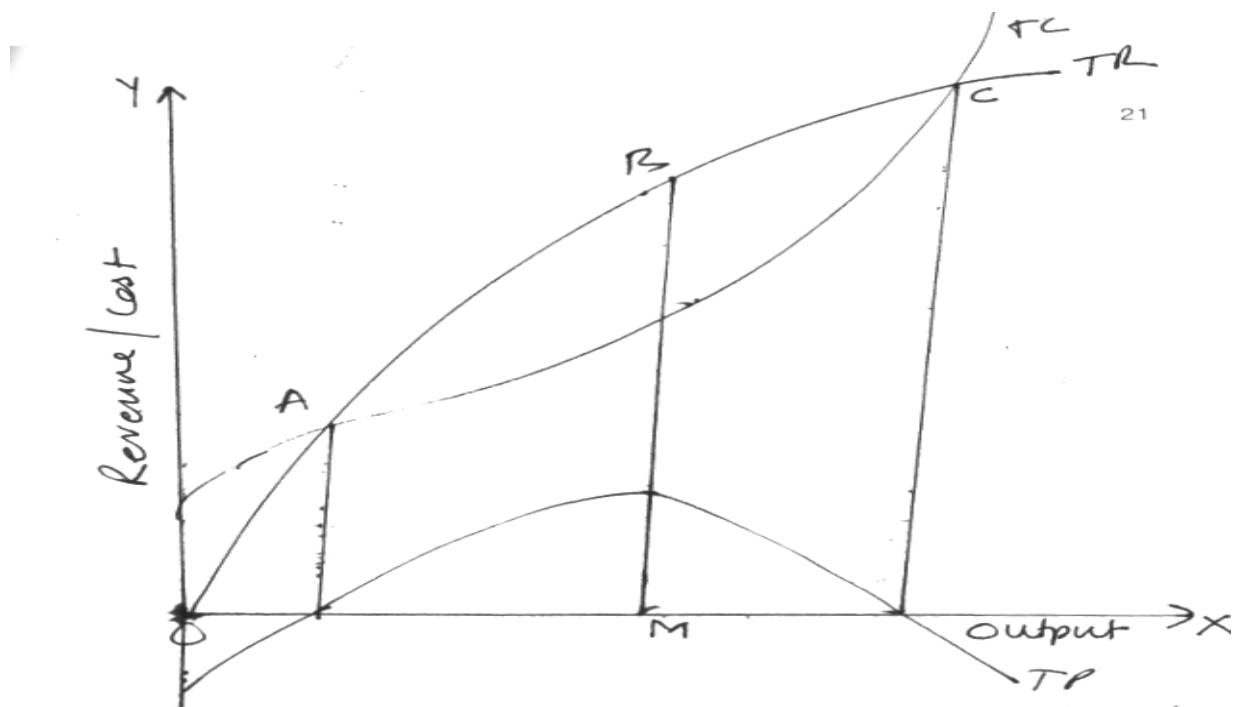
$$\pi = TR - TC = \text{maximum}$$

$\pi$  = Total profit

TR = Total revenue

TC = Total cost

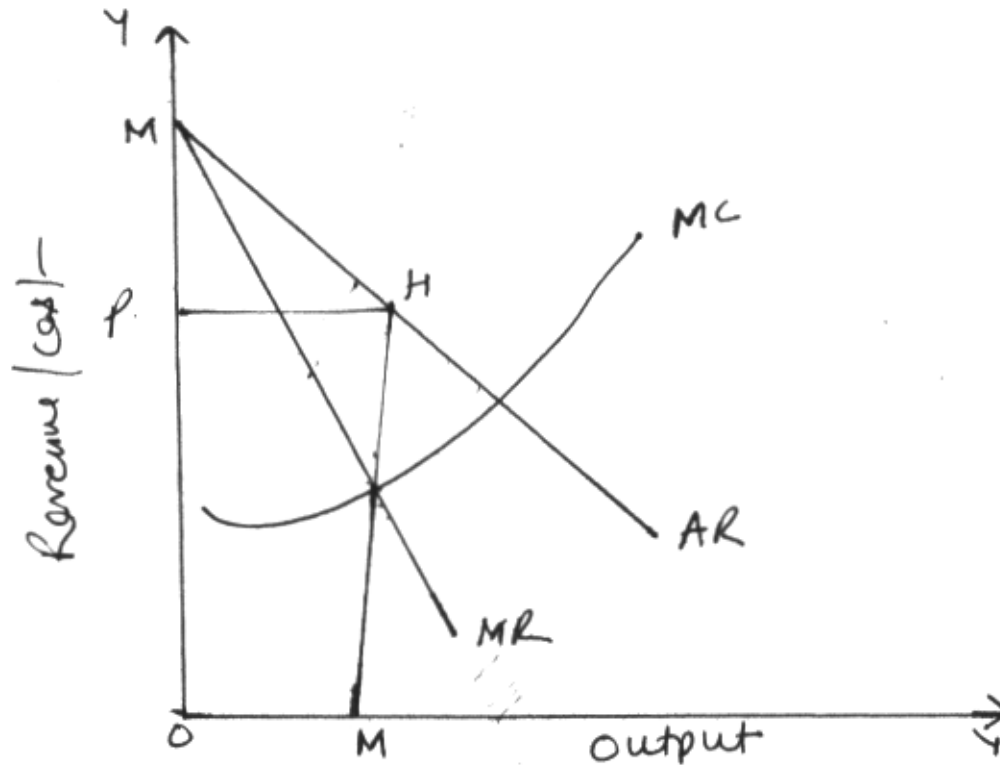
This can be shown as under



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.

### 13.2.2 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.

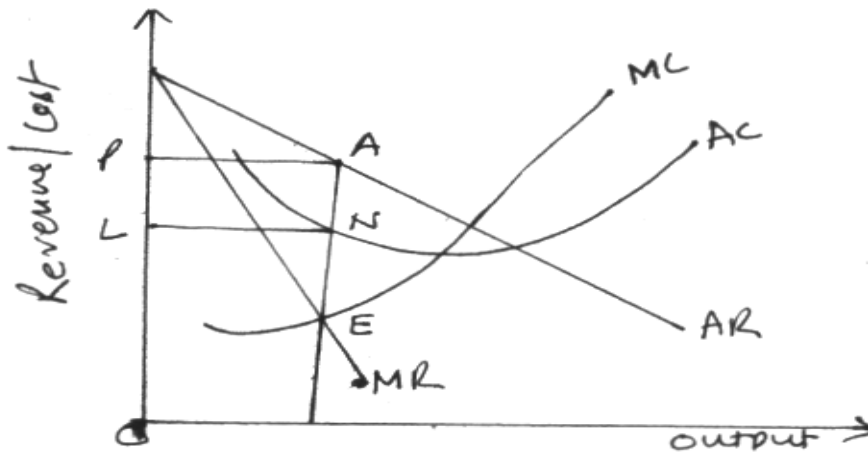
When  $MC = MR$  and MC cuts MR from below. In short-run the monopolist may be in three positions during equilibrium

1. Abnormal profit.
2. Normal profit

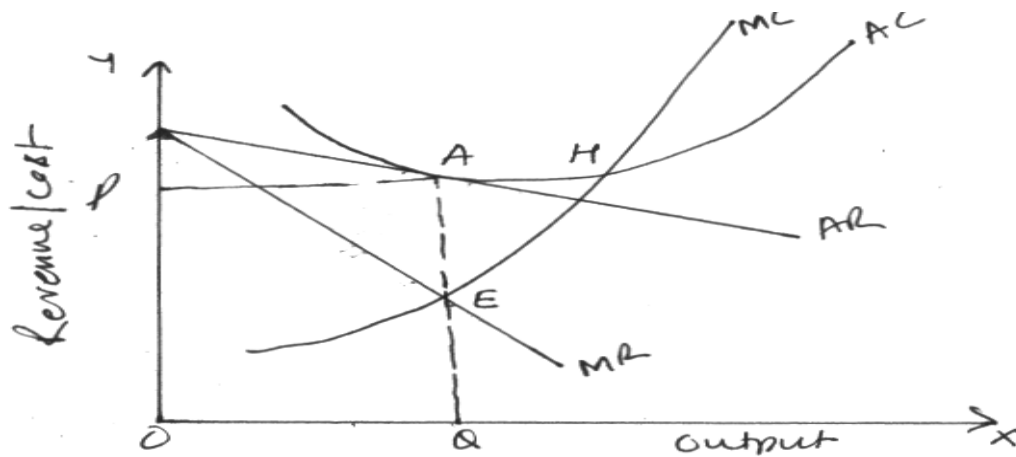


### 3. Minimum loss

**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.

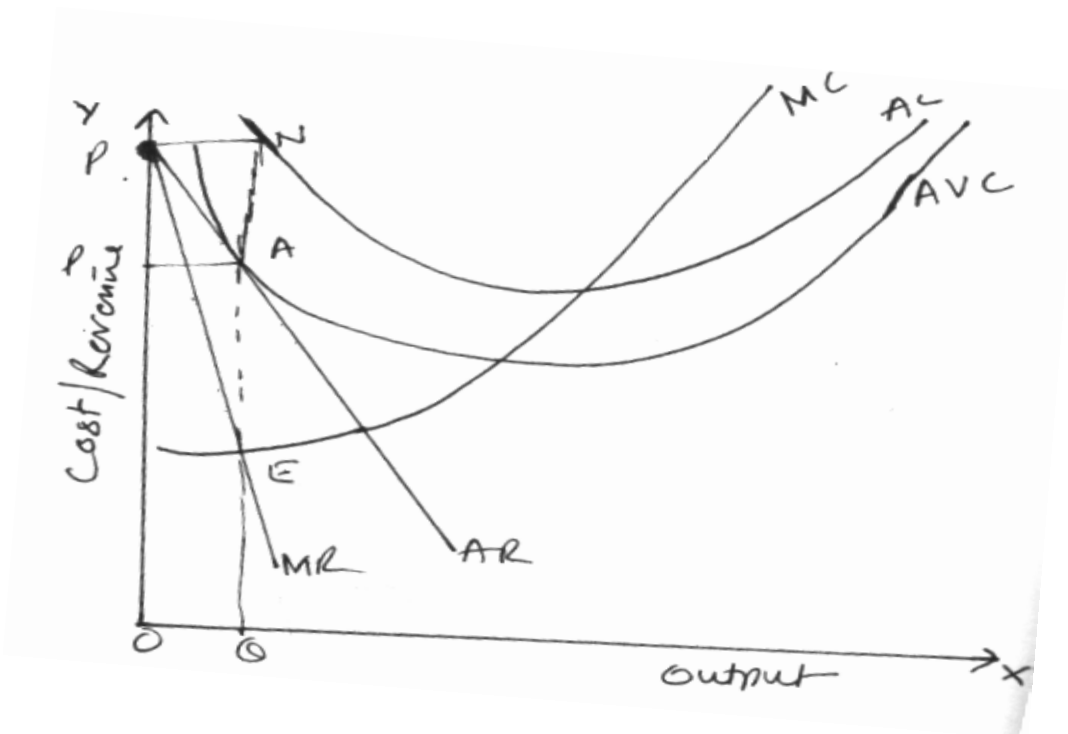


**Normal Profit:** The price determined by monopolist at equilibrium position is equal to the average cost i.e.  $AR = AC$  then the monopolist will get only normal profit. This can be shown as-



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 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.

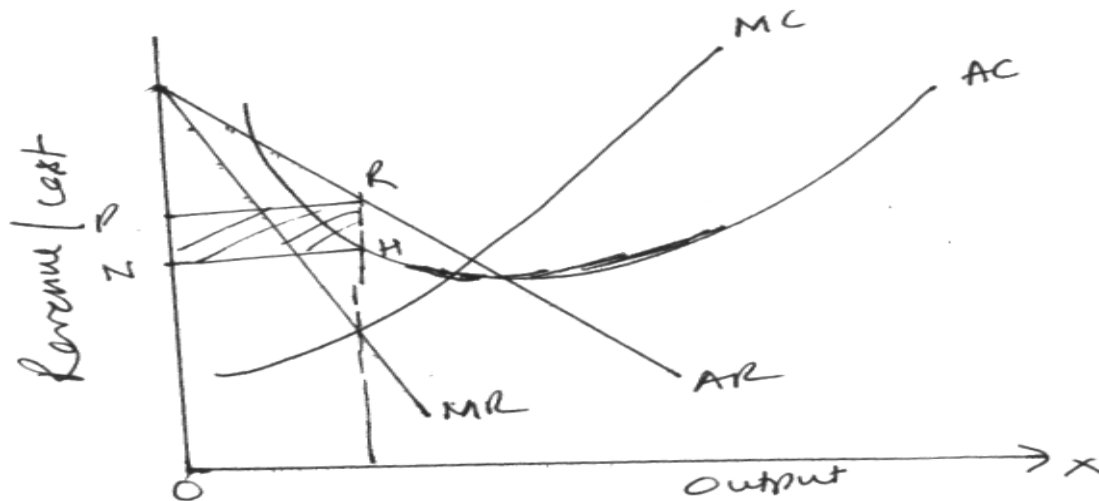
**3. Minimum Loss-** In the short run the monopolist will have to continue its production even at losses. In the short run if the demand of the commodity decreases then price  $a$  will also decrease and the monopolist will continue its production if he is getting price equal to (AVC) i.e. equal to average 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.

**13.2.3 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.

### 13.2.4 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,

### **13.2.5 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

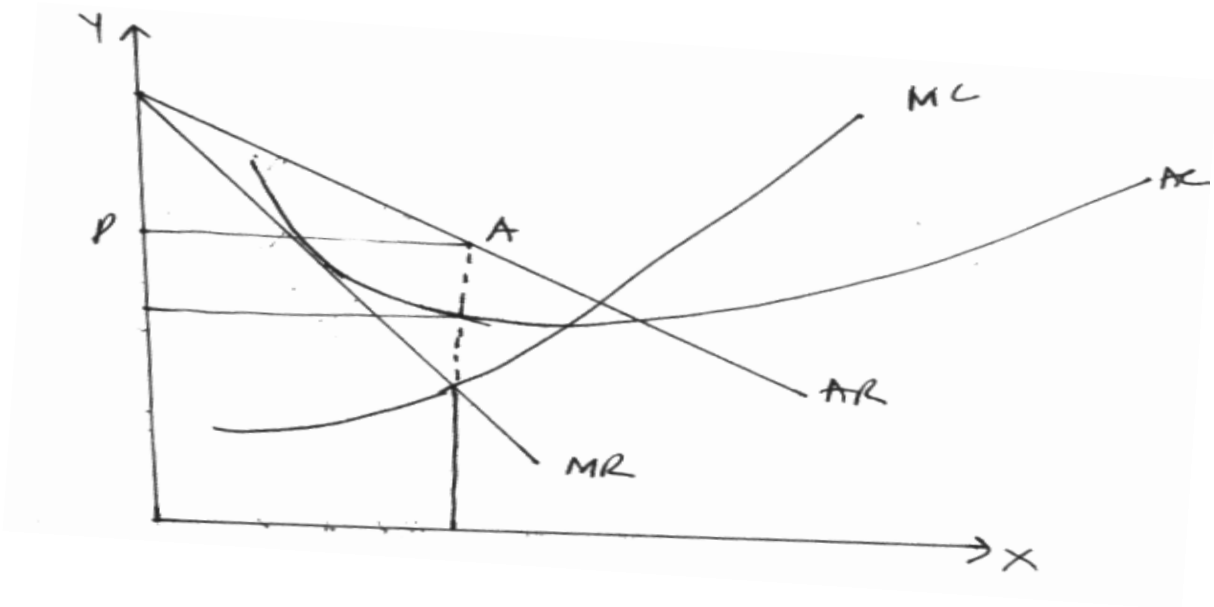
In perfect competitive market the difference between price and marginal cost at equilibrium point is zero. So the monopoly power is also zero, but in monopoly price may be more than marginal cost at equilibrium point. As the price determined by the monopolist is more than the marginal cost as more is 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



$$\text{Monopoly power} = \frac{AR - MR}{AR}$$

$$E_p = \frac{AR}{AR - MR}$$

$$E_p (AR - MR) = AR$$

$$E_p AR - AR = E_p MR$$

$$AR (E_p - 1) = E_p MR$$

$$MR = \frac{AR (E_p - 1)}{E_p}$$

$$\text{Now monopoly power} = \frac{AR - MR}{AR}$$

After putting the value of MR

$$M_p = \frac{AR - AR \frac{(E_p - 1)}{E_p}}{AR}$$

$$M_p = \frac{E_p AR - E_p AR + AR}{\frac{E_p}{AR}}$$

$$M_p = \frac{1}{E_p}$$

### **13.2.6 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.

### **13.3 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.

### **13.3.1 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.

### **13.3.2 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.

### **13.3.3 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-

$$MR = \frac{AR (E_p - 1)}{E_p}$$

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)

$$MR = \frac{10 (5 - 1)}{5} = 8/-$$

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

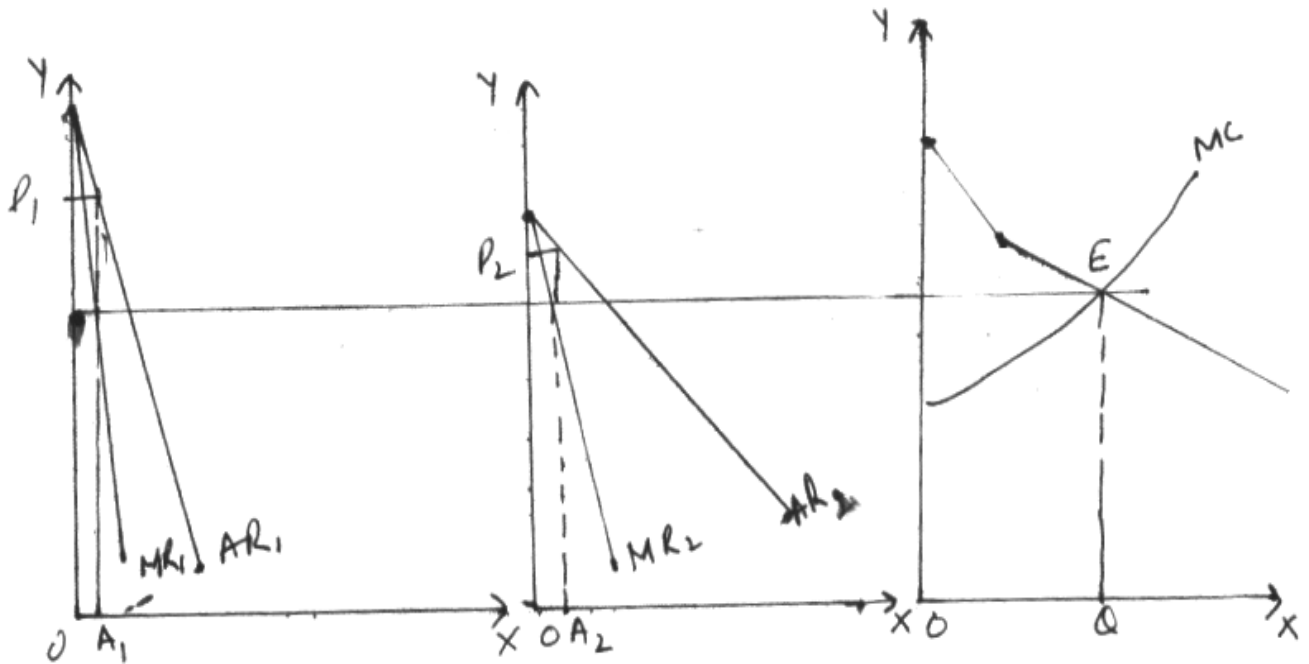
1. What will be his total production.
2. How many production will be sold in each market.
3. What will be the price at which he will get maximum profit.

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  $\Sigma MR$ . 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

$$OQ = OQ_1 + OQ_2$$

#### 13.3.4 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.

## **13.3.5 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.

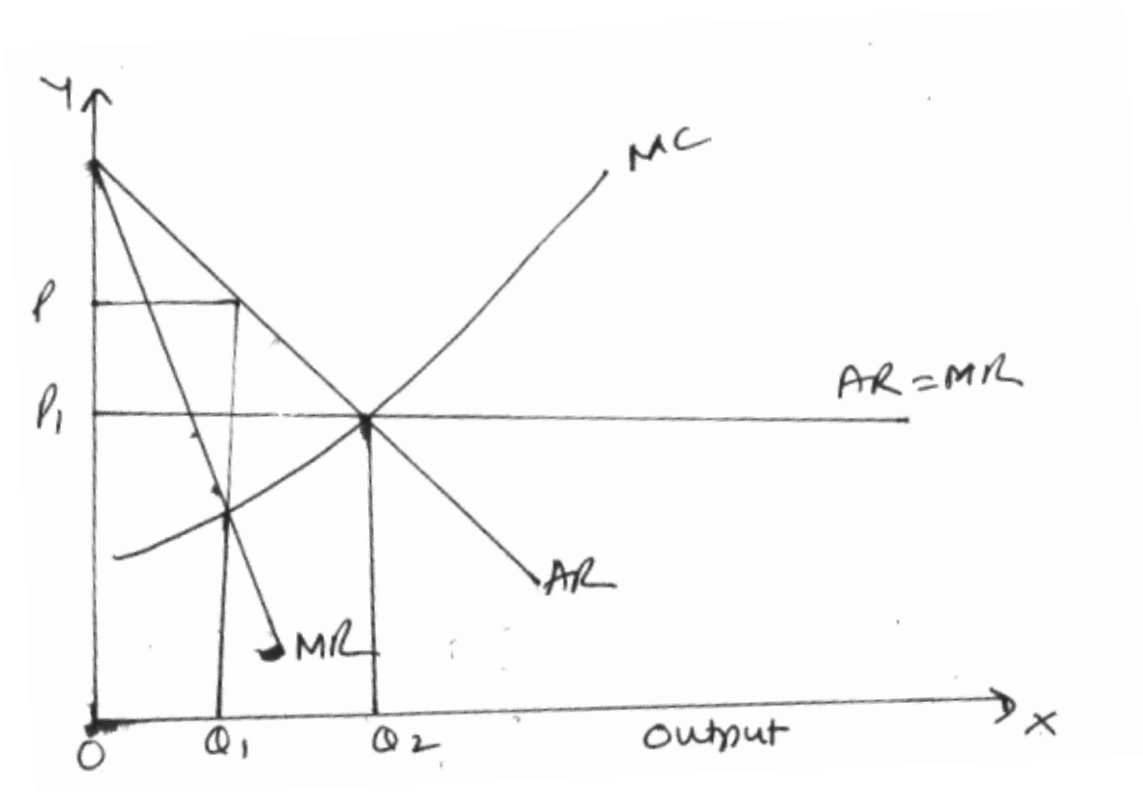
1. Home market
2. Foreign market

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  $OP_1$ .

### 13.4 Summary

*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.

*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.

*A firm is in equilibrium* when it is satisfied 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.

*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

*Short run* is the time period in which the firm can increase its production by increasing its variable factor only.

*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.

*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.

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 the long run the monopolist will be in equilibrium at the point where its LMR will be equal to its LMC. In the long run the monopolist determines the price at which he gets abnormal profit.

The monopolist can decide its production quantity or the price of its product. This decision power of the monopolist is known as *monopoly power*.

According to *Lerner* monopoly power depends upon the difference between price and marginal cost. The monopoly power increases as this difference increases.

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.

When a monopolist charges different prices from different consumers of the same product. Such a situation is described as a *discriminating monopoly* situation.

*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.

### 13.5 Questions

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 how 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’.

### 13.6 Suggested Readings

Duan, Joel	: Managerial Economics
Koutsayiannis, A.	: Modern Micro Economics, Macmillan
Mote, Paul and Gupta	: Managerial Economics: Concept and Cases, Tata McGraw Hill
Young, Karts	: Managerial Economics.
Landsburg Steven E	: Price Theory and Applications, Dryden.
Salvatore S.	: Managerial Economics, McGraw

<b>Class</b>	<b>M.Com( 1<sup>st</sup> Year)</b>	<b>Author</b>	<b>Dr. Ved Pal</b>
<b>Course Code</b>	<b>MC-104</b>	<b>Vetter</b>	<b>Dr. Tilak Sethi</b>

## **Lesson -14**

### **Price Determination: Monopolistic Competition and Oligopoly**

**Objectives:** We have studied about perfect competitive and monopoly markets in previous chapters but these markets hardly exist in real world. So it is a great need to take the price theory close to the real world. The market structure which we study in this chapter is more and less close to the real business world.

### **Structure**

#### **14.0 Monopolistic Competition**

##### **14.1.1 Characteristics of Monopolistic Competition**

##### **14.1.2 Price-output Equilibrium of a Firm under Monopolistic Competition**

##### **14.1.3 Short run Equilibrium of a Monopolistic Firm**

##### **14.1.4 Long run Equilibrium under Monopolistic Competition**

##### **14.1.5 Long run Equilibrium with Entry Closed**

##### **14.1.6 Long-run Equilibrium when Entry Permitted**

#### **14. 2 Price Determination under Oligopoly**

##### **14.2.1 Characteristics of Oligopoly**

##### **14.2.2 Indeterminateness of Demand curve facing by an Oligopolist.**

##### **14.2.3 Price and Output Determination under Oligopoly**

##### **14.2.4 Price Leadership**

##### **14.2.5 Dominant Firm Price Leadership**

##### **14.2.6 Price Output Determination under Price Leadership to Lower Cost**

##### **14.2.7 Collusive Oligopoly**

##### **14.2.8 Kinked Demand Curve Oligopoly Theory and Price Rigidity**

#### **14.3 Summary**

#### **14.4 Questions**

#### **14.5 Suggested Readings**

#### **14.1 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. Chamberlin monopolistic competitive market is a blending of the elements of perfect competition and monopoly.

#### **14.1.1 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.

#### **14.1.2 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.

#### **14.1.3 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 substitutes 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.

- (a) **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

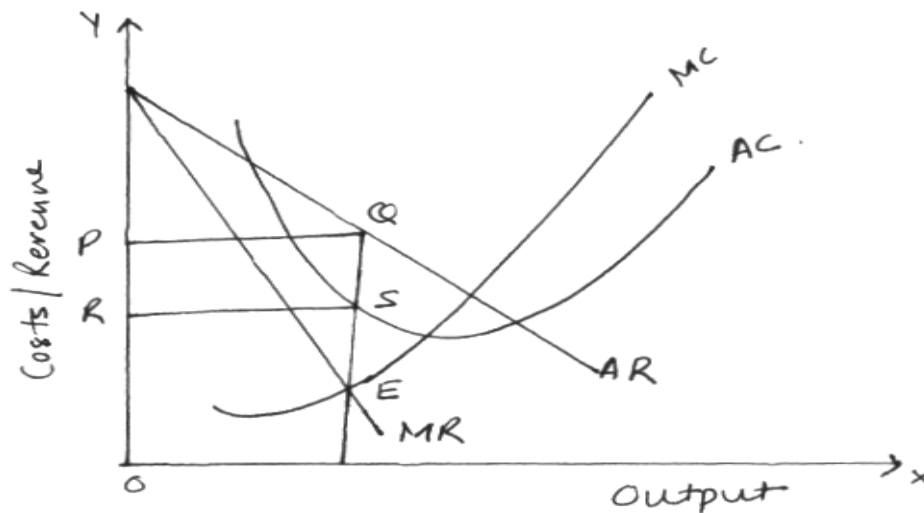
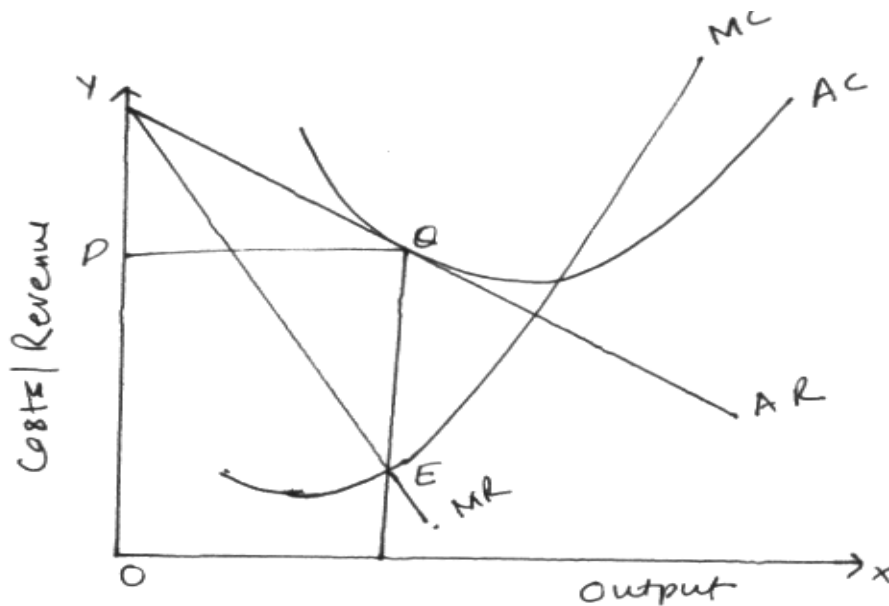


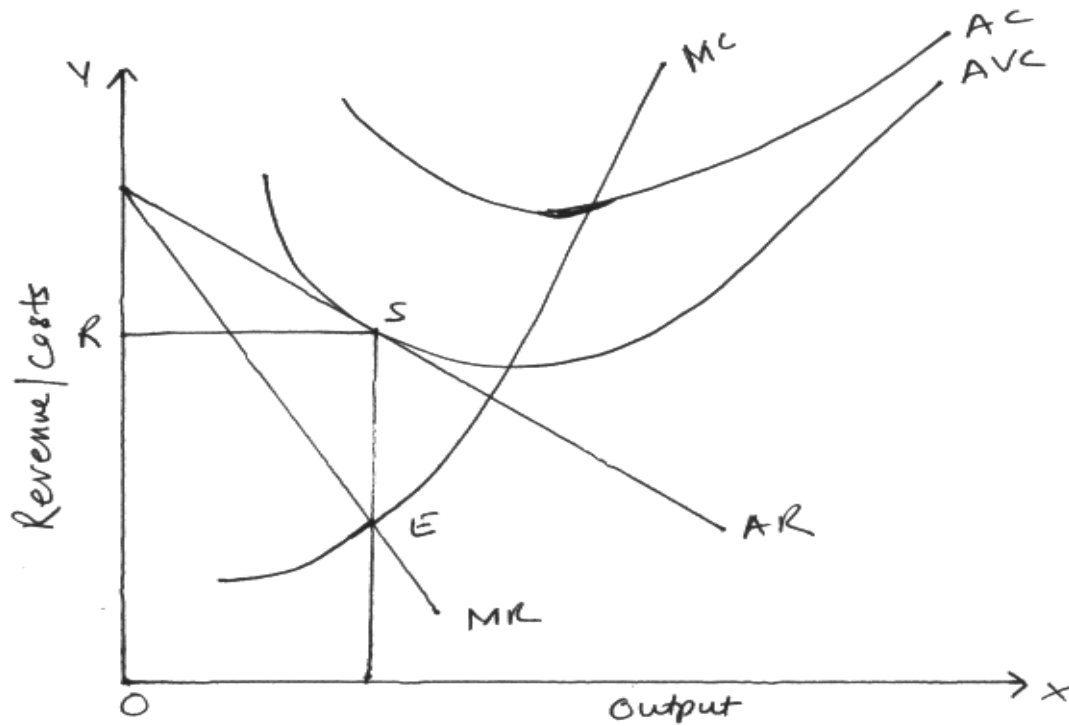
Fig.-1

equal to PQRS. Because at equilibrium point the price determined by the firm is more than its average cost.

- (b) **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.

#### **14.1.4 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

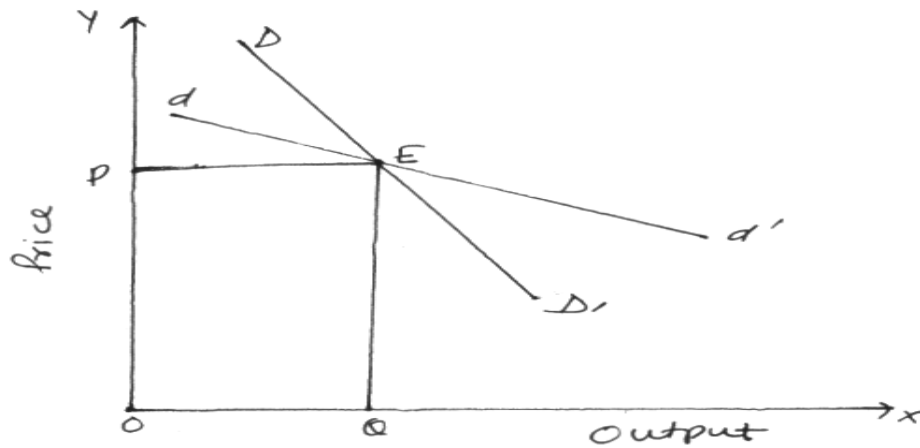


Fig.-4

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

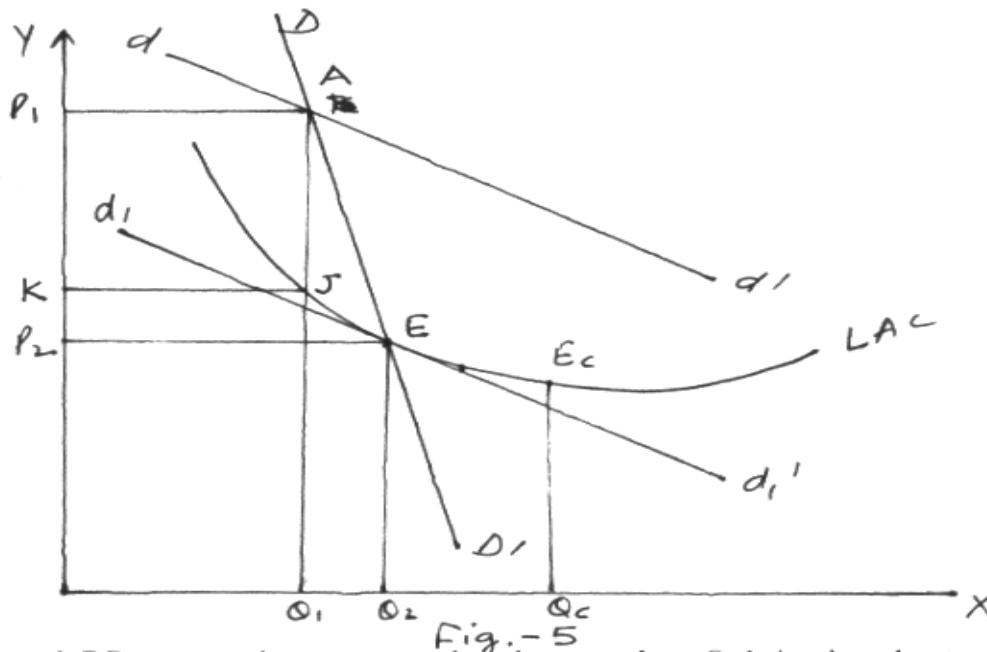
products are uniform throughout the group. The product is different. Only that consumers' preferences be evenly distributed among the different varieties, and that differences between them be not such as to give rise to differences in cost."

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.

#### **14.1.5 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



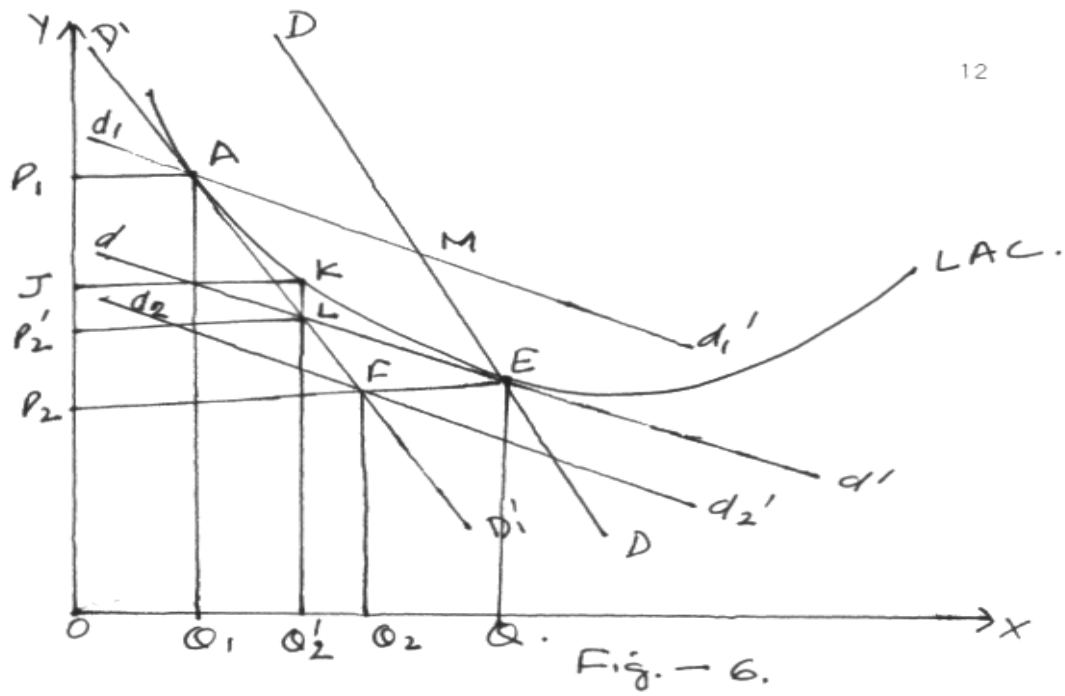
$dd$  and  $DD$  curves intersect each other so that  $Q_1A$  is the short run equilibrium price level at which each firm sells  $OQ_1$  quantities of the product and short-run total profit is represented by rectangle  $P_1AJK$ . Every producer, regarding  $dd'$  as his demand curve, believes he can 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  $d_1d_1'$  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.

#### **14.1.6 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'.



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  $OQ_2$ ) 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

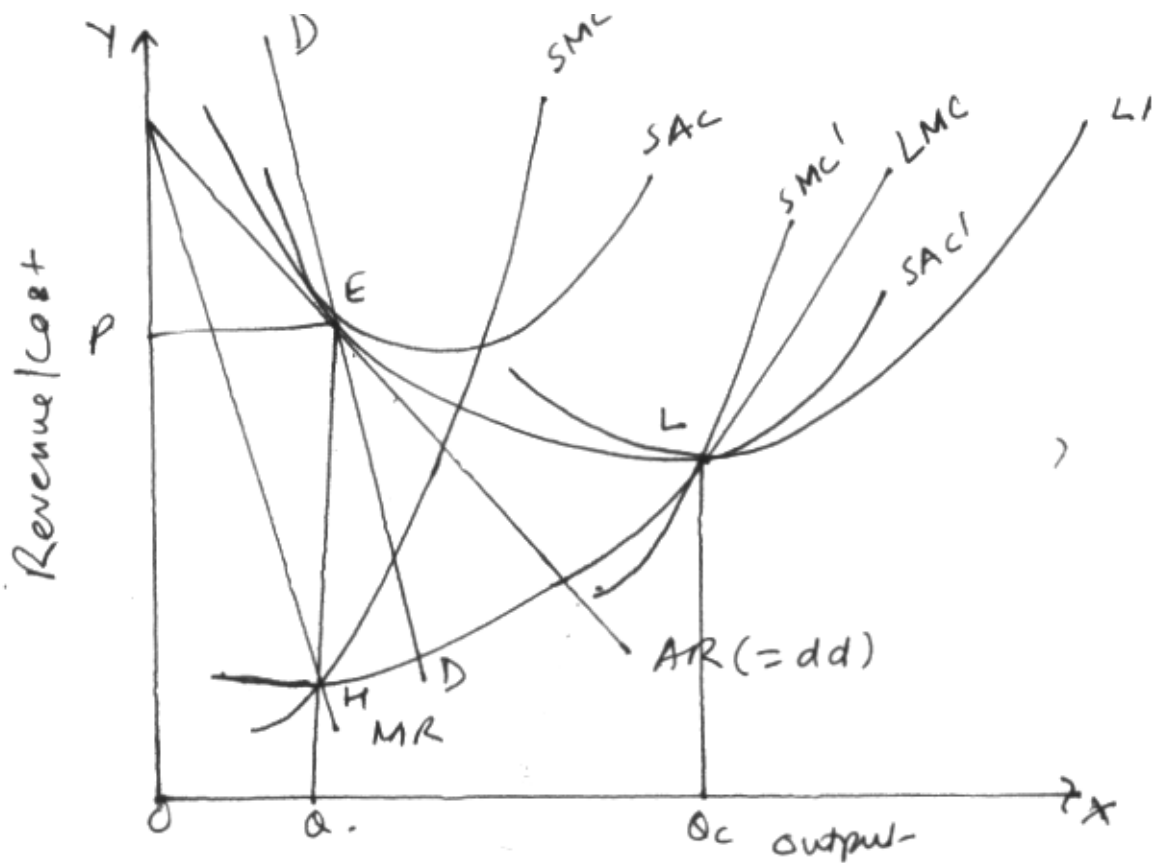


Fig. - 7

## 14. 2 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.

### 14.2.1 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.

**14.2.2 Indeterminateness of Demand curve Facing by an Oligopolist** 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.

**14.2.3 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-

**14.2.4 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-

**14.2.5 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.

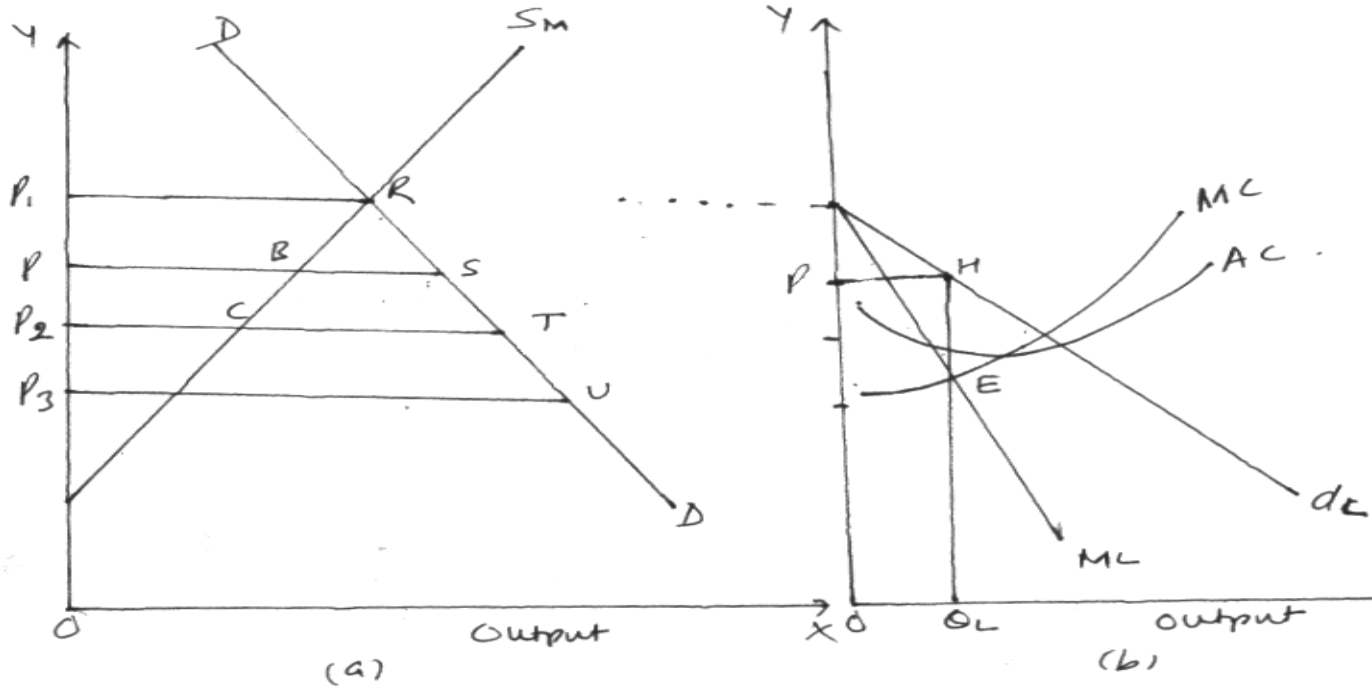


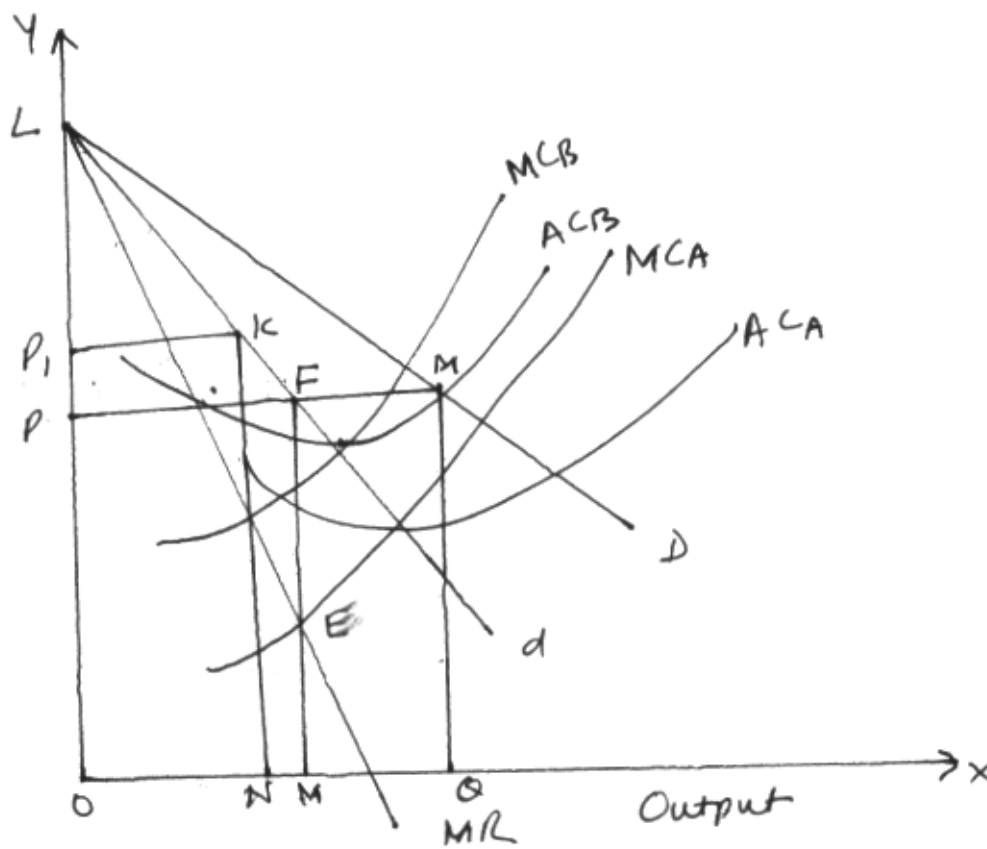
Fig.-8

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.

#### 14.2.6 Price Output Determination under Price Leadership to Lower Cost



It is given in figure -9 which is based on assumptions as under

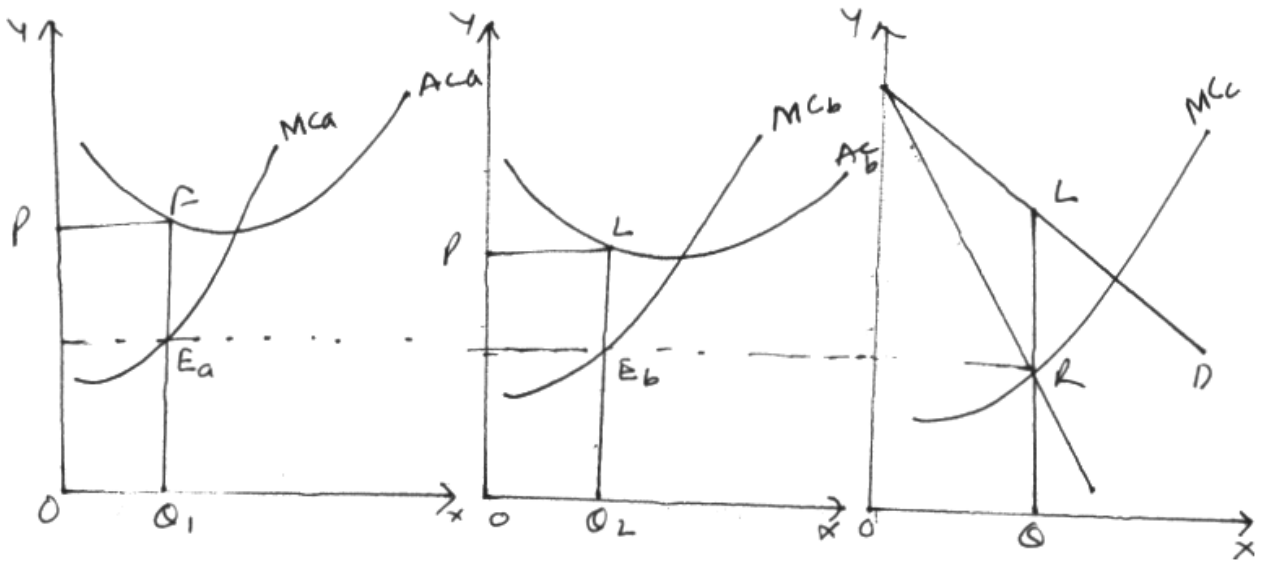
1. There are two firms A and B. The production cost of firm A is less than firm B.
2. Goods produced by both the firms are same so there is no preference in the mind of consumers.
3. Both the firms have equal share in the market. So in the above diagram each firm has demand curve dd which is equal to 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.

**14.2.7 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

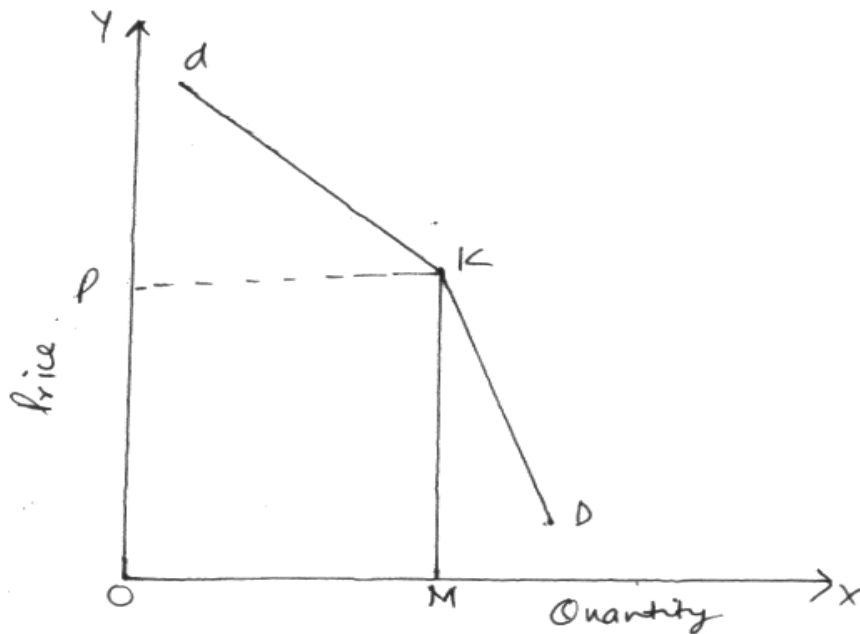
$$OQ = OQ_1 + OQ_2.$$

### 14.2.8 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.





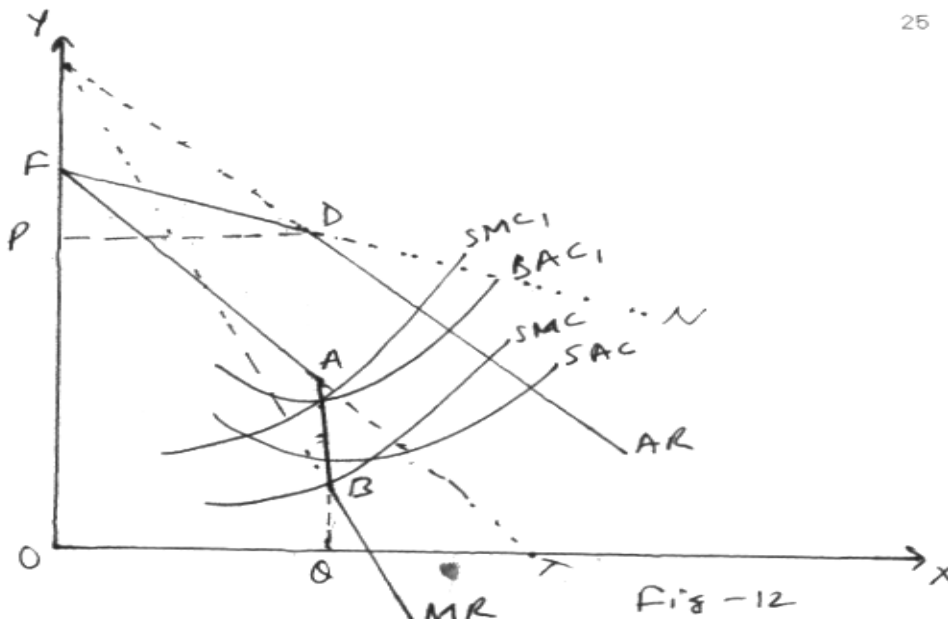
In the above diagram  $dD$  is the kinked demand curve. It is kinked at the point  $k$ , where firm is producing  $OM$  output at price  $OP$ . The upper part  $dk$  of the demand curve is more elastic than lower part  $kD$ . The reason of it is the special relation pattern assumed in this theory which 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.

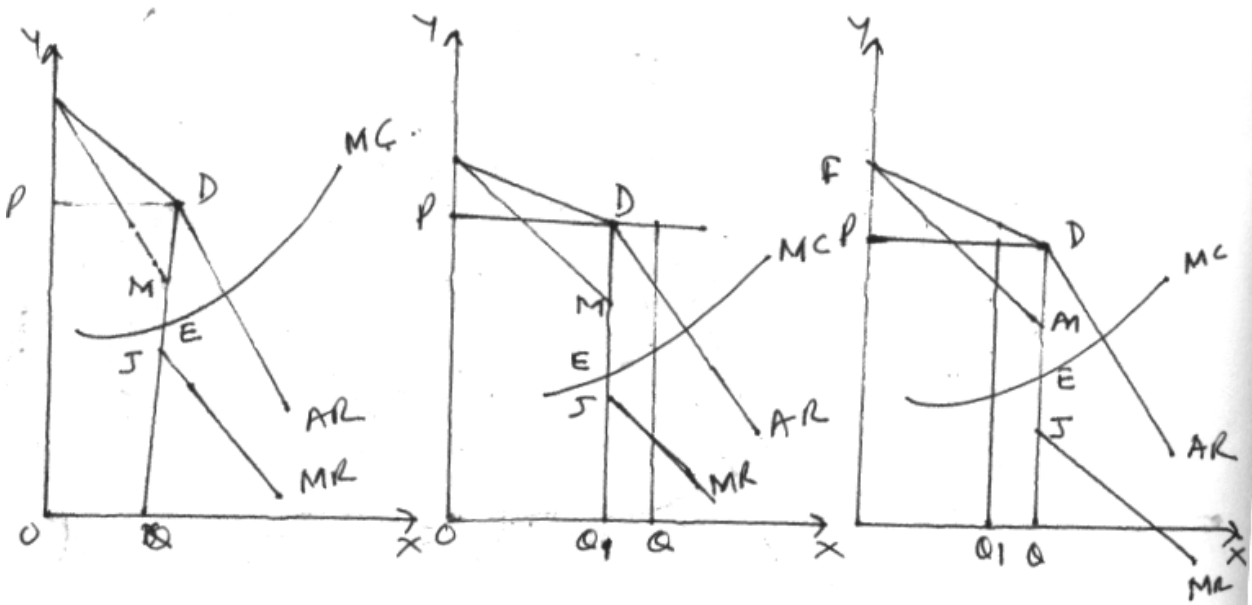
The kinky demand curve has important implications for the MR curve of the firm; it is  $FABC$  and is discontinuous at the output  $OQ$ . This is due to a sudden change in the elasticity of AR curve at point  $D$ . As the  $MR = P(1 - 1/e)$ , it drops sharply at output  $OQ$ .

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 oligopolist's 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



### 14.3 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

#### 14.4 Questions

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.

#### 14.5 Suggested Readings

Duan, Joel	: Managerial Economics
Koutsayiannis, A.	: Modern Micro Economics, Macmillan
Mote, Paul and Gupta	: Managerial Economics: Concept and Cases, Tata McGraw Hill
Young, Karts	: Managerial Economics.
Landsburg Steven E	: Price Theory and Applications, Dryden.
Salvatore S.	: Managerial Economics, McGraw

<b>Course:</b>	Economic Analysis	<b>Author:</b>	Anil Kumar
<b>Course Code:</b>	MC-104	<b>Vetter:</b>	<b>Dr. Karam Pal</b>
<b>Lesson:</b>	15		
<b>DUMPING AND TRANFER PRICING</b>			

**Objective:** The overall objective of this lesson is to discuss international price discrimination (known as dumping) and the pricing of intermediate products transferred between the firm's divisions (known as transfer pricing).

### **Structure**

This lesson is divided into two sections: Section A and Section B

#### Section A

- 15.a.1 Meaning and Nature of Dumping
- 15.a.2 Forms of Dumping
- 15.a.3 Trade Restriction to Counteract Dumping

#### Section B

- 15.b.1 Meaning and Nature of Transfer Pricing
- 15.b.2 Transfer Pricing With No External Market for the Intermediate Product
- 15.b.3 Transfer Pricing With A Perfectly Competitive Market for the Intermediate Product
- 15.b.4 Transfer Pricing With An Imperfectly Competitive Market for the Intermediate Product
- 15.c Self-Assessment Questions
- 15.d Suggested Readings

## Section A: DUMPING

In this section we will discuss the meaning, need and forms of dumping.

### **15.a.1 MEANING AND NATURE OF DUMPING**

When price discrimination is practiced between the domestic market and the foreign market, it is known as dumping. Thus dumping is international price discrimination and refers to the charging of a lower price abroad than at home for the same commodity because of the greater price elasticity of demand in the foreign market. By so doing, the monopolist earns higher profits than by selling the best level of output at the same price in both markets. The price elasticity of demand for the monopolist's product abroad is higher than at home because of the competition from producers from other nations in the foreign market. Foreign competition is usually restricted at home by import tariffs or other trade barriers. These import restrictions serve to segment the market (*i.e.*, keep the domestic market separate from the foreign market) and prevent the re-export of the commodity back to the monopolist's home country (which would undermine the monopolist's ability to sell the commodity at a higher price at home than abroad).

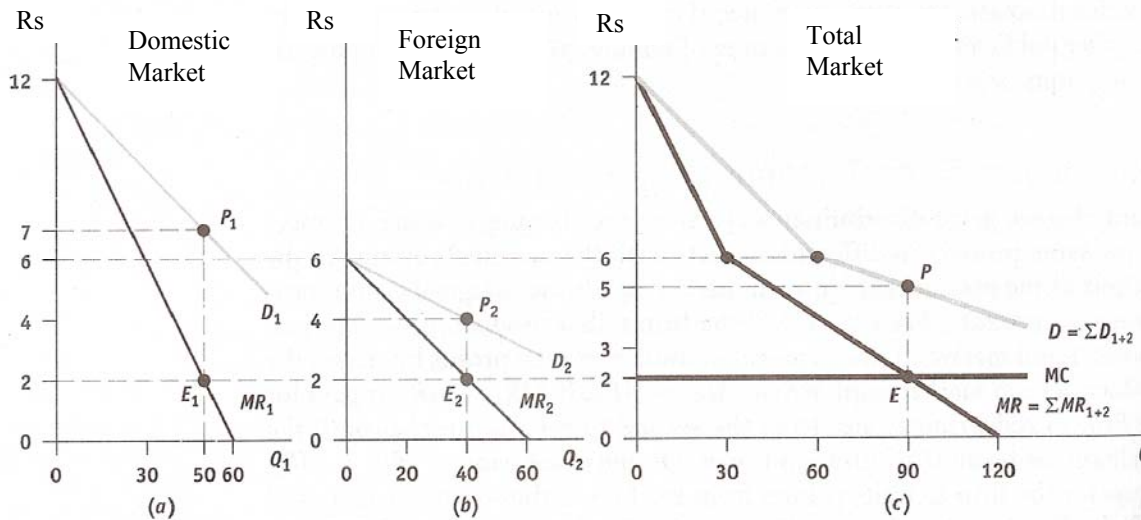
#### Graphic Analysis of Dumping

International price discrimination can be viewed with Figure 15-1. Panel *a* in Figure 15-1 shows  $D_1$  and  $MR_1$  (the demand and marginal revenue curves for the product that the firm faces in the domestic market); panel *b* shows  $D_2$  and  $MR_2$  (the demand and marginal revenue curves that the firm faces in the foreign market); and panel *c* shows  $D$  and  $MR$  (the total demand and marginal revenue curves for the product that the firm faces in both markets together).

The total market demand curve ( $D$ ) is obtained from the horizontal summation of the demand curves in the domestic market and in the foreign market (that is,  $D = \sum D_{1+2}$ ).

Note that up to  $Q = 60$ ,  $D = D_1$ .

Similarly, the total marginal revenue curve ( $MR$ ) is obtained from the horizontal summation of  $MR_1$  and  $MR_2$  (that is,  $MR = \sum MR_{1+2}$ ). Note also that up to  $Q = 30$ ,  $MR = MR_1$ .



**Figure 15-1 International Price Discrimination: Dumping**

The best level of output of the firm is 90 units of the product and is given by point  $E$  in panel  $c$ , at which  $MR = \sum MR_{1+2} = MC = Rs2$ . To maximize profits the firm should then sell 50 units of the product in the domestic market and the remaining 40 units of the product in the foreign market, so that  $MR_1 = MR_2 = MR = MC = Rs2$  (see, respectively, points  $E_1$ ,  $E_2$ , and  $E$  in the three panels of Figure 15-1).

For  $Q_1 = 50$ ,  $P_1 = Rs7$  on  $D_1$  in the domestic market.

For  $Q_2 = 40$ ,  $P_2 = Rs4$  on  $D_2$  in the foreign market.

Note that the price is higher in the domestic market with the more inelastic demand.

Thus, the firm generates total revenues of Rs350 in the domestic market and Rs160 in the

foreign market, for overall total revenue of Rs510 in both the markets together.

If the average total cost ( $ATC$ ) of the firm is Rs3 at the best level of output of 90 units, then the firm earns a profit of  $P_1 - ATC = Rs7 - Rs3 = Rs4$  per unit and Rs200 in total in the domestic market, and  $P_2 - ATC = Rs4 - Rs3 = Rs1$  per unit and Rs40 in total in the foreign market, for a total profit of Rs240 in both markets together.

In the absence of price discrimination, the firm would sell the best level of output of  $Q = 90$  at  $P = Rs5$  (see panel  $c$ ) and generate a total revenue of Rs450 (as compared to a  $TR = Rs510$  with dumping). With  $ATC = Rs3$  for  $Q = 90$ , the firm would earn a profit of  $P - ATC = Rs5 - Rs3 = Rs2$  per unit and Rs180 in total as compared to a profit of Rs240 with dumping.

Thus, given the best level of output and costs, the firm can increase its total revenue and profits significantly by practicing international price discrimination (dumping).

### **Algebraic Analysis of Dumping**

From Figure 15-1, we can determine that the demand and marginal revenue functions of the firm in each market are, respectively,

$$Q_1 = 120 - 10P_1 \quad \text{or} \quad P_1 = 12 - 0.1Q_1 \quad \text{and} \quad MR_1 = 12 - 0.2Q_1$$

$$Q_2 = 120 - 20P_2 \quad \text{or} \quad P_2 = 6 - 0.05Q_2 \quad \text{and} \quad MR_2 = 6 - 0.1Q_2$$

With price discrimination, the condition for profit maximization is

$$MR_1 = MR_2 = MR = MC$$

Setting  $MR_1 = MC$  and  $MR_2 = MC$ , we get

$$MR_1 = 12 - 0.2Q_1 = 2 = MC \quad \text{and} \quad MR_2 = 6 - 0.1Q_2 = 2 = MC$$

so that  $Q_1 = 50$  and  $Q_2 = 40$

The price that the firm should charge for the product in each market is then



$$P_1 = 12 - 0.1(50) = \text{Rs}7 \quad \text{and} \quad P_2 = 6 - 0.05(40) = \text{Rs}4$$

$$\text{so that } TR_1 = P_1 Q_1 = (\text{Rs}7)(50) = \text{Rs}350 \quad \text{and} \quad TR_2 = P_2 Q_2 = (\text{Rs}4)(40) = \text{Rs}160$$

If the firm's total cost function is

$$TC = 90 + 2(Q_1 + Q_2)$$

the total cost for 90 units of output is

$$TC = 90 + 2(50 + 40) = \text{Rs}270$$

and the total profits ( $\Omega$ ) of the firm are

$$\begin{aligned} \Omega &= TR_1 + TR_2 - TC \\ &= \text{Rs}350 + \text{Rs}160 - \text{Rs}270 \\ &= \text{Rs}240 \end{aligned}$$

### 15.a.2 FORMS OF DUMPING

There can be three forms of dumping:

1. **Persistent Dumping:** dumping resulting from international price discrimination (the form discussed above).
2. **Predatory Dumping:** the *temporary* sale of a commodity at below cost or at a lower price abroad in order to drive foreign producers out of business, after which prices are raised abroad to take advantage of the newly acquired monopoly power.
3. **Sporadic Dumping:** the *occasional* sale of the commodity at below cost or at a lower price abroad than domestically in order to unload an unforeseen and temporary surplus of a commodity without having to reduce domestic prices.

### 15.a.3 TRADE RESTRICTIONS TO COUNTERACT DUMPING

Governments often impose trade restrictions to counteract dumping for protecting domestic industries. Trade restrictions to counteract predatory dumping are justified and

allowed to protect domestic industries from unfair competition from abroad. These restrictions usually take the form of antidumping duties to offset price differentials. However, it is often difficult to determine the type of dumping and domestic producers invariably demand protection against any form of dumping. In fact, the very threat of filing a dumping complaint discourages imports and leads to higher domestic production and profits. This is referred to as the "harassment thesis". Persistent and sporadic dumping benefit domestic consumers (by allowing them to purchase the commodity at a lower price) and these benefits may exceed the possible losses of domestic producers. In the past decade, Japan was accused of dumping steel, television sets, and computer chips in the United States, and Europeans of dumping cars, steel, and other products. Most industrial nations (especially those of the European Union), have a tendency of persistently dumping surplus agricultural commodities arising from their farm support programs. Export subsidies are also a form of dumping which, though illegal by international agreement, often occur in disguised forms. When dumping is proved, the violating firm usually chooses to raise its prices (as Japanese TV exporters did in 1977) rather than face antidumping duties. See Kodak Antidumping Disputes with Fuji

**Kodak Antidumping Disputes with Fuji**

In August 1993, the Eastman Kodak Company of Rochester, New York, charged that the Fuji Photo Film Company of Japan had violated U.S. federal law by selling paper and chemicals for color-film processing in the United States at less than one-third of the price that it charges in Japan and that this had materially injured Kodak. Specifically, Kodak charged that Fuji used its excessive profits from its near monopoly in photographic supplies in Japan to dump photographic supplies in the United States in order to undermine the competitive position of Kodak and other U.S. competitors. By 1993, Fuji had captured more than 10 percent of the U.S. photographic supply market, mostly from Kodak. Kodak asked the U.S. Commerce Department to impose stiff tariffs on Fuji's imports of these products into the United States. In August 1994, Fuji signed a five-year agreement under which it agreed to sell color paper and chemical components at or above a fair price determined quarterly by the U.S. Department of Commerce from Fuji cost of

production figures in Japan and the Netherlands, where Fuji produces the photographic supplies exported to the United States. This "fair" price was about 50 percent higher than the pre-agreement price that Fuji charged in the United States. The immediate effect of the agreement was higher prices for photographic supplies for U.S. consumers.

In the face of continued loss of U.S. market share, Kodak again accused Fuji in 1995 of unfairly restricting its access to the Japanese market and again demanded the imposition of stiff tariffs on Fuji photographic exports to the United States. However, the World Trade Organization (the institution created in 1993 to regulate international trade and adjudicate trade disputes among its member nations) dismissed the case in 1997. Although Kodak retains nearly 70 percent of the U.S. photographic market compared to Fuji's 19 percent), it has been steadily losing market share to Fuji over the past decade because of the latter's low-price policy. In the meantime, Fuji has spent over \$1 billion on new plants to produce photographic supplies in the United States, which makes Fuji a domestic supplier and, to a large extent, no longer subject to U.S. antidumping rules. Kodak, on the other hand, has gone through a deep restructuring that cuts its costs by \$1 billion by eliminating 20,000 jobs or about 20 percent of its worldwide labor force and shifting to higher-end products (such as the Advanced Photo System cameras, which offer easier loading, panoramic shots, and other features) in which Fuji hasn't launched a price war, providing opportunities for higher profits.

## **Section B: TRANSFER PRICING**

In this section we will discuss the meaning and importance of transfer pricing, and we will examine the rules for optimal transfer pricing when no external market for the transfer or intermediate product exists, when such a market exists and is perfectly competitive, and when it is imperfectly competitive.

### **15.b.1 MEANING AND NATURE OF TRANSFER PRICING**

The rapid rise of modern large-scale enterprises has been accompanied by decentralization and the establishment of semiautonomous profit centers. Decentralization and the establishment of semiautonomous profit centers gave rise to the need for transfer pricing, or the need to determine the price of intermediate products sold by one semiautonomous division of a large-scale enterprise and purchased by another semiautonomous division of the enterprise. For example, if a steel company owned its

own coal mine, the questions would arise as to how much coal the coal mine should sell to the parent steel company and how much to outsiders, and at what prices. Similarly, the parent steel company must determine how much coal to purchase from its own coal mine and how much from outsiders, and at what prices. These are some of the most complex and troublesome questions that arise in the operation of large-scale enterprises today.

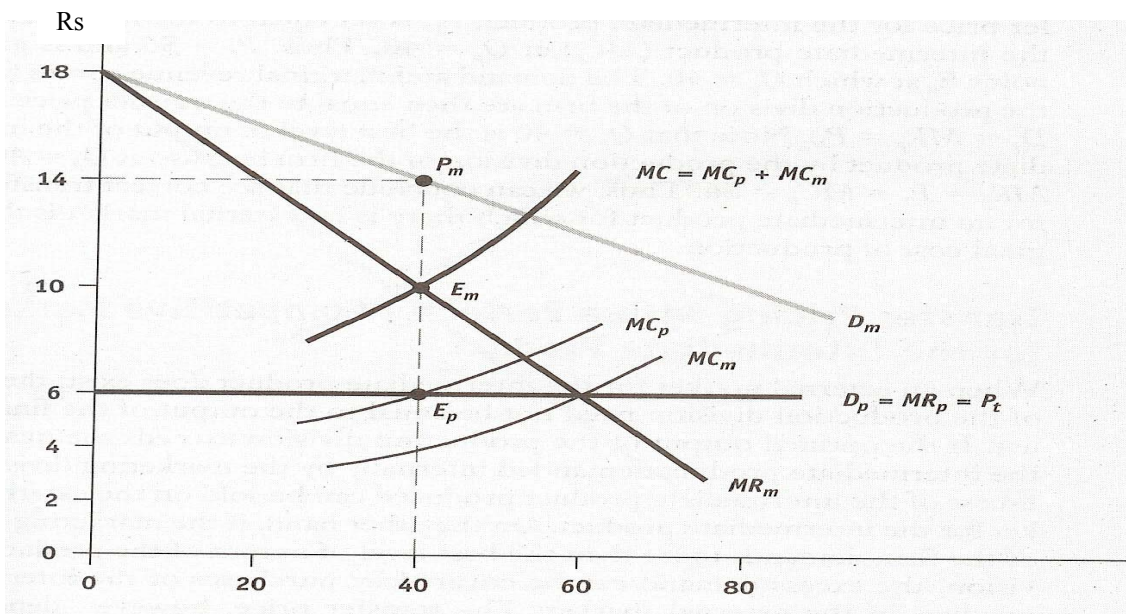
The transfer pricing is of crucial importance to the efficient operation of the individual divisions of the enterprise as well as to the enterprise as a whole. There are two reasons for this. *First*, the price paid by a division of the enterprise for intermediate products produced by another division affects the output of each division and, therefore, the output of the entire enterprise. If wrong transfer prices are set, the various divisions of the firm involved in the transaction, and the firm as a whole, will not produce the optimum or profit-maximizing level of output. *Second*, transfer prices affect the profitability of the divisions involved in the transfer of the intermediate products, and, as such, they serve as incentives and rewards for the efficient operation of the various divisions of the enterprise. Too low transfer prices artificially reduce the profitability of the producing division and artificially increase the profitability of the purchasing division, and these can undermine the morale of the managers, officers, and workers of the former since salary increases and bonuses, and sometimes even their jobs, depend on the profitability of the division.

We will examine how the appropriate transfer prices are determined in cases where an external market for the transfer or intermediate product does not exist, when it exists and is perfectly competitive, and when it exists and is imperfectly competitive. To simplify our discussion, we assume that the firm has two divisions, a production division

(indicated by the subscript  $p$ ) and a marketing division (indicated by the subscript  $m$ ). The production division sells the intermediate product to the marketing division, as well as to outsiders, if an outside market for the intermediate product exists. The marketing division purchases the intermediate product from the production division, completes the production process, and markets the final product for the firm. Also, to simplify the presentation, we will assume that 1 unit of the transfer or intermediate product is required to produce each unit of the final product sold by the marketing division.

### 15.b.2 TRANSFER PRICING WITH NO EXTERNAL MARKET FOR THE INTERMEDIATE PRODUCT

When there is no external demand for the intermediate product, the production division can sell the intermediate product only internally to the marketing division of the firm, and the marketing division can purchase the intermediate product only from the production division of the firm. Since 1 unit of the intermediate product is used to produce each *unit* of the final product, the outputs of the intermediate product and of the final product are equal. Figure 15-2 shows how the transfer price of the intermediate product is determined when there is no external market for the intermediate product.



### **Figure 15-2 Transfer Pricing With No External Market for the Intermediate Product**

In Figure 15-2,  $MC_p$  and  $MC_m$  are the marginal cost curves of the production and marketing divisions of the firm, respectively, while  $MC$  is the vertical summation of  $MC_p$  and  $MC_m$ , and it represents the total marginal cost curve for the firm as a whole. The Figure also shows the external demand curve for the final product sold by the marketing division,  $D_m$ , and its corresponding marginal revenue curve,  $MR_m$ .

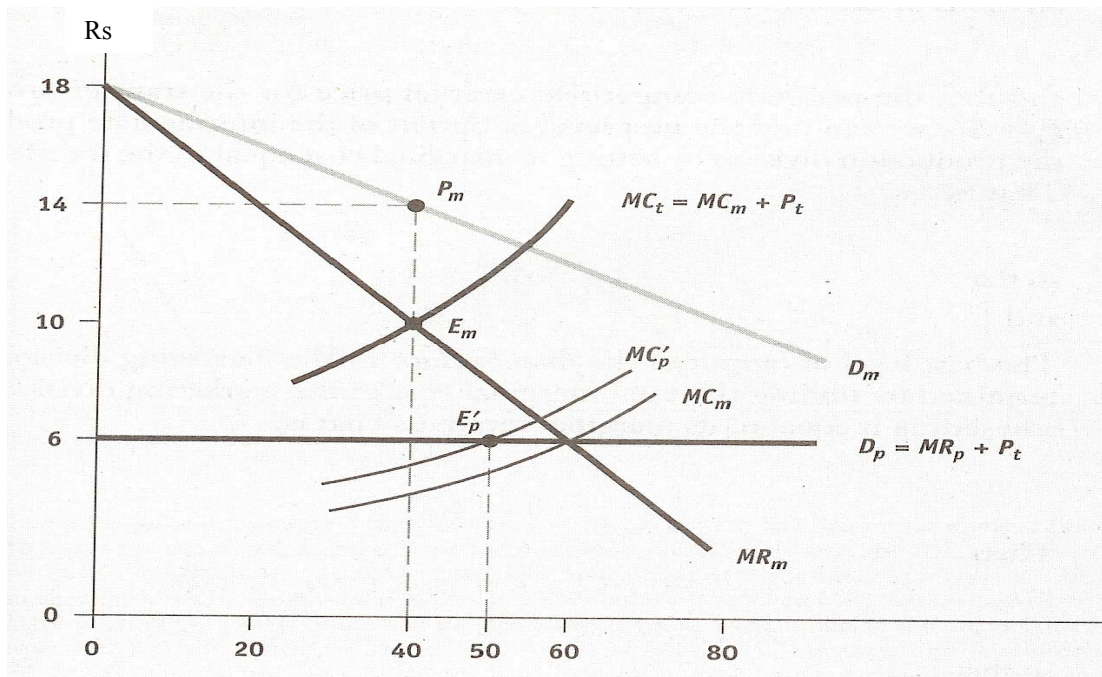
The firm's best or profit-maximizing level of output for the final product is 40 units and is given by point  $E_m$  at which  $MR_m = MC$ . Therefore,  $P_m = \text{Rs}14$ .

Since 40 units of the intermediate product are required (*i.e.*, are demanded by the marketing division of the firm in order to produce the best level of 40 units of the final product), the transfer price for the intermediate product,  $P_t$  is set equal to the marginal cost of the intermediate product ( $MC_p$ ) at  $Q_p = 40$ . Thus,  $P_t = \text{Rs}6$  and is given by point  $E_p$  at which  $Q_p = 40$ . The demand and marginal revenue curves faced by the production division of the firm are then equal to the transfer price (that is,  $D_p = MR_p = P_t$ ). Note that  $Q_p = 40$  is the best level of output of the intermediate product by the production division of the firm because at  $Q_p = 40$ ,  $D_p = MR_p = P_t = MC_p = \text{Rs}6$ . Thus, we can conclude that the correct *transfer price for an intermediate product for which there is no external market is the marginal cost of production*.

### **15.b.3 TRANSFER PRICING WITH A PERFECTLY COMPETITIVE MARKET FOR THE INTERMEDIATE PRODUCT**

When the external market for the intermediate product does exist, the output of the production division need not be equal to the output of the final product. If the optimal

output of the production division exceeds the quantity of the intermediate product demanded internally by the marketing division, the excess of the intermediate product produced can be sold on the external market for the intermediate product. On the other hand, if the marketing division of the firm demands more than the best level of output of the production division, the excess demand can be covered by purchases of the intermediate product in the external market. The transfer price, however, depends on whether or not the external market for the intermediate product is perfectly competitive. The determination of the transfer price when the external market is perfectly competitive is shown in Figure 15-3.



**Figure 15-3 Transfer Pricing With a Perfectly Competitive Market for the Intermediate Product**

Figure 15-3 is identical to Figure 15-2, except that the marginal cost curve of the production division  $MC_p$  is lower than in Figure 15-2. The production division then produces more of the intermediate product than the marketing division demands and sells

the excess in the perfectly competitive external market for the intermediate product. With a perfectly competitive market for the intermediate product, the production division faces horizontal demand curve  $D_p$  for its output at the given market price  $P_t$  for the intermediate product. Since  $D_p$  is horizontal,  $D_p = MR_p = P_t$  (see the Figure). The best or profit-maximizing level of output of the intermediate product by the production division of the firm is 50 units and is given by point  $E$ ; at which  $D_p = MR_p = P_t = MC = \text{Rs}6$ .

Since the marketing division can purchase the intermediate product either internally or externally at  $P_t = \text{Rs}6$ , its total marginal cost curve is given by  $MC_t$ , which is the vertical sum of its own marginal cost of assembling and marketing the product ( $MC_m$ ) and the price of the intermediate product ( $P_t$ ). Thus, the best level of output of the *final* product by the marketing division of the firm is 40 units (the same as when there was no external market for the intermediate product) and is given by point  $E_m$  at which  $MR_m = MC_t$ . At  $Q_m = 40$ ,  $P_m = \text{Rs}14$  (the same as in Figure 15-2).

Thus, the production division of the firm produces 50 units of the intermediate product and sells 40 units internally to the marketing division at  $P_t = \text{Rs}6$  and sells the remaining 10 units in the external market, also at  $P_t = \text{Rs}6$ . The marketing division will not pay more than the external price of  $\text{Rs}6$  per unit for the intermediate product, while the production division will not sell the intermediate product internally to the marketing division for less than  $\text{Rs}6$  per unit. Thus, ***when a perfectly competitive external market for the intermediate product exists, the transfer price for intracompany sales of the intermediate product is given by the external competitive price for the intermediate product.***

The analysis shown graphically in Figure 15-3 can also be seen algebraically. The



demand and marginal revenue curves for the final product faced by the marketing division in Figure 15-3 can be represented algebraically as

$$Q_m = 180 - 10P_m \quad \text{or} \quad P_m = 18 - 0.1Q_m$$

And  $MR_m = 18 - 0.2 Q_m$

Assuming that the marginal cost functions of the production and marketing divisions of the firm are, respectively,

$$MC_p = 1 + 0.1 Q_p \quad \text{and} \quad MC_m = 0.1 Q_m$$

and that the perfectly competitive external price for the transfer product is  $P_t = \text{Rs}6$ , we can find the best level of output of the intermediate product for the production division by setting its marginal cost equal to the transfer price.

That is,  $MC_p = 1 + 0.1 Q_p = \text{Rs}6 = P_t$

so that  $Q_p = 50$

The best level of output of the *final product* for the marketing division is determined by finding the total marginal cost of the marketing division ( $MC_t$  and setting it equal to its marginal revenue). That is,

$$MC_t = MC_m + P_t$$

Then

$$MC_t = 0.1 Q_m + 6 = 18 - 0.2 Q_m = MR_m$$

so that  $Q_m = 40$

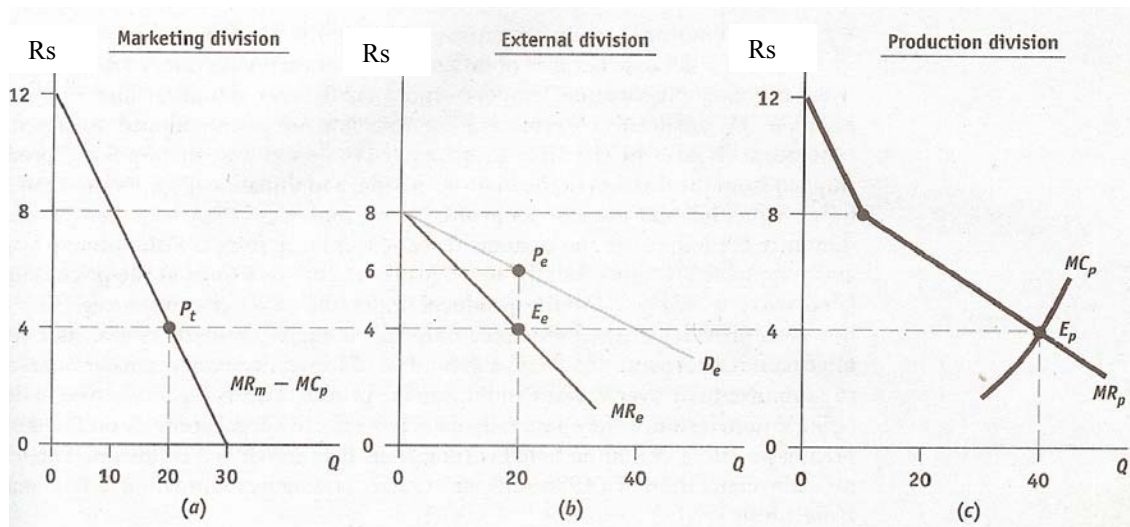
and  $P_m = 18 - 0.1(40) = \text{Rs}14$

Thus, the production division sells 40 units of the intermediate product internally to the marketing division and the remaining 10 units on the external competitive market, all at  $P_t = \text{Rs}6$ . The marketing division uses the 40 units of the intermediate product purchased

internally from the production division at  $P_t = \text{Rs}6$  to produce 40 units of the final product to be sold on the external market at  $P_m = \text{Rs}14$ . These are the same results obtained graphically in Figure 15-3, except that we have assumed linear rather than curvilinear  $MC$  functions in the above algebraic solution.

### 15.b.4 TRANSFER PRICING WITH AN IMPERFECTLY COMPETITIVE MARKET FOR THE INTERMEDIATE PRODUCT

When an imperfectly competitive external market for the intermediate product exists, the transfer price of the intermediate product for intra-firm sales will differ from the price of the intermediate product in the imperfectly competitive external market. The determination of the internal and external prices of the intermediate product by the production division of the firm becomes one of third-degree price discrimination. This is shown in Figure 15-4.



**Figure 15-4 Transfer Pricing With an Imperfectly Competitive Market for the Intermediate Product**

Panel *a* of Figure 15-4 shows the marginal revenue of the marketing division of the firm (that is,  $MR_m$ ) after subtracting from it the transfer price of the intermediate product ( $P_t$ ), which is equal to the marginal cost of the production division ( $MC_p$ ). Thus, the  $MR_m -$

$MC_p$  curve in the left panel shows the net marginal revenue of the marketing division.

Panel *b* presents the negatively sloped demand curve for the intermediate product of the firm in the imperfectly competitive external market ( $D_e$ ) and its corresponding marginal revenue curve ( $MR_e$ ). In panel *c*, the  $MR_p$  curve is the total revenue curve of the production division of the firm, which is equal to the horizontal summation of the net marginal revenue curves for internal sales to the marketing division of the firm and to the external market (that is,  $MR_p = MR_m - MC_p + MR_e$ ). The  $MC_p$  curve, on the other hand, shows the marginal cost to the production division of the firm of producing the intermediate product for internal sales to the marketing division of the firm and to the external market.

The best level of output of the intermediate product by the production division of the firm is 40 units and is given by point  $E_p$ , at which  $MR_p = MC_p$  in panel *c*. The optimal distribution of the 40 units of the intermediate product produced by the production division of the firm is 20 units internally to the marketing division of the firm (given by point  $P_i$  in panel *a*) and 20 units to the external market (given by point  $E_e$  in panel *b*), so that  $MR_m - MC_p = MR_e = MR_p = MC_p = \text{Rs}4$ . Thus, the production division of the firm operates as the monopolist seller of the intermediate product in the segmented internal and external markets for the intermediate product. Setting the internal transfer price at  $P_i = MC_p = \text{Rs}4$  ensures that the marketing division of the firm (in panel *a*) demands 20 units of the intermediate product, which leads to profit maximization for the marketing division and for the firm as a whole. With optimal sales of 20 units of the intermediate product in the external market (given by point  $E_e$  in panel *b*), the market-clearing price for the intermediate product is  $P_e = \text{Rs}6$ .

### **15.c SELF- ASSESSMENT QUESTIONS**

1. What do you understand by dumping? What are different forms of dumping?
2. Answer briefly the following:
3. Is persistent dumping good or bad for the receiving country?
4. Against what type of dumping would the nation want to protect itself? Why?
5. What do you understand by transfer pricing? Why is it main concern for modern large-scale enterprise?
6. How is the transfer price of an intermediate product determined when there is no external market for the intermediate product?
7. How is the transfer price of an intermediate product determined when there is a perfectly competitive external market for the intermediate product?
8. How is the transfer price of an intermediate product determined when there is an imperfectly competitive external market for the intermediate product?

### **15.d SUGGESTED READINGS**

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Subject: **Economic Analysis**

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Course Code: **MC-104**

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Lesson: **16**

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## **BUSINESS CYCLES**

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**OBJECTIVE:** In a free market economy, economic condition rarely remains steady. There are periods of flourishing activity leading to growth in income and employment. There are also periods of recession which lead to decline in output and employment. Generally periods of prosperity and recession alternate in some cyclical pattern. Such movements observed over a period of time are referred to as business cycles. The business cycles are caused either by aggregate demand or aggregate supply or a combination of both.

The objective of this chapter is to understand the following issues:

- Factors affecting the business cycle.
- The process of booms and recession.
- The turning points.
- The factors causing turn in business conditions
- The policy instruments to regulate business cycle.

### **Meaning of Business Cycles**

Different economists have given different definitions of the concept and nature of business cycles. These definitions show the various dimensions to look at the phenomenon of the business cycle. An illustrative definition by the prominent economist Keynes is "a business cycle consists of expansions occurring at about the same time in many economic activities followed by similarly general recession. Contraction and revivals which merge with the expansion phase of the next cycle; this sequence of change is occurring but not periodic".

The available time series of important economic aggregates such as national

income, employment, investment and prices of an economy show a systemic pattern of cyclical fluctuations. The business cycle is distinct from the long term secular trend as well as short terms seasonal variations.

The main features of business cycle may be identified as follows:

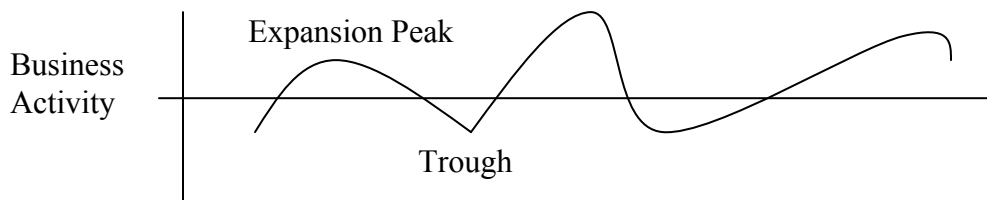
- major economic variables such as GNP, inflation, rate of interest and employment move up and down more or less simultaneously over a period of time;
- the cycles are repeated over time, but not in a regular pattern;
- the cycles take eight to 10 years to complete;
- Exact prediction or estimation of various phases is not possible. Only rough estimate is possible.

### Phases of Business Cycle

All the business cycles generally have some common characteristics in terms of phases of the cycle. Generally, there are four phases of a business cycle. These phases are: **expansion**, **peak**, **recession** and **trough**. Expansion and recession are really the two important phases; peak and trough are in fact the turning points of a business cycle.

**Expansion** is characterized by high level of economic activity and is also referred to as continuous upward movement. This comes to an end and passes into the recession phase, at the upper turning point or peak, During recession, production, employment, investment, prices, profit, wages, interest rates etc.; show a continuous downward movement till the recession phase gives way to the expansion phase at the lower turning point or trough. Figllre-16.1 provides a graphic picture of a business cycle.

Figllre-16.1



## **Phase of Business Cycle**

The **peak** of a business cycle indicates the point of high degree of capacity utilization and/or other supply constraints. The increase in demand beyond this point will tend to put more pressures on prices and wage than increase in output and employment. On balance, there are conditions of general profitability in business. This period is relatively short.

**Recession** is the most difficult period for a business manager. It is the result of continuous interaction between number macro-economic forces which bring about sustained fall in the level of aggregate economic activity. Falling demand creates a situation of over capacity leading to the intense competition and churning of the existing businesses. Inventory levels go up and prices take a beating. Most of the relatively inefficient firms are weeded out of the scene.

**Trough** and **Depression** occurs if the recession is not arrested, it tends to degenerate into a trough and further into depression or slump. Trough is a situation of low economic activity at which the economy is believed to be at the bottom. If the trough *or* the bottom continues for abnormally long period, it is called depression. At this level, consumers demand is low, surplus capacity is maximum, output, price, employment wage, profit and rate of interest are at a low level. The great depression of 1929 lasted for about a decade. Similarly the slump of the 1980s prolonged over a number of years.

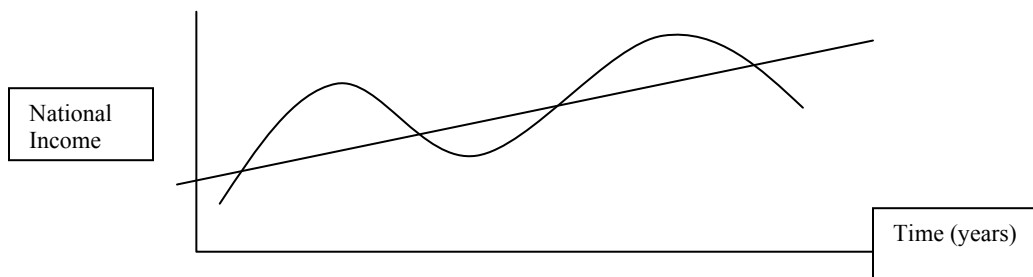
Trough or depression ultimately gives way to **Recovery and Expansion** phase of business cycle. In the recovery period, pessimistic expectations turn into hesitatingly optimistic expectations. Accordingly, output is expanded. Once the consumers start purchasing expanded (additional) output, businessmen are encouraged to make additional investment. This lends to the multiplier process creating more demand in the system. Slowly, hesitations replaced by growing confidence into the future prospects. This results in increase in production, profit, investment, price and other variables. The expansion reaches its potential and it is the time of downward trend in a business cycle once again. The process keeps on repeating in this way.

Schumpeter, the well known economist has given a slightly different description of the phases of the business cycle. He has defined various phases of the cycle in terms of



fluctuations in business activity reflected as deviation in national income around an equilibrium or trend level. Four phases of the cycle defined by Schumpeter are: prosperity, recession, depression and recovery. He divides a business cycle into two parts- the upper half and the lower half. The upper half business cycle is above the trend line of national income. It is the phases namely prosperity and recession. The lower half of the cycle below the trend line is similarly bifurcated into depression and recovery. The Schumpeter's approach is depicted in

Figure 16.2



It is difficult to make generalization about the length or duration of a business cycle. The American experience indicates that major business cycles have had durations on an average of a little over eight years. During 1795 to 1993, there were seventeen cycles of an average duration of 8.35 years.

### **Business Cycle Theories**

Over the years economists have been debating about the sources of business fluctuations. Unfortunately, there is no consensus so far. There is no end to various explanations. However, different sources can generally be classified into two broad categories exogenous and endogenous.

Economists use the term "exogenous" to refer to the process operating from outside the system. The proponents of exogenous theories assert that the factors behind the business cycle are inherently the external shocks such as wars, elections, and supply shocks in agricultural output/oil, migration, discoveries of new resources; and break through in scientific discoveries and technological innovations. The examples cited in this case include the recession in mid-seventies and early eighties caused by oil supply

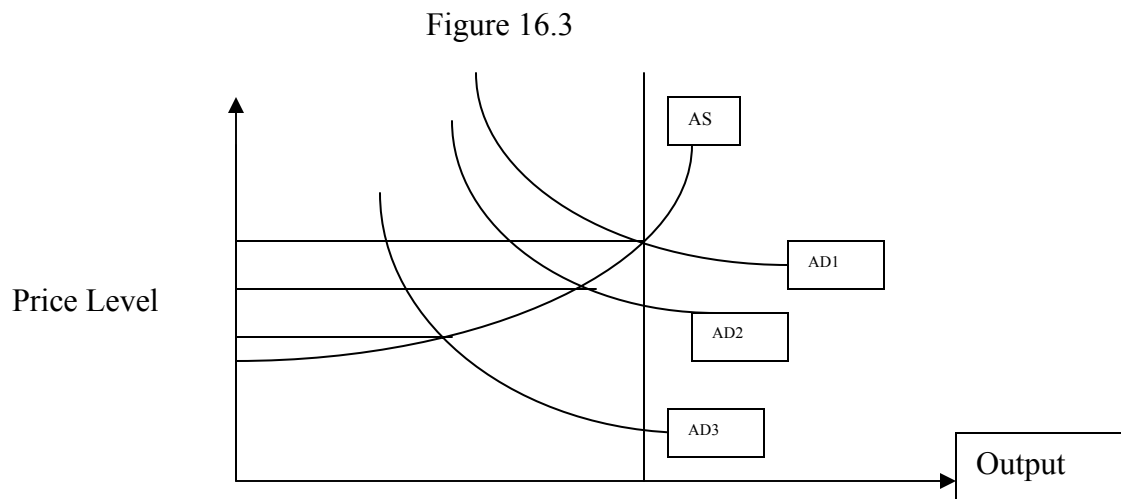
shocks. Similarly, the long economic boom of the 1998 was fuelled by an investment upsurge in the wake of expected efficiency gains by fundamental developments in information technology. The major limitation of external shock theories is its inability to explain the almost regular nature of business cycles. In other words, it is somewhat difficult to prove that external shocks occur in a regular manner over of the period of time.

The endogenous theories, on the other hand try to explain the process of business cycle from within the economic system itself. In this approach, expansion generates recession and vice-versa in a sustained manner over the period of time.

Some of the important theories ore discussed below:

### 1. Demand Induced Business Cycles

One important source of business fluctuations is the swings in aggregate demand. The shift in demand could be caused by a sudden rise or fall in consumption expenditure, shift in government expenditure and fluctuations in exports and imports. Private investment is the most volatile component of aggregate demand. The private investment is primarily influenced by the future expectations and rate of interest. The national income is affected through the changes in these constituents. Figure 16.3 depicts a typical cycle in which shift in aggregate demand affect the equilibrium income level.



In figure-16.3  $E_1$  is the point of initial equilibrium. The corresponding level of output is  $Q_1$  and price level  $P_1$ . Suppose an enhanced spending by the government. on

defence and/or infrastructure shift the aggregate demand curve  $AD_1$  to shift upward to  $AD_2$ . Given the supply curve (AS) in our example, the output is increased at  $Q_2$  and price level gone up to  $P_2$ .

Similarly, suppose due to increased uncertainty in economic system, the consumer decides to spend less on consumption and private investment also comes down in this situation. The aggregate demand curve will move leftward to  $AD_1$ . The corresponding output will be  $Q_1$  and price level  $P_1$ . Business cycle fluctuations in output, employment and other macro variables are often caused by shift in aggregate demand.

### **The Monetary Approach**

Monetary theories attribute business fluctuations to the expansion and contraction to money and credit. A systematic thinking in this direction was initiated by Hawtrey, who believed that business cycle could not propel itself in the absence of elastic money supply. He believed that business cycle is essentially a monetary phenomenon triggered by variations in money supply.

The postulate of general monetary theory is explained here. Suppose the national economy variables are in initial state of equilibrium. Aggregate demand equal aggregate expenditure and money holding of the household and the business sectors are at the desired level. The supply of bank credit is just sufficient to meet the demand of it and therefore, banks have no incentive to change the supply of credit. The balance of payment is also in equilibrium. Now, if the money supply is increased in the economic system, the equilibrium is disturbed. Availability of more than desired level of money prompts the households and businesses to increase their spending. The output will increase in response to increase in demand. Expanding demand leads general price level to go up in sympathy, which in turn widens the profit margin gap inducing the business sector to produce even more.

The expansion process will tend to slacken with the resources getting scarcer and expensive. Rising rate of interest forces the business sector to go slow in making additional investment in plants and machinery. The increase in rate of interest is basically a manifestation of high demand for credit, which pushes the credit deposit ratio of banks to an unsustainably high level endangering their liquidity position. The banks are

completed to restrict further growth in credit, setting in the process of contraction. The demand for money is reduced and bank credit is being repaid. This causes reduction in money supply lowering income and output. As cash balance and credit deposit ratios of banks get comfortable banks again start issuing fresh credit and set the stage for the next round of revival. This process keeps on repeating and business cycle continues.

The monetary theory was further refined by Hayek, Machlup and Friedman using more contemporary approach providing it the new respectability.

### **The Multiplier-Accelerator Mechanism**

This theory is significant improvement in understanding and explaining the occurrence of business cycle. The investment explains the relationship between investment and its manifold impact on the equilibrium level of income. Similarly, the accelerator principle highlights the effect of increase income on investment. This principle says that the rate of investment in an economy depends primarily on the rate of change of income. Obviously, high growth in national income will induce more investment to take place. This theory combines multiplier-accelerator to explain the business cycle process.

Given the level of technology, capital stock (K) required to produce output (Y) will be:

$$K = \alpha Y \quad \text{----- (i)}$$

Equation (1) represents capital - output ratio, which means; the number of units of capital required to produce one unit of output. It is also called accelerator coefficient relating changes in output to consequential changes in capital. In other words,

$$\Delta K = \alpha, \Delta Y \quad \text{where } \Delta \rightarrow \text{represent change}$$

and since  $\Delta K$  is investment (I), we can write

$$I = \alpha \cdot \Delta Y \quad \text{-----(ii)}$$

Equation (ii) is acceleration relationship in the sense that a change in Y will lead to a change in capital stock. Thus, if  $\Delta Y = 1000$  and  $\alpha = 5$ , the investment of 5000 will be required to satisfy the given relationship in the equation (ii). The accelerator principle

itself hints that rises and falls in aggregate demand or output produces corresponding changes in investment. And changes in investment given the multiplier relationship generate manifold changes in the level of output. In summary, it implies that mutually reinforcing combined effect of multiplier and accelerator work in both the direction. The outcome is wide fluctuations in an economy periodically.

### **Business Cycles and Stabilization Policies**

As discussed, the business cycle is caused both by the demand and supply shocks. However, relative contribution of specific factors varies in different business cycles.

The stabilization policies are expected to play a significant role in moderating the business cycles. The inflation which occurs during the boom period, in the long run, is invariably associated with the growth in money supply. The long-run unemployment, which coincides with the recession, similarly is due to retrenchment of workers in the wake of reducing demand, and mis-match between required skills and their availability. The reason behind both the problems is rigidities in the labour market. In the long-run, inflation and unemployment are unrelated issues, but in the short-run, there is a definite trade-off between them. Obviously, fiscal and monetary policies can be put to use to ease out the fluctuations in the economic conditions ranging between inflation and unemployment. The exact policy mix depends on a number of underlying factors, but it will be sufficient to say there, that during inflation the policy mix can attempt to contain aggregate demand through various policy instruments. Instruments discussed in detail in a separate chapter on monetary and fiscal policy. Similarly, during recession the policy tools are geared to expand the aggregate demand.

The effectiveness of policy mix is handicapped due to the following limitations:

- a. Inaccurate estimates and forecasts of economic events;
- b. Unstable policy multipliers;
- c. Presence of various lags;
- d. Conflicting priorities; and
- e. Political cost of policies.

Moreover, with the growing integration of the world economy and the floating exchange rate system, the rate of fiscal policy is undermined, while that of the monetary policy in regulating the business cycles has enhanced.

## **Conclusion**

The wide fluctuations in the economic activities are inherent in a free market economy. The business cycles occur due to the cumulative nature of the events in an economy. The fluctuation can at best be mitigated, provided exact genesis of them is recognized well in time, which is well-nigh impossible. Therefore, many a times, policy makers' are accused of magnifying the fluctuations instead of controlling them by the selection of wrong policy instrument or incorrect timing. The fluctuations in economic activity affect the fortunes of almost all economic aggregates in a substantial manner. Therefore, the studies of business cycle stabilization policies are of utmost importance.

## ***Self-Assessment Questions***

1. *What is meant by business cycles? Discuss its objectives? What are the instruments of business cycles?*
2. *Define business cycles. Discuss the role of business cycles during inflation and deflation.*
3. *What are the limitations of business cycles? What are the factors that determine the effectiveness of business cycles?*

## ***Suggested readings***

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Subject: **Economic Analysis**

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Course Code: **MC-104**

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Lesson: **17**

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## **INFLATION**

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**OBJECTIVE:** Inflation occurs when the general level of prices is rising consistently. We calculate inflation by using price indices. The price indices are the weighted average of the prices of thousands of individual products and services. Inflation is as old as market economy. Generally, price level will go up if the aggregate demand exceeds the aggregate supply. Seen in this perspective mild inflation is regarded as healthy by most of the economists. The only point of dispute is that how much inflation is mild. In Japan inflation rate beyond 1-2 percent per annum is politically unacceptable, in USA the inflation rate of 2-3 percent is tolerable while the policy makers in India do not bother if inflation remains below 6-7 percent. The inflation affects all segments of society. The purchasing power of money is eroded and therefore, the affected people make efforts to get compensated, organizing themselves politically. One of the costs of inflation is that the compensation process gets politicized. If the affected groups are politically powerful, the whole economic system can get distorted as happened in South America in the 1980s, where inflation reached above 1000 percent per annum. Therefore, it becomes imperative to study and understand the process of inflation in a market economy.

### **Meaning of Inflation**

A price in a market economy is the exchange value of a unit of good or service expressed in terms of money. The price of one kg of wheat, suppose is Rs. 8. It means one can buy one kg of wheat for this amount. Similarly, if the medical fee of a heart surgeon is Rs. 50,000, a patient could get operated upon for Rs. 50,000. There are as many prices as the number of goods and services. All these individual prices form the general price level. The general price implies the average price of a unit of all goods and services. The general price can be obtained as a weighted average of the individual prices. The price indexes are constituted keeping in view of the various purposes. In India there are five price index series.

- GDP deflator
- Wholesale price Index
- Consumer price index for industrial workers
- Consumer price index for urban non-manual employees
- Consumer price index for agricultural workers.

### **GDP Deflator**

GDP (Gross Domestic Product) deflator *refers* to the index of the average price of all the goods and services produced in the economy. It is computed as the ratio of the nominal GDP in a given year to the real GDP of that year.

### **Wholesale Price Index**

The wholesale price index is the index of the average wholesale price of the commodities produced and transacted in the economy. While constructing this, the level or stage of wholesale transaction is first identified for collecting price statistics. The weights are assigned on the basis of the relative value of wholesale transactions in various products in the economy. The WPI is generally used as a measure of inflation rate in India for various purposes.

### **Consumer Price Indices**

A consumer price index is the index of the average retail price of the goods and services contained in the consumption basket of the target group. The consumption basket depends upon the level of income/wealth, rural-urban living, education and habits etc. In India, we have three such indices: -

- CPI for industrial workers (CPI-IW)
- CPI for urban non-manual employees (CPI-UNME)
- CPI for agricultural labours (CPI-AL)

The Labour Bureau of the ministry of Labour Complies and publishes data on CPI-(IW) and CPI-AL. The CPI-UNME is maintained by the central statistical organization. Unlike WPI, which is prepared only at the all India level, CPI-AL is first prepared at the state level. The CPI-IW and CPI-UNME are prepared at the selected center's levels. The local indices are aggregated to prepare all India level indices.

### **Stages of Inflation**



The inflation exhibits different levels of severity. Generally, it is classified into three categories low inflation, galloping inflation and hyper inflation.

### **Low Inflation**

Low inflation is characterized by prices that rise slowly and predictably. Generally, this is single digit annual inflation rate. People do not feel concerned about the inflation rate, economic agents internalize the expected change in future price level and the surprise element is in almost absent.

### **Galloping Inflation**

When inflation rate shoots up to 50, 100 or even more percent per year, it is called the galloping inflation. In many Latin American countries, during 1970s and 80s, rate of inflation was between 100 to 600 percent per annum.

Once, galloping inflation become entrenched, serious economic distortions creeps in. The rate of inflation is incorporated separately in future contracts to protect the real value of earnings creating in-built mechanism of spiraling inflation. Financial markets are disturbed significantly. The people keep bare minimum amount of cash. Speculation becomes more rewarding the general investment, endangering the whole edifice of economic system.

### **Hyperinflation**

This is most serious and dangerous type of inflation. No economic system can survive, if suffering from this malice. This is basically a case of galloping inflation going out of control. The prices start rising by million or even trillion percent a year. The case of hyper inflation in Germany between 1920s and 30s was documented in great detail. From January 1922 to November 1923, the price index rose from 1 to 10,000,000,000.

Common features of hyperinflation are: real stock of money comes down significantly and velocity of circulation of money goes up much more than proportionately.

### **Anticipated vs. Unanticipated Inflation**

Modern economists make a distinction between inflation rate that is expected or unexpected. In fact, the economists believe that anticipated inflation will not affect the

normal functioning of the economy. But inflation can be anticipated, only if the rate is consistently low over the period of time and public has trust in the intentions and capability of the monetary authorities to keep it under control.

But in reality, the inflation is generally unanticipated. An unexpected jump in prices will benefit a few at the cost of large sections and society. A general rule of the distribution of gain of inflation in general and unanticipated inflation in particular is that, where future obligations are fixed in nominal term the creditors lose and the debtors gain.

### **The Economic Impacts of Inflation**

Monetary authorities are mandated to keep inflation under control. In popular perception, the index of economic performance is inversely proportional to the rise in inflation rate. The inflation is a serious economic evil. The reason is straightforward. During rising prices, all prices do not move in the same proportion. In other words, inflation disrupts the relative price structure and therefore, the allocative efficiency of the pricing mechanism.

Two major effects of inflation can be summarized as follows:

- A redistribution of income and wealth among different groups;
- Distortions in relative prices and outputs of different goods.

### **Impact on Income and Wealth Distribution**

Inflation affects the distribution of income and wealth basically because of differences in the assets and liabilities that people hold. For debtors, the sudden decline in the value of money is an unexpected windfall. But the gain of the debtors is exactly equal to the loss of the creditors. But if the inflation persists, over the period of time, people start incorporating the expected change in value of money into their contracts. Suppose, there is no inflation and the rate of interest is 4 percent. Suppose after initial inflationary pressures at a rate of 7 percent, the people come to believe that the rate of inflation in the next year will continue at the same rate i.e. 7 percent. In this case, the creditors will demand a nominal rate of interest at 11 percent. The *real* rate is only 4 percent, while remaining 7 percent is the hedge against inflation. The traditional understanding of adverse impact of inflation on orphan, widow is no longer valid. In fact, a basic rule is

there. Those having fixed contracts in nominal terms will be the loser. However, even farmers, daily wage earners and self-employed persons are more or less insulated from the adverse impact. Interestingly, even organized sector employees invariably have their wages indexed against inflation.

The major redistributive impact of inflation comes through its effect on the real value of people's wealth.

### **Impact on Economic Efficiency**

Inflation affects the real economy in two specific ways. One, it can harm economic efficiency. And it can also influence the aggregate output (GNP). The case of adverse impact on economic efficiency is straight forward. Inflation distorts relative price structure. Distortion in price structure emits confusing signals to the financial market with regard to allocation of resources into specific economic activity. The end result: Some sectors find difficulty in meeting the supply targets while many others might be creating excess capacities.

Similarly, inflation also distorts the use of money. The rule is simple. Higher the inflation, lower the amount of currency held by the persons. The inconvenience in holding less than desired money and increased visit to collect cash entails *real* loss to the economy.

Inflation also creates distortion in tax structure. The real value of specific taxes expressed in terms of rupee tends to decrease with the rise in price level. Income tax and corporation taxes also erode in value with the upward movement of prices.

### **Theory of Inflation**

As mentioned earlier, general price level is determined by the interaction of aggregate demand (AD) and aggregate supply (AS). Obviously, any movement in general price level can always be traced into either shift in AD or AS or a combination of both. The most important point still remains. What causes shift in AD and AS? Various economists have put forward different explanations to unravel the mystery of the phenomenon called inflation. Before we discuss the conceptual foundation of inflation, it will be pertinent to understand the concept of inertial inflation.

### **Inertial Inflation**

In a smoothly functioning market economy, a mild rate of inflation is regarded as somewhat necessary. Reason behind this perception is that the rise in price acts as an indicator of the growing demand, signaling producers to produce more in future. The policy makers, producers, workers and consumers come to believe that this rate of inflation will keep on going. Accordingly, they start incorporating this rate into their calculations. For examples, in India, during 1980s, the rate of inflation between 6 to 7 percent was an expected norm. As a consequence, the producers, workers and consumers in general added 7 percent inflation premium into their future contracts and calculations. Since, under normal circumstances, no one expects a change in this inflation rate, it is regarded as inertial inflation rate. The inertial inflation rate will change only under unforeseen events affecting AD and AS.

### **Demand-Pull Inflation**

Demand pull inflation occurs when the aggregate demand (AD) in the economy rises faster than the available output or aggregate supply (AS). The larger the magnitude of excess in demand over supply, the higher is the rate of inflation. The upward shift in aggregate demand may be caused either by the rise in consumption, investment government spending or net export. One important factor behind demand pull inflation is the rapid increase in money supply. The money supply increases when government resorts to deficit financing. Central bank can also increase the money supply through expansionary monetary policy to achieve desired objectives. Inflow of foreign currency also stimulates the money supply. The case of demand-pull inflation is shown in figure-1.

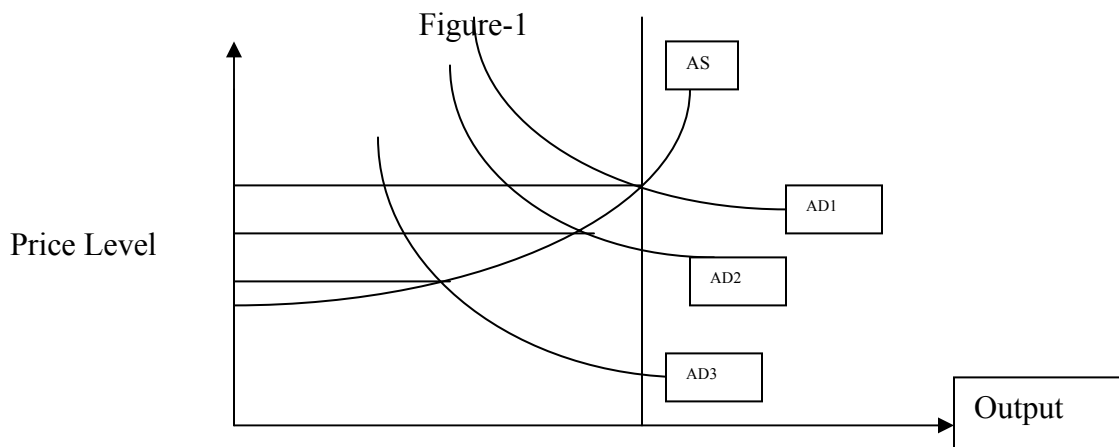


Figure-1 illustrates the case of demand-pull inflation in terms of aggregate demand and aggregate supply. Given the supply curve AS, the aggregate demand curve AD<sub>1</sub>, intersects it at point E<sub>1</sub>. Corresponding price level is P<sub>1</sub> and output level a Q<sub>1</sub>. Suppose, for some reason aggregate supply curve moves upward to AD<sub>2</sub>. The new point of equilibrium is E<sub>2</sub> with P<sub>2</sub> price level and Q<sub>2</sub> output. The point to note in this case is that the growth in demand has increased both the price level as well as the real output. The Q<sub>p</sub> curve represents the maximum potential output. The importance of Q<sub>p</sub> is that if the AD keeps on increasing, the output cannot go beyond this maximum limit and the impact of additional AD will be the increase in prices level only. In fact, the classical economists assumed the state of full employment and therefore, they were strongly against the monetary expansion because it would result in rise in price level without having any positive impact on output level.

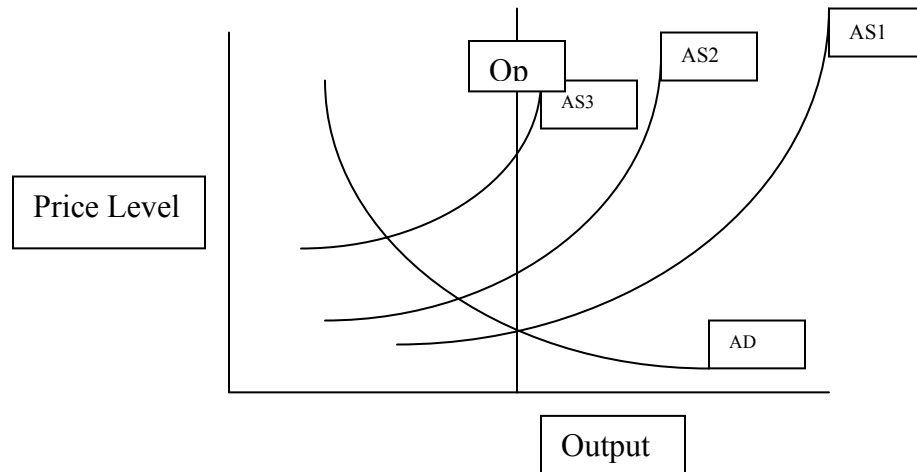
### **Cost-Push Inflation**

As the name suggests, in this case, price level is pushed by the rise in cost of production. In fact, historically, inflation was associated with the rise in price along with output. The relationship was so much entrenched in the mind of policy makers, that wherever, they felt the need to increase the output, they adopted demand enhancement fiscal and monetary policies. The end result would invariably be on the expected line. However, during late 1960s and early 1970, a strange phenomenon took place. The prices were rising but the output was not increasing. On investigation, it was revealed that it occurred because of the fact that unionized labour succeeded in getting wage rate far in excess of their productivity. The outcome was increase in cost and unsold stock compelled the producers to cut back the output and employment. Reduction in employment level further reduced the demand. In normal circumstances, increase in unemployment would have caused a downward pressure on wage rate, but since labour was unionized, wages remained sticky in downward direction. This is called the cost-push inflation.

Another form of cost-push inflation occurred when the oil-shock in early 1970s and 1980s took place. The sudden jump in universally used commodity like crude oil pushed the price up. In this case also, higher price forced the output to cut-down. The

cost push inflation is represented in figure-2.

Figure-2



In figure-2, initial equilibrium of the economy is established at point  $E_1$ , where aggregate demand curve AD and aggregate supply curve  $AS_1$  intersect. The output corresponding to  $E_1$  is  $Q_1$  and price level  $P_1$ . As show in the figure, if for some reasons, aggregate supply curve moves upward, the new equilibrium point is  $E_2$  reducing the output at  $Q_2$  and increasing the price level to  $P_2$ , This case is also called stagflation. This means, stagflation is the case when output is stagnating or decreasing while the prices are rising.

This situation is most difficult to handle as traditional fiscal and monetary policies are not of much help. The government needs to introduce competition in the labour market. Alternatively greater freedom in international trade also has a sobering effect on price level.

### **Expectations and Inflation**

The expectations play on important role in determination of the rate of inflation and the expectations come to be formed on the basis of past experiences. For example, if the prices are rising at a mild rate, the consumers, producers, workers and other market participants will incorporate low rate of inflation into their future contracts. Alternatively, in case of rapidly rising inflation rate, future contracts will be indexed at a much higher inflation rate. The case of Latin American countries during 1980s can be cited in this

regard, where nominal interest rate went up to 200-300 percent per annum in anticipation of very high inflation rate.

In fact, the concept of inertial rate of inflation plays a crucial role in this context. As the market participant extrapolate past behaviour to continue in future, expectation gather it's their own momentum. It becomes very difficult for the policy makers to change the perception of the economic agent in the short term. The result is that, even if rate of inflation is reduced, the market takes it as an aberration and future contract continue to be indexed at the inertial rate of inflation. The markets take a note of the changed rate of inflation, only if it changes substantially from the inertial inflation rate for sufficiently long time period. In USA, to control the spiraling inflation, the government in 1982 had to hike the rate of interest up to 22 percent to convince the market about its resolve to contain inflation. In India, also during 1995-97, the rate of interest was raised up to 20 percent to dampen the inertial inflation rate running much higher above the politically acceptable level.

### **Tools of Inflation Control**

The control of inflation is of critical importance for the successful management of the macro-economy. The tools, available in the hands of government and central banks, generally work indirectly via change in aggregate demand and aggregate supply. The policy kit of a government includes standard, traditional as well as innovative instruments to address the problem of inflation. The policy options a Government uses to contain inflation are discussed as under:

### **Restrictive Monetary Policy**

The monetary policy consists of change in supply and cost of money in the economy by the central bank. The money supply can be reduced by increase in Cash Reserve Ratio (CRR) which will leave less discretionary funds with the banks for lending purpose. Similarly, open market operation (OMO), in effect means, sale and purchase of government securities by the central banks. In case of restrictive monetary policy, the central bank resort to sale of securities at higher discount rate. This reduces the supply of money with the banks and general public. The central bank can also hike the bank rate

(the rate at which it lend money to banks) and thereby increasing the cost of funds in order to dampen the growing demand of credit.

The success of monetary policy depends greatly on the sensitivity of consumption and investment to interest rates and profitability conditions in business.

### **Income Policy**

This is a direct measure, where government controls the wage rate, interest rate and profit rate by way of direct instruction to this effect. However, in a modern market economy with external linkage, this policy has lost its effectiveness.

### **Restrictive Fiscal Policy**

A restrictive fiscal policy implies the efforts of the government to reduce government expenditure and increase the tax rates to appropriate the purchase power from the hands of public. The expenditure reduction directly affects the aggregate demand. The tax hike works through reduction of disposable income. Generally, control of inflation through fiscal policy is not recommended. The reason being, it is contractionary in nature and therefore, income level falls and unemployment increases with the fall in inflation. Moreover, it interferes in the function of free market economy, leading to unnecessary inefficiency.

### **Conclusion**

The government can control inflation, but it is not without a cost. The most delicate task to strike a balance between inflation and output lost that accompany the lower price level.

## ***Self-Assessment Questions***

4. *What is meant by inflation? Discuss its objectives? What are the instruments of inflation?*
5. *Defined inflation. Discuss the role of inflation during inflation and deflation.*
6. *What are the limitations of inflation? What are the factors that determine the effectiveness of inflation?*



***Suggested readings***

*Shapiro, Edward, Macroeconomic Analysis, Galgotia Publications, New Delhi.*

*Diulio Eugene, Macroeconomic, Tata McGraw Hill Publishing Company Ltd., New Delhi.*

Subject: **Economic Analysis**  
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Lesson: **18**

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## **National Income**

### Learning Objectives

*After learning this lesson, the students will be able to understand the concept of national income, its components, measurement, difficulties and significance.*

### Structure

- 18.1. Introduction
- 18.2. Measures of aggregate income
- 18.3. Approaches to measurement of national income
- 18.4. Difficulties in measurement of national income
- 18.5. Problems of measurement in a developing economy
- 18.6. Importance of national income analysis
- 18.7. Self-test questions
- 18.8. Suggested readings

#### 18.1. Introduction

Macroeconomics is concerned with the determination of the Economy's total output, the price level, the level of employment, interest rates and other variables. A necessary step in understanding how these variables are determined is "national income accounting".

The national income accounts give us regular estimates of GNP- the basic measure of the economy's performance in producing goods and services.

National income is the most comprehensive measure of the level of the aggregate economic activity in an Economy. It is the total income of a nation as against the income of an individual but the term national income is not as simple and self-explanatory as the concept of individual income may be. For example, not all the income received by individuals during a given period can be included in the national income, similarly not all the income that is generated in the process of production in an economy during a given period is received by the individuals in the economy.

To begin with, one may define national income as the **aggregate of money value of the annual flow of final goods and services in the national economy during a given period.**

According to Paul Studenski, National income is both a flow of goods and services and a flow of money incomes. It is therefore called national product as often as national income. The flow of national income begins when production units combine capital and labour and turn out goods and services. We call this Gross National Product (GNP), it is the value of all final goods and services produced by domestically owned factors of production within a given period. It includes the value of goods produced such as houses and food grains and the value of services such as broker's services and economist's lectures. The output of each of these is valued at its market price and the values are

added together to give GNP. GNP accounts for the Indian economy since 1951 are available on a systematic basis.

At the same time, the production units which produce goods and services distribute money incomes to all who help in production in the form of wages, rent, interest and profit- we call this as Gross National Income. GNI is the sum of the money incomes derived from activities involving current production in an economy in a given time period.

It may be noted from above that

- National income is an aggregative value concept: it makes use of the value determined by the measuring rod of money as the common denominator for the purpose of aggregating the diverse output resulting from different types of economic activities.
- National income is a flow concept: it represents a given amount of aggregate production per unit of time, conventionally represented by one year. Thus, national income usually relates to a particular year and indicates the output during that year
- National income represents the aggregate value of final products rather than the total value of all kinds of products produced in the economy. The insistence on final goods and services is simply to make sure that we do not double count.

## 18.2. Measures of aggregate income

For the purpose of measurement and analysis, national income can be viewed as an aggregate of various component flows. Generally these component flows represent the intersectoral transactions which describe the broad structure of the economic system. Accordingly, there exist several measures of aggregate incomes varying in their scope and coverage.

To begin with let us consider the most comprehensive and broad-based measure of aggregate income widely known as Gross National Product at market prices or GNP at market prices. It shows the market value of the aggregate final product before the deduction of provisions for the consumption of fixed capital, attributable to the factors of production supplied by the normal residents of a country.

Two important words are 'gross' and 'national'. Similarly the phrase "at market prices" is also significant because it specifies the criterion of valuation. The main alternatives to these three specifications are 'net', 'domestic' and at 'factor cost'.

### (a) Gross and Net concepts

Gross emphasises that no allowance for capital consumption has been made or that depreciation has yet to be deducted.

Net indicates that provision for capital consumption has already been made or in other words that depreciation has already been deducted.

Thus the difference between the gross aggregate and the net aggregate is depreciation.  
GNP at market price/factor cost = NNP at market price/factor + depreciation cost.

### **(b) National and domestic concepts**

The term national denotes that the aggregate under consideration represents the total income which accrues to the normal residents of a country due to their participation in world production during the current year. Thus, the term 'national' is used to emphasise that the aggregate under consideration covers all types of factor incomes accruing to normal residents of a country irrespective of whether the factors of production supplied by them are located at home or abroad.

As against this, it is also possible to measure the value of the total output or income originating within the specified geographical boundary of a country known as "domestic territory". The resulting measure is called "domestic product".

In other words, the distinction between "national" and "domestic" aggregates lies in the frame of reference- the former takes the normal residents of a country, the latter takes a given "geographical area". Here, national produce differs from domestic product by the amount of net factor income from abroad.

GNP at market price/factor = GDP at market price/factor cost + Net factor income from abroad (- Net factor income to abroad)

NNP at market price/factor cost = NDP at market price/factor cost + Net factor income from abroad (- Net factor income to abroad)

Net factor income from abroad = Factor income received from abroad – Factor income paid abroad.

### **(c) Gross national product and gross domestic product**

For some purposes we need to find the total income generated from production within the territorial boundaries of an economy, irrespective of whether it belongs to the inhabitants of that nation or not. Such an income is known as gross domestic product (GDP) and found as:

GDP = GNP – Net factor income from abroad

Net factor income from abroad = Factor income received from abroad – Factor income paid abroad.

### **(d) GNP as a sum of expenditures on final products**

Expenditure on final products in an economy can be classified into the following categories:

- Personal consumption expenditure (c)- The sum of expenditure on both the durable and non-durable goods as well as services for consumption purposes

- Gross Private Investment (I<sub>g</sub>) is the total expenditure incurred for the replacement of capital goods and for additional investment
- Government expenditure (G) is the sum of expenditure on consumption and capital goods by the government, and
- Net Exports (Exports – Imports) (X – M) constitute the difference between the expenditure or rest of the world on output of the national economy and the expenditure of the national economy on output of the rest of the world.
- GNP is the aggregate of the above mentioned four categories of consumption expenditure. That is,
- $GNP = C + I_g + G + (X - M)$

**(e) GNP as the total of factor incomes**

As mentioned above, national product gives a measure of a nation's productive activity, irrespective of the fact whether this activity takes place at home or abroad. When national income is calculated after excluding indirect taxes like excise duty, sales tax, etc. and including subsidies we get GNP at factor cost as this is the amount received by all the factors of production (indirect taxes being the amount claimed by the government and subsidies becoming a part of factor income).

GNP at factor cost = GNP at market prices – Indirect taxes + Subsidies

**(f) NNP at Factor Cost (or national income)**

Goods and services are produced with the help of factors of production. National income or NNP at factor cost is the sum of all the income payments received by these factors of production.

$NI = GNP - \text{Depreciation} - \text{Indirect taxes} + \text{Subsidies}$

Since factors receive subsidies, they are added while indirect taxes are subtracted as these do not form part of the factor income.

NNP at factor cost = NNP at market prices – indirect taxes + Subsidies

**(g) Personal income**

National income is the total income accruing to the factors of production for their contribution to current production. It does not represent the total income that individuals actually receive.

Two types of factors account for the difference between national income and personal income. On the one hand a part of the total income which accrues to the factors of

production is not actually paid out to the individuals who own the factors of production. The obvious instances are corporate taxes and undistributed or retained profits. On the other hand, the total income that individuals actually receive generally includes some part that comes to be regarded as payment for the factor services rendered in the current year, for example, gifts, pensions, relief payments and other welfare payments. Such payments are known as “transfer payments” because they do not represent the payments made for any direct contribution to current production.

Thus, personal income is calculated by subtracting from national income those types of incomes which are earned but not received and adding those types which are received but not currently earned. So

Personal income = NNP at factor cost – Undistributed profits – Corporate taxes + transfer payments

#### **(h) Disposable income**

Disposable income is the total income that actually remains with individuals to dispose off as they wish. It differs from personal income by the amount of direct taxes paid by individuals.

Disposable income = Personal Income – Personal taxes

#### **(i) Value added**

The concept of value added is a useful device to find out the exact amount that is added at each stage of production to the value of the final product. Value added can be defined as the difference between the value of output produced by that firm and the total expenditure incurred by it on the materials and intermediate products purchased from other business firms. Thus, value added is obtained by deducting the value of material inputs or intermediate products from the corresponding value of output.

Value added = Total sales + Closing stock of finished and semi-finished goods – Total expenditure on raw materials and intermediate products – Opening stock of finished and semi-finished goods.

### **18.3. Approaches to measurement of national income**

It is evident that the measurement of national income involves the measurement of the size of the circular flow. Basically there are three ways of looking at the circular flow of income. It arises out of the process of activity chain in which production creates income, income generates spending and spending in turn induces production. Accordingly there are three different ways in which we can measure the size of the circular flow. We can measure it either at the production stage by measuring the value of output or at the income accrual stage by measuring the amount of factor income earned or at the expenditure stage by measuring the size of total expenditure incurred in the economy.

- Product Approach
- Income Approach
- Expenditure Approach

### (a) Product Approach

According to this method, the sum of net value of goods and services produced at market prices is found. Three steps are involved in calculation of national income through this method:

- Gross product is calculated by adding up the money value of output in the different sectors of the economy.
- Money value of raw material and services used and the amount of depreciation of physical assets involved in the production process are summed up.
- The net output or value added is found by subtracting the aggregate of the cost of raw material, services and depreciation from the gross product found in first step.
- Let us denote the amounts of each of the three different types of final outputs in a given year as  $Q_1, Q_2, Q_3 \dots Q_n$  and their respective market prices as  $P_1, P_2, P_3, \dots, P_n$  where  $n$  stands for the total number of final goods and service produced in the economy. Then according to the product approach, the size of the national income (NI) will be equal to the sum of the annual flow of final goods and services valued at their respective market prices, i.e.,

$$NI = P_1Q_1 + P_2Q_2 + P_3Q_3 + \dots + P_nQ_n$$

$$NI = \sum_{i=1}^n P_iQ_i$$

Production approach involves estimation of gross value of products, by-products and ancillary activities of a production unit and deducting from it the value of inputs of raw materials and other intermediates including services to obtain gross value added.

Broadly speaking the steps involved are:

- Obtain estimates of quantities of all outputs and all inputs.
- Obtain estimates of average price for each output and input from market sources.

- Compute gross value of outputs and inputs using price-quantity data and subtract the latter from the former to get gross value added.
- Obtain estimates of value of stocks of fixed assets and apply predetermined determined depreciation rates to get capital consumption.

This approach is used to estimate gross and net value added in the following sectors of the Indian economy:

- Agriculture and allied activities (e.g., animal husbandry)
- Forestry and logging
- Fishing
- Mining and quarrying
- Registered manufacturing

For the first three of these sectors, obtaining reliable data on quantities and average prices is a difficult task particularly for minor products and by-products as also for unorganised part of fishing activity. CSO uses estimates obtained from a variety of sources such as union ministry of agriculture, state statistical bureaus, directorate of market intelligence, etc. for registered manufacturing the Annual Survey of Industries (ASI) gives data on inputs and outputs on a census basis for larger units and sample basis for smaller units. However, ASI data are often out of date and several adjustments are required.

Corrections for non-response to ASI questionnaires also have to be incorporated. For mining and quarrying the Indian Bureau of Mines supplies quantity and value data for inputs and outputs which are supplemented by data from state governments.

For constant price estimation, the same procedure can be used with prices of the base year being employed for valuation of quantities.

#### **(b) Income approach**

This approach is also known as the income-distributed method. According to this method, the incomes received by all the basic factors of production used in the production process are summed up. The basic factors for the purposes of national income are categorised as labour and capital. We have three incomes.

- Labour income which includes wages, salaries, bonus, social security and welfare contributions.



- Capital income which includes dividends, pre-tax retained earnings, interest on saving and bonus, rent, royalties and profits of government enterprises.
- Mixed income, i.e., earnings from professions, farming enterprises, etc.

These three components of income are added together to get national income.

Following the income approach, national income can be measured by aggregating the annual flows of factor earnings generated by the production of the final output. Thus the value of output, say good I ( $P_iQ_i$ ) is also reflected in the sum of the corresponding factor incomes generated, i.e.,

$$P_iQ_i = R_i + W_i + I_i + P_i.$$

Where  $R_i$ ,  $W_i$ ,  $I_i$ ,  $P_i$  denote flow of rent, wages, interest, and profits generated by the production of good i. It follows, therefore, that national income can be measured as the sum of annual flow of different types of factor incomes in the economy.

$$NI = \sum_{i=1}^n (R_i + W_i + I_i + P_i)$$

In this approach, payments for factor, viz. wages, salaries, rents, interest and profits are directly aggregated together to obtain estimates of value added. Output or input valuation is not necessary. This approach is particularly suitable for those activities whose output are difficult to value.

The prime example is services. However, reliable data on factor incomes are available only for those units which keep proper annual accounts. For others, some indirect method has to be followed. One such method involves estimation of number of workers employed and of value added per worker. The product of the two gives an estimate of total value added in the relevant activity. Number of workers is estimated by extrapolation-interpolation of decennial case figures; per worker value added is taken from surveys conducted at various times with appropriate adjustments to bring up the estimates to date.

The approach is used for following activities;

- Railways
- Electricity, gas and communication
- Banking, finance and insurance
- Real estate
- Public administration and defence

For the first three groups almost complete data are available from annual accounts. Such data are also available for parts of latter three- the part that is in the organised sector. For the rest the indirect approach has to be employed.

Database is the weakest for unorganised sectors of the economy such as unregistered manufacturing, trade, hotels and restaurants and a variety of personal services. For these sectors rough and ready estimates based sometimes on production approach, sometimes on income approach are used. Most often estimates are obtained for a benchmark year during which a major survey had been conducted and then these benchmark estimates are brought up to date using a variety of indicators.

Constant price estimates using the income approach are obtained by updating the base year estimates using some physical indices such as amount of electricity sold, tonne-kilometres of freight transport, etc.

### **(c) Expenditure approach**

This method is known as the final product method. According to this method, the total national expenditure is the sum of the expenditure incurred by the society in a particular year. The expenditures are classified as personal consumption expenditure, net domestic investment, government expenditure on goods and services and net foreign investment (imports-exports).

The flow of total expenditure can be measured by aggregating the flows of expenditure on final goods and services incurred by the three main sectors involved, viz., the household sector, the business sector, the government sector. Thus from the viewpoint of the expenditure approach, national income can be measured by

$$NI = E_h + E_b + E_g$$

Where,  $E_h$ ,  $E_b$ ,  $E_g$  denote the annual flow of expenditure on final goods and services incurred by the household sector, the business sector, and the government sector.

These three approaches to the measurement of national income yield identical results.

They provide three alternative methods of measuring essentially the same magnitude. If we follow the product approach or the expenditure approach, we are in effect trying to measure national income by the size of the income flow in the upper half of the circle. As against this if we follow income approach, we are actually trying to measure the flow in the lower half of the circle.

Estimates of national product can also be obtained by adding together expenditure flows, viz.,  $C$ ,  $I$ ,  $G$ ,  $E$  and subtracting  $M$ . To obtain these, CSO uses the commodity flow approach. For instance, in case of private consumption expenditures, over 160 goods and services are identified and quantities of these entering private consumption are estimated by deducting from quantities produced, quantities used up in intermediate uses, purchased by government, etc. Market prices are then applied to the quantities to get expenditures. For organised construction, value of output is estimated by estimating the quantities of major construction materials, cement, steel, bricks, etc., used up in construction. Similarly, several items of machinery and equipment are identified and market value of their outputs are added together to estimate capital formation in the form of machinery and equipment.

We will conclude this section with a brief word about measurement of savings. Estimates of saving are prepared separately for three sectors, viz.,

- Household sector comprising individuals, all non-government, non-corporate enterprises like sole proprietorships, partnerships and non-profit institutions.
- Private corporate sector consisting of public limited and private limited companies, other than government companies, and cooperative institutions.
- Public sector consisting of government administration departments and public sector enterprises departmental and non-departmental.

For the household sector two categories of savings are estimated separately, viz.,

- Financial savings consisting of increase in household's holdings of currency, net bank deposits, deposits with non-bank financial institutions, households' investment in shares and debentures, small savings and government securities and savings in the form of life insurance and provident funds.
- Savings in the form of physical assets consisting of increase in stocks and household sector investment in construction, machinery and equipment. The latter is wholly due to inclusion in household sector of non-corporate, non-government business units.

Data for household sector's financial savings come from a variety of financial institutions. For physical savings it is estimated as a residual, i.e., from the total gross domestic capital formation that due to private corporate and public sector is deducted and the rest is attributed to household sector.

Private corporate sector's savings are their retained earnings. Data come mainly from Reserve Bank's surveys of finance of joint stock companies. Savings of public sector are estimated from budget documents and annual reports of public sector enterprises.

#### 18.4. Difficulties in measurement of national income

There is large number of difficulties in measuring national income. Some of these are: National income is always measured in money, but there are a number of goods and services which are difficult to be assessed in terms of money, e.g., painting as a hobby by an individual, the bringing up of children by the mother. Similarly, when the owner of a firm gets married to his lady secretary, her services, though a part of national income, are

not included in it. By excluding all such services from it, the national income will work out to be less than what it actually is.

The greatest difficulty in calculating the national income is of **double counting**, which arises from the failure to distinguish properly between a final and an intermediate product. There always exists the fear of a good or a service being included more than once. If it so happens, the national income would work out to be many times the actual. Flour used by a bakery is an intermediate product and that by a household the final product. To solve this difficulty, only the final goods and services are taken into account, and that is not so easy a task.

Income earned through **illegal activities** such as gambling, or illicit extraction of wine, etc. is not include in national income. Such goods and services do have value and meet the needs of the consumers. But by leaving them out, the national income works out to less than the actual.

Then there arises the difficulty of including **transfer payments** in the national income. Individuals get pension, unemployment allowance and interest on public loans, but whether these should be included in national income is a difficult problem. On the one hand, these earnings are a part of individual income and on the other, they are government expenditure. To avoid this difficulty, these are deducted from national income.

**Capital gains or losses** which accrue to property owners by increases or decreases in the market value of their capital assets or changes in demand are excluded from the GNP because such changes do not result from current economic activities. It is only when capital gains or losses are the result of the current flow or non-flow of productive activities that they are included in the GNP. "Those changes in the value of goods that result from ungovernable or unpredictable causes are treated as accidental shifts that are outside current activity proper. Those changes in value that can be anticipated and insured against, such as fire and flood, are also excluded because the adjustment for such shifts in value has already been charged against the operation of previous years through insurance premiums".

All inventory changes whether negative or positive are included in the GNP. The procedure is to take positive or negative changes in physical units of inventories and multiply them by current prices. Then this figure is added to total current production of the firm. But the problem is that firms record inventories at their original costs rather than at replacement costs. When prices rise there are gains in the book value of inventories. Contrariwise, there are losses when prices fall. So the book value of inventories overstates or understates the actual inventories. Contrariwise, there are losses when prices fall. So the book value of inventories overstates or understates the actual inventories.

Thus for correct imputation of GNP, inventory evaluation is required. A negative valuation adjustment is made for gains and a positive valuation adjustment is made for losses. But inventory valuation is a very difficult and cumbersome procedure.

Another difficulty in calculating national income is that of price-changes which fail to keep stable the measuring rod of money for national income. When the price level in the country rises, the national income also shows an increase even though the production might have fallen. On the contrary, with a fall in price level, the national income shows a decline even though the production might have gone up. Thus due to price-changes the national income cannot be adequately measured. To solve this difficulty, the statisticians

have introduced the concept of real national income, according to which the prices of the year in question are assessed in terms of prices of the base year. But this does not solve the problem of calculating the national income, because the index numbers which measure the price-changes are just rough estimates. Thus the national income data are misleading and unreliable.

Moreover, the calculation of national income in terms of money is under-estimation of real national income. It does not include the leisure foregone in the process of production of a commodity. The incomes earned by two individuals may be equal, but if one of them works for longer hours than the other, would it be correct to some extent to say that the real income of the former has been understated. Thus national income does not take into consideration the actual cost of production of a commodity.

In calculating national income, a good number of public services are also taken which cannot be estimated correctly. How should the police and military services be estimated? In the days of war, the forces are active, but during peace they rest in cantonments. Similarly, to estimate the contribution made to national income by profits earned on irrigation and power projects in terms of money is also a difficult problem.

### 18.5 Problems of measurement in a developing economy

In a developing economy, complete and reliable information relating to the various methods of estimating national income are not available due to the following problems:

1. Non-monetised sector- There is a large non-monetised sector in a developing economy. This is the subsistence sector in rural areas in which a large portion of production is partly exchanged for the other goods and is partly kept for personal consumption. Such production and consumption cannot be calculated in national income.
2. Lack of occupational specialisation- There is the lack of occupational specialisation in such a country which makes the calculation of national income by product method difficult. Besides the crop, farmers in a developing country are engaged in supplementary occupations like dairying, poultry, cloth making, etc. But proper account of income from such productive activities is difficult to maintain and thus may not be included in the national income estimates.
3. Non-market transactions- People living in rural areas in a developing country are able to avoid expenses by building their

own huts, tools, implements, garments and other essential commodities. Similarly, people in urban areas having kitchen gardens produce vegetables which they consume themselves. All such productive activities do not enter the market transactions and hence are not included in the national income estimates.

4. Illiteracy- The majority of people in such a country are illiterate and they do not keep any accounts about the production and sales of their products. Under the circumstances, the estimates of production and earned incomes are simply guesses.
5. non-availability of data- adequate and correct production and cost data are not available in a developing country. Such data relate to crops, forestry, fisheries, animal husbandry, and the activities of petty shopkeepers, small enterprises, construction workers, etc. for estimating national income by the income method, data on unearned incomes and on persons employed in the service sector are not available. Moreover, data on consumption and investment expenditures of the rural and urban population are not available. Moreover, data on consumption and investment expenditures of the rural and urban population are not available for the estimation of national income by the expenditure method. Moreover, there is no machinery for the collection of data in such countries.

#### 18.6. Importance of national income analysis

National income data are of great importance for the economy of a country. These days the national income data are regarded as accounts of the economy, which are known as social accounts. These refer to net national income and net national expenditure, which ultimately equal each other. Social accounts tell us how the aggregates of a nation's income, output and product result from the income of different individuals, products of industries and transactions of international trade. Their main constituents are inter-related and each particular accounts can be used to verify the correctness of any other account. Based very much on social accounts, the national income data have following importance.

National income data form the basis of national policies such as employment policy, because these figures enable us to know the direction in which the industrial output,

investment and savings etc. change, and proper measures can be adopted to bring the economy to the right path.

In the present age of planning, the national data are of great importance. For economic planning it is essential that the data pertaining to a country's gross income, output, saving, consumption from different sources should be available. Without these, planning is not possible. Similarly the economists propound short-run as well as long-run economic models or long-run investment models in which the national income data are very widely used.

The national income data are also used by the research scholars of economics. They make use of the various data of the country's input, output, income, saving, consumption, investment, employment etc., which are obtained from social accounts.

National income data are significant for a country's per capita income which reflects the economic welfare of the country. The higher the per capital income, the higher the economic welfare and vice-versa.

National income statistics enable us to know about the distribution of income in the country. From the data pertaining to wages, rent, interest and profits we learn of the disparities in the incomes of different sections of the society. Similarly, the regional distribution of income is revealed. It is only on the basis of these that the government can adopt measures to remove the inequalities in income distribution and to restore regional equilibrium. With a view to removing these personal and regional disequilibria, the decisions to levy more taxes and increase public expenditure also rest on national income statistics.

### 18.7. Self-test questions

7. *Explain briefly various concepts of national income. What are the difficulties in measuring national income?*
8. *What are the methods of measuring national income? Explain the significance of the national income.*

### 18.8. Suggested readings

*Beckerman, N., An Introduction to National Income Analysis, London, English Language Book Society, Ch. 2.*

*Ruggles, R. and Ruggles, N., National Income Accounts and Income Analysis, NY, McGraw Hill, Chs. 1, 2 and 12.*

**COURSE: ECONOMIC ANALYSIS**

**COURSE CODE: MC-104**  
**LESSON: 19**

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***BALANCE OF PAYMENT***

**OBJECTIVE:** After going through this lesson the students should be able to explain the concept of balance of payment. In this chapter, we explain the meaning and structure of BOP and causes and cures of BOP disequilibria.

**STRUCTURE:**

- 19.1 Introduction
- 19.2 Definition and Importance of Balance of Payments
- 19.3 Balance of Payments Accounts
- 19.4 Disequilibrium in Balance of Payments
- 19.5 Uses and Kinds of BOP Disequilibrium
- 19.6 Balance of Payments Adjustments
- 19.7 Reason for Exchange Control
- 19.8 Problems in Exchange Control
- 19.9 Summary
- 19.10 Self-Test Questions
- 19.11 Suggested Readings

**19.1 INTRODUCTION**

As we know that every business/firm prepares its annual final Accounts and balance sheet of its transactions with the rest of the society with a view to knowing its profit or loss, and assets and liabilities. Similarly, every nation carrying out economic transactions with foreign countries prepares its Balance of Payment (BOP) Accounts periodically with a view to taking stock of its assets and liabilities and its receipts from and payment obligations to the rest of the world.



## **19.2 DEFINITION AND IMPORTANCE OF BALANCE OF PAYMENTS**

A systematic record of all economic transactions between the residents of a country and residents of foreign countries during a certain period of time is called balance of payment. The systematic of recording the economic transactions is double entry book-keeping system. Economic transactions include all such transactions that involve the transfer of title or ownership. While some transactions involve physical transfer of goods, services, assets and money along with the transfer of title, some transactions do not.

The balance of payments serves a very useful purpose in so far as it yields necessary information for the formulation of future policy in regard to domestic monetary, fiscal and foreign trade policies. The major uses of BOP accounts are: (i) the balance of payments accounts provide an extremely useful data for the economic analysis of the country's weakness and strength as a partner in international trade. By comparing the statements contained in the balance of payments for several successive years, one can find out whether the international economic position of the country is improving or deteriorating. In case it is deteriorating, necessary corrective measures are warranted; (ii) balance of payments also reveals the changes in the composition and magnitude of foreign trade. The changes those are deterrent to the economic well being of the country call for necessary action by the government. For example, a regular outflow of capital or export of essential goods causing scarcity on the domestic market needs to be curbed through policy measures or direct action; (iii) balance of payments also provides indications of future repercussions of countries' past trade performances. If balance of payments shows a continuous and large deficit over time, it shows the growing international indebtedness of the country, which may ultimately lead to financial bankruptcy. Recall the foreign exchange crisis of 1990 that had pushed India on the verge of financial bankruptcy so far as her external payment obligations and meeting current import bill was concerned. On the other hand, a continuous large scale surplus in the balance of payments, particularly

when its magnitude goes beyond the absorption capacity of the country, indicates impending danger of high inflation; and detailed balance of payments accounts reveal also the weak and strong points in the country's foreign trade relations and thereby invites government attention to the need for corrective measures against the weak spots and unhealthy developments.

### **19.3 BALANCE OF PAYMENTS ACCOUNTS**

The economic transactions between a country and the rest of the world may be grouped under two broad categories:

(i) current transactions-export and import of merchandise and service; and, (ii) capital transactions. Current transactions pertain to export and import of goods and services that change the current level of consumption in the country or bring a change in the current level of national (money) income. Capital transactions are those, which increase or decrease a country's total stock of capital, instead of affecting the current level of consumption or national income.

In accordance with the two kinds of transactions, balance of payments accounting is divided into two major accounts:

- (i) Current accounts; and
- (ii) Capital accounts.

#### **19.3.1 Current Account**

The items, which are entered in the current account of the balance of payments, are listed in Table 19.1, in the order of their importance, as suggested by the IMF and currently followed in India. In the 'credit' column are entered the values receivable and in 'debt' column, the values payable. The net balance shows the excess of credit over the debit for each item: it may be negative (-) or positive (+).

**Table 19.1 Balance of Payments: Current Account**

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Transactions	Credit	Debit	Net Balance
1. Merchandise	Export	Import	—
2. Foreign travel	Earnings	Payments	—
3. Transportation	Earnings	Payments	—
4. Insurance (Premium)	Receipts	Payments	—
5. Investment Income	Dividend	Dividend	—
	Receipts	Payments	
6. Government (purchase and sales of goods and services)	Receipt	Payments	—
7. Miscellaneous'	Receipt	Payments	—
Current Account Balance	---	---	Surplus (+) Deficit (-)

The items listed in the Current Account can be further grouped as: (i) visible items; and (ii) invisible items. Merchandise trade, i.e., export and import of goods, falls under the visible items. All other items in the current account-payment and receipt for the services, such as banking, insurance and shipping etc., are termed as 'invisibles'. Sometimes another category, called 'unrequired transfer', is created to give a separate treatment to the items like gifts, donations, military aid, technical assistance, etc. These are different from other invisible items as they involve unilateral transfers.

The net balance on the visible items, i.e., the excess of merchandise exports ( $X_g$ ) over the merchandise imports ( $M_g$ ) is called balance of trade. If  $X_g > M_g$ , the balance of trade is said to be favourable and if  $X_g < M_g$  it is unfavourable. The overall balance on the Current Account'-surplus or a deficit, is carried over to the Capital Account.

### 19.3.2 Capital Account

As mentioned above, the items entered in the Capital Account of the balance of payments are those, which affect the existing stock of capital of the country. The broad categories of capital account items are: (a) short-term capital movement;

and (b) long-term capital movements; and (c) changes in the gold and exchange reserves.

Short-term capital movements include (i) purchase of short-term securities such as treasury bills, commercial bills and acceptance bills, etc.; (ii) speculative purchase of foreign currency; and (iii) cash balances held by foreigners for such reasons as fear of war, political instability, etc. Another item of short-term capital is the net balances (positive or negative) in the Current Account. Long-term capital movements include: (i) direct investments in shares, bonds and in real estate and physical assets such as plant, building, equipments etc., in which investors hold a controlling power; (ii) portfolio investments in stocks and bonds such as government securities, securities of firms not entitling the holder with a controlling power; and (iii) amortization of capital, i.e., repurchase and resale of securities earlier sold to or purchased from the foreigners. Direct export or import of capital goods fall under the category of direct investment and are treated as such.

The balance of payments accounting is based on the double-entry book keeping system in which both sides of a transaction, receipts and payments are recorded. For example, exports involve outflow of goods and inflow of foreign currency. Similarly, imports involve inflow of goods and outflow of foreign currency. Both, inflow and outflow are recorded in this system. International borrowing and lending give rise to credit to the lender and debit to the borrower. Both are recorded in the balance of payments. However, donations, gifts, aids, assistance, etc., are unilateral transfers and do not involve quid pro quo or transfer of an

equivalent value. In regard to these items, there is only give, no take or, in other words, there is only credit, no debit since it is non-refundable. Yet, the receiving country is debited to keep the record of non-refundable amounts or values and donator is credited for the record purposes. Such entries have information value for non-economic purposes. Besides, these transactions reduce the deficit, if any, in the Current Account of the receiving country. Since in this system of BOP accounting international transaction are entered on both debit and credit sides, BOP accounts are always in balance.

## **19.4 DISEQUILIBRIUM IN BALANCE OF PAYMENTS**

The BOP is always in balance because in the accounting procedure, a deficit in the Current Account is offset by a surplus on Capital Account. If there is no surplus on the capital account, it may mean either borrowing from abroad or running down the gold and foreign exchange reserves. Similarly, a surplus on the Current Account is offset by a matching deficit on Capital Account resulting from loans and gifts to debtor country or by the depletion of its gold and foreign exchange reserves. It means the 'balance of payments' remains always in balance. It is there should be no question of imbalance or disequilibrium in the balance of payments. But, disequilibrium in the balance of payments does arise because total receipts during the reference period need not always necessarily be equal to the total payment obligations of that period. When total receipts do not match with total payment obligations of the accounting period, this is a position of disequilibrium in the balance of payments.

### **19.4.1 Assessing the BOP Disequilibrium**

For the purpose of assessing the overall balance of payments position, the total receipts and total payments arising out of transfer of goods and services and long-term capital movements, and all other transactions are regrouped under the following two categories: **Autonomous transactions** take place on their own due to people's desire to consume more or to make a large profit. For example, export and imports of goods, items of current account-are undertaken with a view to making profit or consuming more goods. Exports and imports take place irrespective of other transactions included in the balance of payments accounts. Hence, these are autonomous transactions. If exports ( $X_g$ ) equal imports ( $M_g$ ) in value there will be no other transactions. But, if  $X_g$  is not equal to  $M_g$ , it leads to short run capital movements, e.g., international borrowing or lending. Such international borrowing/lendings are not undertaken for their own sake, but for making payment for the deficit in the balance of trade. Hence, these are called induced or accommodating transactions. They involve accommodating capital flows. On the capital account, the export and import of long-term capital are autonomous transactions. Also, the short-term capital movements motivated by the desire to invest abroad for higher return fall in the category of autonomous transaction. Thus, all exports and imports of goods and services, long-term and short-term capital movements motivated by the desire to earn higher returns abroad or to give gifts and donations, etc., are the autonomous transactions. On the other hand, the **short-term capital movements**, viz., gold movements and accommodating capital movements on account of the autonomous transactions are induced transactions. These transactions lead to reduction in the gold and foreign

exchange reserves of the country.

In the assessment of balance of payments position only autonomous transactions are taken into account. The total receipt and payments resulting from the autonomous transaction determine the deficit or surplus in the balance of payments. If total receipts and payments are unequal, the balance of payments is in disequilibrium. If the total payments exceed the total receipts, the balance of payment shows deficit. On the contrary, if receipts from autonomous transactions exceed the payments for autonomous transactions, the balance of payments is in surplus. Naturally, if both are equal, there is neither deficit nor surplus, and the balance of payments is in equilibrium. From the policy point of view, however, depletion in the gold and foreign exchange reserves is generally taken as an indicator of balance of payments running into deficit, which is a matter of concern for the government. But, if reserves are abundant and the government has adopted a deliberate policy to run it down, then the deficit in the balance of payments is not an unhealthy sign for the economy. Besides, the disequilibrium of surplus nature (except that it might cause inflation) is not as serious a matter of worry as the disequilibrium of deficit nature.

## **19.5 USES AND KINDS OF BOP DISEQUILIBRIUM**

As already discussed, a deficit kind of disequilibrium in the balance of payments arises when a country's autonomous payments exceed its autonomous receipts. The autonomous payments arise due to import of goods and services and export of capital. Similarly, autonomous receipts result from the merchandise export and import of capital. It may, therefore, be said that disequilibrium of deficit nature

arises when total imports exceed total exports. But imports and exports do not determine themselves. The volume and value of imports and exports are determined by a host of other factors. And, these factors become the ultimate cause of BOP disequilibrium.

As regards the determinants of imports, the total import of a country depends upon three factors: (i) internal demand for foreign goods, which depends largely on the total purchasing power of the residents of the importing country; (ii) the relative prices of imports and their domestic substitutes; (iii) people's preference for foreign goods; (iv) price-elasticity of demand for imports; and (v) income-elasticity of imports. Similarly, the total export of a country depends on (i) foreign demand for its goods, (ii) competitiveness of its price and quality; and (iii) its exportable surplus.

Under static conditions, these factors remain constant. Therefore, equilibrium in the balance of payments, once achieved, remains stable. But under dynamic conditions, factors, which determine imports and exports, keep changing, sometimes gradually and smoothly, but often violently and unexpectedly. The changes differ in their duration and intensity from country to country and from time to time. The changes occur as a result of disturbances in the domestic economy and abroad create conditions for disequilibrium in the balance of payments.

### **19.5.1 Price Changes and Fundamental Disequilibrium**

The first and a major cause of disequilibrium in the balance of payments is the change in the price level. The change in the price level may be inflationary or



deflationary. Deflation normally causes a surplus in the balance of payments. The balance-of-payments surplus does not cause a serious concern from the surplus country's point of view. It may, however lead to wasteful expenditure and misallocation of resources. On the other hand, inflationary changes in prices cause deficits in the balance of payments. The BOP deficits result in increased indebtedness, depletion of gold reserves; loss of employment distortions in the domestic economy and cause other economic problems in the deficit countries. Inflation causes a change in the relative prices of imports and exports. It makes imports cheaper and exports costlier. Therefore, exchange rate remaining the same, inflation causes an increase in imports because domestic prices become relatively higher than the import prices. On the other hand, inflation leads to a decrease in exports because of decrease in foreign demand due to increase in domestic prices. The increase in imports depends also on the price-elasticity of demand for imports in the home market and decrease in exports depends on the price-elasticity of foreign demand for home-products. In case price-elastic ties of imports and exports are not equal to zero, imports are bound to exceed the exports. As a result, there will be a deficit in the balance of payments. If inflationary conditions perpetuate due to some in-built fundamental imbalances in the economy, it produces long run disequilibrium. If the size of deficit is large and disequilibrium is obdurate it is called fundamental disequilibrium.

### **17.5.2 Business Cycles and Cyclical Disequilibrium**

Business cycles are characterized by economic ups and downs. The economic ups and downs are often associated with inflationary rise or deflationary decline in the general price level, respectively. The effect of continuous inflationary or deflationary changes on the BOP has already been discussed. The price changes or fluctuations may be local, confined to one or a few countries or they may be global as it happened in the early 1930s. If price fluctuations take the form of a business cycle, most countries face depression and inflation almost simultaneously. But since the economic size of the nations differs, their imports are affected in varying degrees. Deficits and surpluses in the balance of payments vary from moderate to large. The countries with higher marginal propensity to import accumulate larger deficits during inflationary

phase of a trade cycle and a moderate deficit, or even a surplus, during the period of depression. Such disequilibria are known as cyclical disequilibria. This is, however, only a theoretical possibility. Since little is known about the marginal propensities to import, any generalization would be unwise.

### **19.5.3 Structural Changes and Structural Disequilibrium**

Structural changes in an economy are caused by such factors as (i) depletion of the cheap natural resources, (ii) change in technology with which a country is not in a position to keep pace, i.e., technology lag, and (iii) change in consumers' taste and preference. Such changes cause inefficiency and high cost in the exporting countries and they find it difficult to face the competition in the international market, due to either high cost of production or lack of foreign demand. The gradual exhaustion of better coal seams in Great Britain resulted in increased cost of coal production despite improvement in technology. This factor combined with labour problems converted Great Britain from a net coal-exporting nation to a net-importing one. The shift from steam engine to oil engine in shipping brought a shift in the demand from coal to oil. The introduction and spreading use of nylon in the U.S.A. affected Japanese silk exports. All such changes bring about a change in demand and supply conditions. If the size of foreign trade is fairly large, then the balance of payments is adversely affected. The ultimate result is disequilibrium in the balance of payments. It is called structural disequilibrium. The structural disequilibrium may also originate from the discovery of new resources, which may invite foreign capital in a large measure. The large-scale capital inflow may turn the balance-of-payments deficit into a surplus.

In addition to the fundamental factors responsible for disequilibrium in the balance of payments, there are certain other factors, which may cause temporal disequilibrium. Some of them the following: (i) disturbances or crop failure

particularly in countries producing primary goods. India faced deficits in her BOP during the 1950s and 1960s due to this factor; (ii) Rapid growth in population leading to large scale imports of food grains or wage goods; (iii) Ambitious development projects requiring heavy imports of technology, equipment, machinery and technical know-how; and (iv) Demonstration-effect of advanced countries on the consumption pattern of less developed countries.

## **19.6 BALANCE OF PAYMENTS ADJUSTMENTS**

The short-term and small deficits in the balance of payments are quite likely in a wide range of international transactions. Since such deficits do not seriously injure the economy or the economic status of the country, they do not call for immediate corrective actions. More importantly, intermittent short-term changes in domestic economic policies with a view to removing the short-term deficit in the balance of payments may do more harm than good to the economy by causing dislocations in the process of re-allocation of resources. This may cause short-term fluctuations in the economy. The short-term deficits of smaller magnitude are, therefore, not a matter of serious concern for the policy-makers. But, a chronic deficit of larger magnitude has a wide range of economic and political implications. A chronic deficit indicates either a country turning an eternal borrower or depletion of its foreign exchange and gold reserves. Such a country loses its international liquidity and credibility. Such a situation often leads to a compromise with economic independence. For instance, India faced a similar situation in July 1990 when her forex reserves had fallen dangerously low-it was sufficient to meet import bill of 15 day's imports whereas a forex reserve

sufficient to pay for 90 day's imports is required. A country facing chronic and large deficits in its balance of payments is forced to adopt corrective measures; bring necessary changes in its internal economic policies for wiping out the deficit, or at least to bring it to a manageable size. It is a widely accepted view that the conditions for the automatic corrective mechanism based on international price-mechanism does not exist and the government has no option but to intervene with the market conditions of demand and supply using the policy measure available to them. The policy measures that are generally adopted to correct the BOP disequilibrium can be classified as follows:

#### **19.6.1 Indirect Measures to Correct Adverse BOP**

Under the free trade system, BOP deficit arises either because aggregate domestic demand for goods and services<sup>6</sup> is greater than the domestic supply (prices of domestic and foreign goods being comparable), or because domestic prices are significantly higher than the foreign prices. Thus, the deficit may be removed either by increasing domestic production at an internationally comparable cost of production or by reducing excess demand or by using the two methods simultaneously. It may be very difficult to increase the output in the short-run, especially when a country has a near full employment, or when there are other production constraints. Therefore, the only way to reduce a deficit is to reduce the demand for foreign goods through two kinds of policy measures: **(i) Income and Expenditure Policies: Income Measures:** Demand may be reduced through a change in its main determinants, viz., income and price. Here we discuss how reduction in income can lead to reduction in demand and how it helps in reducing

the deficit in the balance, payment. The two policy tools to change disposable income are monetary in fiscal policies. Monetary policy operates on the demand for and supply, if money while fiscal policy operates on the disposable income of the people. The working and efficacy of these policies as instrumental of solving the balance of payment problem is described below.

**Monetary Policy:** The instruments of monetary policy include discount (or bank) rate policy, open market operations, statutory reserve ratio, and selective credit controls. Of these, the first two instruments are generally adopted in the context of, balance of payment policy. This, however, should not mean that other measures are not relevant. To solve the problem of BOP deficit, a 'tight money policy' or dear money, Policy is adopted. Under 'dear money' policy, central monetary authorities raise the discount rate. Consequently, under normal conditions, the demand or bank credit for investment decreases. With a fall in investment and through their multipliers affect the income of the people decreases. If marginal, propensity to consume is greater than zero, demand for goods and services decreases. The decrease in demand implies also a simultaneous decrease in imports, important being income-elastic. This is how 'a tight money policy' is supposed to correct deficit in the balance of payments. The efficacy of 'tight money policy' is, however, doubtful under the following additions: (i) when rates of returns are much higher than the increased and rate; and (ii) when investors have already effected their investment in anticipation of an increase in the rate of the interest. The tight money policy then combined with open market operations, i.e., sale of government bonds and securities. These two instruments together

reduce the demand for capital, on the one hand, and demand for consumer goods, on the other. If all ones well, the BOP deficit tends to decrease.

**Fiscal Policy:** Fiscal policy as a tool of changing household incomes includes variation in (i) taxation, and (ii) public expenditure. Taxation reduces household disposable income. Direct taxes directly transfer the household incomes to the public coffers and thus reduce the overall demand for consumer goods, both domestic and imported. Direct taxes reduce personal savings directly in a great measure while indirect taxes do it in a relatively small measure. Taxation reduces the disposable income of the household and thereby the aggregate demand including the demand for imports. Taxation can be used to curtail investment by taxing capital at progressive rates. As regards the indirect taxes, ego sales tax and excise duty, their effect on imports is uncertain. The government can reduce income and demand by adopting a policy of surplus budgeting in which the government keeps its expenditure less than its revenue. Taxation reduces the disposable income of the households and public expenditure increases the household's income and their purchasing power. But the multiplier effect of public expenditure is greater by than the multiplier effect of taxation. Therefore, while adopting surplus-budget policy a due consideration is given to this fact. To account for this fact, it is necessary that the surplus is so large that the total cumulative effect of taxation on disposable income exceeds the effect of public expenditure. The reduction in income that will be necessary to achieve a certain target of reducing the BOP deficit depends on the foreign trade multiplier.

### **19.6.2 Price Measures: Exchange Depreciation and Devaluation**

Reducing demand for imports through price measures requires changing the relative prices of imports and exports. Relative prices of imports and exports can be changed through (a) exchange depreciation, and (b) devaluation. Exchange depreciation refers to a fall in the market value of home currency in terms of foreign currency and devaluation refers to government's deliberate devaluation of home currency in terms of gold and reserve currency. However, in terms of purchasing power parity theory both turn out to be the same and their impact on foreign demand is also the same. Therefore, we shall consider them as one in their role as measures for correcting adverse balance of payments. Devaluation and exchange depreciation change the relative prices of imports and exports-import prices increase and export prices decrease, though not necessarily in the proportion of devaluation. As a result of change in the relative prices of exports and imports, the demand for imports decreases in the country, which devalues its currency, and foreign demand for its produce increases provided foreign demand for imports is price elastic. Thus, if devaluation or exchange depreciation is effective, imports decrease and exports increase. The country's payment for imports would decrease and export earnings would increase. This ultimately decreases the deficits in the balance of payments in due course of time. However, whether expected results of devaluation or exchange depreciation are achieved-or not depends on the following conditions: (i) the most important condition in this regard is the Marshall-Lerner condition. The Marshall-Lerner condition states that devaluation will improve the balance of payments only if the sum of elasticities of home demand for imports and that of foreign demand for its exports is greater

than unity. If the sum of elasticities is less than unity, the balance of payments can be improved through revaluation instead of devaluation; (ii) devaluation can be successful only if the affected countries do not devalue their currency in retaliation; (iii) devaluation must not change the cost-price structure in favour of imports; and (iv) the government ensures that inflation, which may be the result of devaluation, is kept under control, so that the effect of devaluation is not counter-balanced by the effect of inflation.

### ***19.6.3 Direct Measure: Exchange Control***

We have so far discussed indirect measures of adjusting the adverse balance of payments—the measures, which work through the market mechanism. We now turn to discuss one of the most important direct control measures, i.e. exchange control. The exchange control refers to a set of restrictions imposed on the international transactions and payments, by the government or the exchange control authority. Exchange control may be partial, confined to only a few kinds of international transactions, or total depending on the requirement of the country. The main feature of a full-fledged exchange control system may be as follows. The government acquires, through legislative measures, a complete control over the foreign exchange transactions. It monopolises the purchase and sale of foreign exchange. Law prohibits the sale and purchase of foreign exchange by the resident individuals. Even holding foreign exchange without informing the exchange control authority is declared illegal. All payments to foreigners and receipts from them are routed through the exchange control authority or the authorized agents. Foreign exchange payments are restricted, generally, to the



import of essential goods and services such as food items, raw materials, other essential industrial imports like petroleum products, etc. A system of rationing is adopted in the foreign exchange allocation for essential imports. To ensure the effectiveness of the exchange control system and to prevent any possible evasion, stringent laws (like India's FERA and COFEPOSA) are enacted and a circuitous legal procedure of acquiring import and export licenses is brought into force. In the process, the convertibility of the home currency is sacrificed.

### **19.7 REASON FOR EXCHANGE CONTROL**

*With its features mentioned above, the exchange control system as a measure of adjusting adverse balance of payments differs radically from the indirect corrective measures. While the latter work through the market forces, demand and supply conditions, the former work through a control mechanism based on adhoc rules and regulations. In contrast to the self-sustained, automatic functioning of the market system, exchange control requires a cumbersome bureaucratic system of checks and controls. Yet, many countries facing balance of payment deficits opt for exchange control for lack of other options. In fact, automatic adjustment in the balance of payments requires the existence of the following conditions: (i) international competitive strength of the deficit countries, (ii) a fairly high elasticity of demand for imports, (iii) perfectly competitive international market mechanism, and (iii) absence of government intervention with market conditions.*

*The existence of these conditions has always been doubted. Owing to differences in resource endowments, technology and the level of industrial growth, countries differ in their economic strength and their industries lack international competitiveness. The protectionist policies adopted by various countries intervene with the international market mechanism. Besides*

*automatic method of balance of payments adjustments requires a strict discipline, economic strength, and political will to endure the destabilizing shocks which the automatic method is expected to bring to a country in the process of adjustment. Since these conditions rarely exist, the efficacy of the international mechanism to bring about automatic balance of payments adjustment is often doubted.*

*For these reasons, exchange control remains the last resort for the countries under severe strain of BOP deficits. The exchange control is said to possess a superior effectiveness in providing solutions to BOP deficit. Besides, it insulates the economy against the impact of economic fluctuations in foreign countries. Another positive advantage of exchange control lies in its effectiveness in dealing with the problem of capital movements. The government's monopoly over foreign exchange can effectively stop or reduce the capital movements by simply refusing to release foreign exchange for capital transfer. Many countries, i.e., Germany, Denmark and Argentina adopted exchange control during the 1930s because of this advantage.*

Although, the exchange control is positively a superior method of dealing with disequilibrium in the balance of payments, mainly in the less developed countries, it does not provide a permanent solution to the basic causes of deficit problem.

### **19.8 PROBLEMS IN EXCHANGE CONTROL**

It is presumed that exchange control provides a solution to BOP deficits, but it creates other problems, which are discussed below:

When restrictions of exchange control become widespread, a large number of currencies are rendered inconvertible. This restricts foreign trade and the gains from foreign trade are either lost or reduced to a minimum. Exchange control is,

therefore, not without a cost. Besides, after the interest of the economy is secured; external deficit is removed; insulation of the economy against external influence is complete; the exchange-control countries, instead of giving up exchange control, gear their internal policies-monetary and fiscal-towards the promotion of economic growth, achieving full employment and its maintenance, etc. In doing so, they adopt easy monetary and promotional fiscal policies. Consequently, income and prices tend to rise and an inflationary trend is set in the economy. Price tends to rise because, in an insulated economy, import-competing industries are under no compulsion to check cost increase or to improve efficiency. As a result, exports become relatively costlier and imports relatively cheaper, and hence, exports tend to shrink and imports tend to expand. This is the first outcome of overvaluation of home currency. The balance of payments is no doubt maintained per force in equilibrium, but the initial advantage gradually disappears.

The countries confronted with problems arising out of exchange control are forced to find new outlets for their exports and new sources of imports. The efforts in this direction give rise to bilateral trade agreements between the countries having a common interest. The basic feature of the bilateral trade agreements is to accept each others inconvertible currency in mutual trade. Under the trade agreements, the commodities and their quantities or values may also be specified.

Another outcome of exchange control leading to bilateral trade agreements is the emergence of disorderly cross exchange rates, i.e., the multiplicity of inconsistent

exchange rates. In other words, the inconvertible currencies have different exchange rates between them. An inconvertible currency has different exchange relation with the countries as party to the bilateral trade agreement, exchange rates not being consistent with each other. The multiplicity of inconsistent exchange rates becomes inevitable (unless otherwise prevented) when countries having trade surplus and deficits fix up official rates from time to time depending on their requirement and maintain them through arbitrary rules. Exchange rates become multiple also because 'exchange arbitrage', i.e., the simultaneous purchase and sale of exchange in different markets, becomes impossible.

Under the multiple exchange rate systems, there may be a dual exchange rate policy in which there is an official rate for permissible private and official transactions, and a market rate for all other kinds of transactions. The multiple exchange rate system, however, has its own shortcomings. The system adds complexity and uncertainty to international transactions. Besides, it requires efficient and honest administrative machinery in the absence of which it very often leads to inefficient use of resources. It is, therefore, desirable for the deficit countries to first evaluate the consequences, efficacy and practicability of exchange control and then decide on the course of action. It has been suggested that exchange control, if adopted, should be moderate and a temporary measure till the basic solution to the problems of balance-of-payments deficit is obtained. The exchange control problem does not provide a permanent or a long-term solution to the balance of-payments deficit and it should be adopted only as a short-run measure.

## **17.9 SUMMARY**

The balance of payments serves a backbone for a nation to formulate the policy in regard to domestic monetary, fiscal and foreign trade policies. Mainly, the balance of payments accounts provide an extremely useful data for the economic analysis of the country's weakness and strength as a partner in international trade. Moreover, these accounts are useful in the comparison of payments for several successive years, so that one can find out whether the international economic position of the country is improving or deteriorating.

## **19.10 SELF-TEST QUESTIONS**

1. Explain the balance of payments. If balance of payments always balances, how is the deficit or surplus in balance of payments known?
2. Define disequilibrium in the balance of payments? Distinguish between fundamental disequilibrium and structural disequilibrium in the balance of payments.
3. What are the causes of different kinds of disequilibria in the balance of payments? Suggest measures to correct an adverse balance of payments.
4. Why we control the foreign exchange? Examine the efficacy of exchange control as a measure to correct adverse balance of payments?
5. What do you mean by devaluation? What are the conditions for its effectiveness as a corrective measure for unfavourable balance of payments?

## **19.11 SUGGESTED READINGS**

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Lesson: **20**

## **MONETARY POLICY**

**Objectives: On learning this lesson, the students will be able to understand the concept of monetary policy, its objectives, instruments, use of monetary policy during inflation and deflation and the limitations of monetary policy.**

### ***Structure***

- 20.1. *Concept of monetary policy*
- 20.2. *Objectives of monetary policy*
- 20.3. *Instruments of monetary policy*
- 20.4. *Monetary policy in inflation*
- 20.5. *Monetary policy in deflation*
- 20.6. *Effectiveness of monetary policy*
- 20.7. *Problems or limitations of monetary policy*
- 20.8. *Self-test questions*
- 20.9. *Suggested readings*

### **20.1. Concept of monetary policy**

*In advanced countries, central authority or central bank only performs the function to control money market in order to bring reasonable degree of stability. On the contrary, in developing countries it plays a pioneer and dynamic role in accelerating economic growth with stability and social justice. It not only controls the money market but also provides adequate resources for development. Here it must be noticed that central banks are faced with countless problems and have to bear new responsibilities. Therefore, central bank works carefully to bring stability by controlling credit activities of the commercial banks and promoting smooth conditions for economic development. Again, monetary policy takes steps to control inflation and maintains economic growth. Thus, they have to follow the policy of credit expansion and credit control simultaneously.*

*In a narrow sense, monetary policy means monetary measures and decision of a country which aim at controlling the volume of money, influencing the level of interest rates, public spending, use of money and credit while, in a broader sense, it refer to the monetary system which deals with all those monetary and non-monetary measures and decisions having monetary effects. Therefore, monetary policy implies those measures designed to ensure an efficient operation of the economic system or set of specific objectives through its influence on the supply, cost and availability of money. For this purpose, monetary authority involves the deliberate and conscious management of monetary instruments like bank rate, open market operations, change in reverse ratio and qualitative credit controls.*

## 20.2. Objectives of monetary policy

*Objectives of monetary policy have been different in different countries and in different times depending on the nature of problems faced by the monetary authorities of a country. Sometimes, these objectives are not found compatible with one another. However, important objectives of monetary policy are:*

- (a) Neutrality of money.
- (b) Stability of exchange rates.
- (c) Maintaining price stability.
- (d) Obtaining satisfactory rate of economic growth by controlling business cycles.
- (e) Generating employment.

- (a) **Neutrality of money-** Those who advocate neutral money maintains that the variations in the quantity of money can generate oscillations in the economic system. If the banks follow a cheap money policy, brings down the rates of interest, create more money and dishoarding of idle assets, it will bring, in turn, a state of prosperity. On the other hand, if the banks follow a dear money policy, raise the rate of interest, encourage hoarding and destruction of credit money tends to have a depressing effect on the economic activities being performed in the economy. Neutrality of money, however, does not mean that the supply of money is fixed or should remain fixed. The objective of the monetary authority in relation to the neutrality of money is simply to counterbalance the changes in the velocity of circulation of money so that the hoarding and dishoarding activities or the cheap or dear money policies do not cause serious fluctuations in real economic variables.

*Economists like Wicksteed, Hayek, Robertson feel that the main objective of the monetary policy is the neutrality of money. The policy of neutral money aims at doing away with the disturbing effects of the changes in the quantity of money on important economic variables like income, output, employment and prices. This policy implies that the quantity of money could be so controlled as to have no negative effect on the prices, output and employment. According to this theory money is to remain neutral, i.e., to cause no fluctuations. The advocates of neutral money believe that the worst disturbances in the modern economy are those*



*originating in monetary changes. In their view creation and destruction of money spoil the equilibrium between demand, supply, production, consumption, etc. but when neutral money is followed under a monetary policy there will be no fluctuations but only comparatively smooth adjustments. As such the main aim of the monetary policy is not to deviate from the neutrality of money. In other words, monetary authority must keep the quantity of money perfectly stable- which means it must be kept constant under all circumstances.*

- (b) **Exchange rate stability-** The traditional objective of monetary policy has been the achievement of stable exchange rates. This objective was primary, while stability of prices and output was secondary owing to the paramount importance of international trade in the economies of leading countries like England, Denmark, Japan, etc. For this, maintenance and proper conduct of the gold standard was considered to be the primary function of the monetary authorities. This way, minor changes in exchange rates were easily noticed. These led to a lot of speculation and consequent dislocation of economies. This imposed on them periods of inflation and deflation. This objective is now considered to be of only secondary importance except in case of countries like Japan and England, whose prosperity still depends upon foreign trade. However, in under-developed countries the relationship between economic growth and exchange stability occupies special importance because an underdeveloped country has to import materials and equipments for development, besides, heavy borrowings. The exchange rate, therefore, has to be so adjusted that the balance of payments position does not worsen.
- (c) **Price stability-** In the thirties, during and after the great depression (1929-33), price stability and control of business cycles became important objectives of monetary policy. Fluctuations in prices in the upward direction and more so in the downward direction create difficult problems of production and distribution, besides great economic unrest and political upheavals. But this objective of monetary policy proved to be short-lived on the grounds that it was difficult to determine a satisfactory price level at which the general price level should be stabilised. Price stabilisation policy is beset with many practical difficulties; it may remove indirect business incentives which come through a rise in prices.

Moreover, the prices of different sectors and groups in the economy vary considerably and exhibit different trends. Again, stability of prices does not lead to stability of business conditions. Keeping in view the great stress laid by transactions and cash balance theorists upon the evil consequences of inflation and deflation, some tried to enquire into the relationship of the full employment objective with that of the objectives of price stability. It may be noted that these two objectives are quite closely related though they are by no means identical. Economic welfare would perhaps be maximum if we could attain full employment and keep price level stability simultaneously- this might be described as the ideal objective of the monetary policy.

- (d) **Objectives of generating employment and economic growth-** The objective of price stabilisation are good but it is not always desirable. We happen to live in an age of welfare states and full employment policies. There was a time, when exchange and price stabilities were considered important objectives of monetary policies, but in recent years both price and exchange stabilities have been relegated to the background and full employment- its attainment and maintenance- has assumed greater importance as the goal of monetary policy. It is argued that the achievement of full employment includes automatically price and exchange stabilities.

*Prof. Crowther is of the opinion that the main object of monetary policy of a country is to bring about equilibrium between saving and investment in the country at the level of full employment. Keynes was one of these economists who directed his efforts to discover, not only how and how well or ill a nation's economy in any period is, but also what policies and decisions are needed on the part of the government to enable the economy to work as well as possible. He was interested not only in diagnosing the ailments of the economy but also in prescribing right remedies for them. The Pre-Keynesian classical type of monetary policy tried to accomplish the results in depression simply by making more central bank funds available at low rates of interest. But the ineffectiveness and inadequacy of such a policy in a depression was demonstrated both by the Keynesian analysis and the actual experience of depression of the thirties, when the desire for liquidity made it impossible to increase funds for investment. Thus, monetary policy is designed and used not only to cope with the acute booms and slumps when they have already taken place but to counteract the less extreme fluctuations in their initial stages. An appropriate monetary policy can, therefore,*

*lessen fluctuations in general economic activities and can also reduce or prevent the degeneration of the economy.*

Advanced economies like U.K. and U.S.A. may work normally at full employment level; the problem in such economies is how to maintain full employment, of avoiding fluctuation in the level of employments and production. In other words, how to have economic growth with stability. On the other hand, the main problem of an underdeveloped country is how to achieve full employment. Such an economy has to overcome underemployment of the entire agricultural population and has to remove unemployment of a large number of people who are without jobs for want of employment opportunities. Hence, a monetary policy designed to promote full employment through increased investment shall have to be followed. Such a policy is the cheap money policy, which in turn, lowers the rate of interest so as to stimulate borrowing for investment, which through multiplier and acceleration effects goes to increase the level of employment. Once the level of full employment has been achieved, then through the equality of saving and investment, monetary policy tries to maintain it. For, if investment is greater than saving at full employment, inflation will set in, and if investment is less than saving, deflation will appear. It is, therefore, clear that the maintenance of full employment will also imply stable cost-price structure as also stable exchange rates. For full employment is a very delicate situation and may be upset by changes in exchange rates or prices, which in turn, will lead to fluctuations in the balance of general economic activities. Thus, achieving and maintaining full employment is definitely superior in that all other objectives are automatically attained. Both in advanced as well as underdeveloped economies the objectives of exchange and price stability cannot be ignored. But they can be sacrificed to some extent in the short-run in favour of full employment and satisfactory growth. Moreover, they may, to some extent, be conflicting in short period over the long-run they are all complementary.

## 20.3. Instruments of monetary policy

*Broadly, instruments or techniques of monetary policy can be divided into two categories:*

(a) Quantitative or general methods.

(b) Qualitative or selective methods.

### 20.3.1 Quantitative or general methods

- 1. Bank rate or discount rate-** Bank rate refers to that rate at which a central bank is ready to lend money to commercial banks or to discount bills of specified types. Thus by changing the bank rate, the credit and further money supply can be affected. In other words, rise in bank rate increases rate of interest and fall in bank rate lowers rate of interest. During the course of inflation, monetary authority raises the bank rate to curb inflation. Higher bank rate will check the expansion of credit of commercial banks. They will be left with fewer reserves which would restrict the credit creating capacity of the bank. On the contrary, during depression, bank rate is lowered, business community will prefer to have more and more loans to pull the economy out of depression. Therefore, bank rate or discount rate can be used in both type of situation is inflation and depression.
- 2. Open market operations-** By open market operations, we mean the sale or purchases of securities. As is known that the credit creating capacity of the commercial banks depend on the cash reserves of the bank. In this way, the monetary authority (Central Bank) controls the credit by affecting the base of the credit-creation by the commercial banks. If the credit to be decreased in the country, the Central Bank begins to sell securities in the open market. This will result to reduce money supply with the public as they will withdraw their money with the commercial banks to purchase the securities. The cash reserves will tend to diminish. This happens in the period of inflation. During depression, when prices are falling, the central bank purchases securities resulting expansion of credit and aggregate demand also increases and prices are also risen.

3. **Variable reserve ratio-** The commercial banks have to keep given percentage as cash-reserve with the central bank. In lieu of that cash ratio, it allows commercial bank to contract or expand its credit facility. If the central bank wants to contract credit (during inflation period) it raises the cash reserve ratio. As a result, commercial banks are left with fewer amounts of deposits. Their power to credit is curtailed. If there is depression in the economy, the reserve ratio is reduced to raise the credit creating capacity of commercial banks. Therefore, variable reserve ratio can be used to affect commercial banks to raise or reduce their credit creation capacity.
4. **Change in liquidity-** According to this method, every bank is required to keep a certain proportion of its deposits as cash with it. When the central bank wants to contract credit, it raises its liquidity ratio and vice-versa.

### **20.3.2 Qualitative or selective method**

1. **Change in margin requirement-** Under this method, the central bank change in the margin requirement to control and release funds. When the central bank feels that prices are rising on account of stock-piling of some commodities by the traders, then the central bank controls credit sanctioned by the method of raising margin requirement (Margin requirement is the difference between the market value of the assets and its maximum loan value). Let us suppose, a borrower pledged goods worth Rs. 1000 as security with a bank and get a loan of amounting to Rs. 800. This margin requirement is 200 or 20 per cent. If this margin is raised, the borrower will have to pledge of greater value to secure loan of a given amount. This would reduce money supply and inflation would be curtailed. Similarly, in case of depression, central bank reduces margin requirement. This will in turn raise the credit creating capacity of the commercial banks. Therefore, margin requirement is significant tool in the hands of central authority during inflation and depression.
3. **Direct action-** This method is adopted when some commercial bank do not cooperate the central bank in controlling the credit. Thus, central bank takes direct

action against the defaulter. The central bank may take direct action in a number of ways as under:

i) *It may refuse rediscount facilities to those banks that are not following its directions.*

ii) It may follow similar policy with the bank seeking accommodation in excess of its capital and reserves.

iii) It may change penal rates over and above the bank rate.

iv) Any other strict restrictions on the defaulter institution.

**4. Rationing of the credit-** Under this method, the central bank fixes a limit for the credit facilities to commercial banks. Being the lender or the last resort, central bank rations the available credit among the applicants. Generally, rationing of credit is done by the following four ways:

i) *Central bank can refuse loan to any bank.*

ii) Central bank can reduce the amount of loans given to the banks.

iii) Central bank can fix quota of the credit.

iv) Central bank can determine the limit of the credit granted to a particular industry or trade.

**5. Moral persuasion or advice-** In the recent year, the central bank has used moral persuasion as a tool of credit control. Moral persuasion is a general term describing a variety of informal method used by the central bank to persuade commercial banks to behave in a particular manner. Moral suasion takes the form of directive and publicity. In fact, moral persuasion is a sort of advice. There is no element of compulsion in it. The central bank focuses on the dangerous consequences of the credit expansion and seeks their cooperation. The effectiveness of this method depends on the prestige enjoyed by the central bank on the degree of co-operation extended by the commercial banks.

6. **Publicity-** Publicity is also another qualitative technique. It means to force them to follow only that credit policy which is in the interest of the economy. The publicity generally takes the form of periodicals and journals. The banks are not kept informed about the type of monetary policy, the central bank regards good for the economy. Therefore, the main aim of this method to bring the banking community under the pressure of public opinion.

#### 20.4. Monetary policy in inflation

*Inflation occurs when there is wave of optimism. It means MEC (Rate of profitability) is high on account of rising prices. As such the banks create more credit than requirements. The businessmen facing the scarcity of stocks of goods further reduce the supply. The banks cannot cope with the increased demand for credit. Under these circumstances, the aim of monetary policy is to slow down the money supply. Another reason due to which the credit would expand is the high values of securities on the stock exchanges. The increase in money supply would raise the fixed capital, plant and machinery. One may feel that it would go on for ever. But in reality it does not happen so. Both consumers spend and investment spending reaches a high pitch making credit conditions restrictive. Thus banks cannot cope up with increased demand.*

Monetary policy is effective in controlling inflation if it is induced by demand pull. The monetary authority can reduce the reserves of the commercial banks by raising interest rates, by selling securities, by raising reserve ratio, by raising margin requirements and controlling consumer credit. Thus monetary policy can control inflation by controlling monetary supply and raising the cost of borrowing. Such a monetary policy during inflation is necessary to stabilise the economy and to avoid sudden fall.

The monetary policy can be more effective during inflationary pressures. It is easier to raise interest rates than to lower them. If consumption and spending are not reduced in spite of all-out efforts to reduce money supply through 'General Measures', the monetary authority has to resort to 'Qualitative measures'. The monetary policy would be effective if it is applied quickly and continuously in checking the booms from developing into inflation.

The various methods adopted to contain inflation as under:

- i) **To check money supply-** In order to control inflation one of the most significant method is to control the supply of money. This can be done if the Central Bank of the country or the monetary authority reduces the currency.
- ii) **To raise the interest rate-** In order to control inflation, dear money policy should be followed. This can be done if the Central Bank of the country raises the bank rate. The increase in the bank rate would raise the interest rate. This would raise cost of borrowings and hence the borrowings would fall. This would check prices from further increase.
- iii) **Credit control-** In order to reduce money supply, credit must be controlled. In order to control money supply, the Central Bank adopts many quantitative and qualitative measures to control credit. In case of quantitative measures, bank rate is increased, securities are sold in the open market and liquidity ratio is increased. Similarly in case of qualitative measures, marginal requirement is raised, credit is rationed, further publicity and moral suasion also help in reducing money supply.
- iv) **Demonetisation of old currency-** In case of excessive money supply, the government can demonetise a part of money supply. This can be done if notes of high denomination are banned. This will help the economy to make a large sum of money useless. This would help in checking black money also.

*No doubt, above stated method can go a long way in controlling inflation, but experience shows that monetary policy has not been very useful in averting inflationary pressures. This lack of success has been partly the result of factors inherent in monetary policy and partly due to various neutralising effects. The effectiveness of monetary policy during inflation will depend on changes in the velocity of circulation of money because these changes sometimes may completely offset the restrictions imposed by the central bank on the supply and cost of money. The policy makers cannot ignore the differential effects and aspects of dearer money policy on different sectors of the economy.*

### **20.5. Monetary policy in deflation**

*During the Great Depression of 1929-30, there was a serious decline in the scope of monetary policy as an instrument of economic policy. It was stated that recovery from depression was severely limited than in controlling boom and inflation. This view emerged from the experience of the 'Great Depression' and the publication of Keynes 'General Theory' of Income, Price and Employment.*

*Depression refers to a continuous process of falling economic activities. Under this situation, price level falls continuously. Due to excessive aggregate supply, the problems*



of over-production and general unemployment exist. Under depression, the aim of the monetary policy is to boost aggregate demand. This is done by raising money supply, reducing interest rate and hence to raise credit.

Due to fall in prices, MEC (rate of profitability) is low, due to which income, output and employment fall and result in uncertainties. It is a period of low interest rates and high liquidity preference: The objectives of monetary policy during depression are to neutralize the fall in velocity of money, to satisfy demands for precautionary and speculative motives, to strengthen the cash position of banks and non-bank groups. This is meant to bring the interest rates down with a view to encouraging investment, etc.

Following measures are adopted in order to overcome deflation in the economy:

- i) **Cheap money policy** i.e. lowering of rate of interest, followed with a view to increasing aggregate demand, using excessive saving for development, boosting the prices of securities and confidence of security market. Reduction in the rate of interest is easier than the reduction in wages. The reduction in the rate of interest also raises consumption by encouraging a hire purchase system and credit. A fall in the interest rates in under-developed countries may adversely affect the savings and may not promote investment or allocation of resources.
- ii) **Increase in money supply-** In order to control depression, aggregate demand has to be raised. This can be done by raising money supply. Money supply can be raised by minting more currency. The government can also raise money supply by raising expenditure. This can be done if the government follows deficit financing.
- iii) **Credit expansion-** Under depression, the Central Bank should expand credit through its liberal policies. This will help in increasing money supply. This would be possible if bank rate is reduced due to which interest rate would fall, the securities should be bought from the open market and liquidity ratio be reduced. That way, commercial banks would create more credit.

In short, during depression monetary policy was very little application. The rate of interest during depression is already very low. To reduce it further is again a problem. The profit margins during depression are very low. Businessmen borrow when business is expanding and not when it is declining. During depression, the businessmen are scared because of falling profits, so even fall in the interest rate would not raise investment. One can carry a horse to water but cannot make it drink. Even if the rate of interest falls, there is a limit to the fall. The minimum interest rate is referred as 'Liquidity Trap'. Thus monetary policy pursued during depression is rendered ineffective and helpless. Even if the central bank is able to follow cheap money policy, it has hardly any significant effect on the aggregate spending. From this, it should not be concluded that monetary policy is totally ineffective or useless. It does work if it is handled carefully and properly.

## **20.6. Effectiveness of monetary policy**

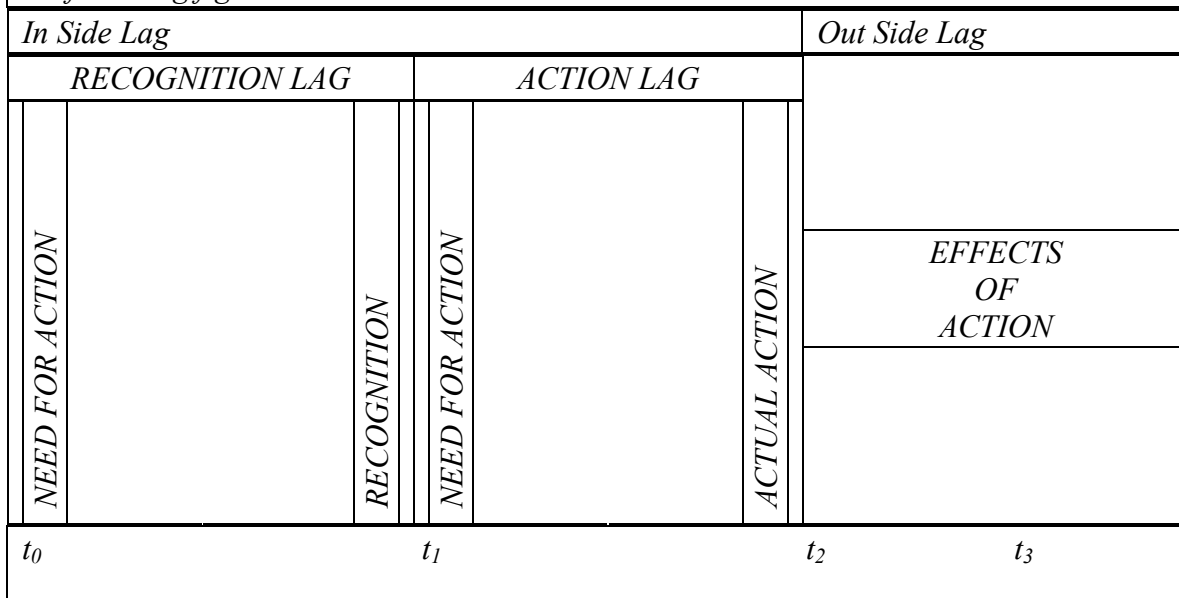
Different methods of monetary policy seem to be quite simple but its implementation is a complex task. Let us evaluate the effectiveness of monetary policy as below:

1. **Changes in velocity-** Changes in velocity of money greatly influence the effectiveness of monetary policy. In case, regulatory authority reduces the supply of money with a view of reducing credit but at the same time, people make more

use of money i.e. increase in velocity, then supply of money instead of diminishing, may increase. Again, if speculative demand also declines due to a fall in the prices of bonds. This type of decrease in demand for money also results in increasing the velocity of circumstances. Under these circumstances, effectiveness of monetary policy does not prove much effective.

2. **Non-banking financial institutions-** The policy adopted by non-banking financial institutions also affects the effectiveness of monetary policy to a greater extent. If the working of these institutions does not in accordance of monetary policy, then it can get much success. However, Prof. Gurley and Shaw attached much more significance to these institutions which sometimes limit to the smooth working of monetary policy.
3. **Lags of monetary policy-** The changes in monetary policy do not have a direct link with the changes in aggregate spending. The links between these two are through the supply, cost and availability of money. It requires a long time for monetary policy to have its effect on aggregate demand. It means monetary policy cannot bring quick changes to achieve economic stability. Some economists suggest that the central bank should not put in efforts for short-run economic stabilisation. Rather the central bank should change the money supply in accordance with the needs of the economy.
4. **Problem in forecasting-** The formulation of an appropriate monetary policy requires that the magnitude of the problem- recession or inflation is correctly assessed, as it helps in determining the dose of the medicine. What is more important is to forecast the effects of monetary actions. In spite of advances made in forecasting techniques, reliable forecasting of macroeconomic variables remains an enigma.

Monetary-lags depend on the time period taken between initial and final results, say changes in money supply to changes in aggregate demand. If a longer period is taken the longer are the lags in monetary policy and vice versa. We can say that if interest rate falls, the spending may rise out only after some time because lag has been illustrated in the following figure:



The lag in the effect of monetary policy can be divided into many parts:

- (i) **Recognition Lag-** It means some time period is required to recognise the changes in the economy so as to change the policy. In the figure, we find that there is recession in economic activity in period  $t_0$ . But it will take some time for the policy makers to recognise it. The recognition must be supported by evidence for some period. If the recession which starts in  $t_0$  is recognised in  $t_1$  this gap between  $t_0$  to  $t_1$  is called recognition lag. The time lag taken is 3 months.
- (ii) **Action lag-** Once the necessity of change in policy is required, there is need of some time to make suitable adjustments or changes in the policy. Some time is required for working out details and implementing them. The policy action may be controversial. In that case some delay is inevitable. The delay may be caused by political pressures. There may be many other reasons for delay. The action lag period is taken quite close to zero.
- (iii) **Inside lag-** The total of recognition lag and action lag is known as inside lag. Inside lag = Recognition lag + Action lag. ( $t_0t_2 = t_0t_1 + t_1t_2$ ). The length of this lag depends on the ability of policy makers to recognise, taking action for the same and what is used as a basis for computation. As regards the duration of inside lag, the length of this period is generally believed to be more than three months.
- (iv) **Outside lag-** After change in the policy, there is need for some time for these changes to work and affect aggregate spending and income. Outside lag is  $t_2$  to  $t_3$ . It is very difficult to analyse the causes of outside lag because of the involvement of complete inter-relationship in the economic system. The outside lag can be estimated by statistical inference or direct estimate method as suggested by Thomas Mayer.

Thus the total lag period includes inside and outside lag i.e.  $t_0$  to  $t_3$ . Milton Friedman uses statistical inference or direct estimate method as suggested by Thomas Mayer to estimate total lag. The total time lag may vary from six months to two years. The time lags must be reduced to ensure economic growth with stability.

## **20.7. Problems or limitations of monetary policy in less-developed and developing countries**

Monetary policy does not work effectively in the underdeveloped countries on account of the following reasons:

1. **Under-developed money market-** The money market in less developing countries is highly under-developed. Due to the unorganised nature of the money market and lack of its integration with the central bank, the traditional methods of credit control like bank rate policy, open market operations and variations in the reserve ratio etc. have got limited effect. The central bank extends its control only to the organised sector and not to the unorganised sector. This creates several complicated problems for the central bank when it tries to control the money market of the country. The money market is also conspicuous by the absence of a well-developed bill market.
2. **Non-monetized sector-** Due to the existence of an extensive non-monetized sector, changes in the money supply of the country or the changes in the interest rates do not have any effect on the level of economic activity. It is because money does not

- enter into this sector and all the transactions conducted therein are merely better exchanges. Therefore, non-monetized sector creates many problems in the smooth working of the monetary policy.
3. **Lack of integrated interest rate structure-** The various types of interest rates prevalent in the money market do not bear any definite relationship with the bank rate of the country. Any changes affected in the other interest rate do not produce proportional changes in the other interest rates. The result is that the central bank of the country is unable to control the money market in an effective manners and monetary policy fails in its operation.
  4. **Proportion of credit to money-** The proportion of credit to money in the monetized sector is very small. Nearly a 70-75% money supply consists of currency in active circulation. The bank deposits in such an economy form only a small and insignificant portion of the total money supply. This seriously limits the working of monetary policy.
  5. **Shortage of real factors-** Another problem in developing countries exists that there is a shortage of real factors like capital, entrepreneurial ability etc., therefore, monetary policy can do nothing about it.
  6. **Lack of banking facilities-** In a developing economy, adequate banking facilities are not available specially to those areas in the country which are either un-banked or under-banked. The idle savings of the people cannot be mobilised. Moreover, sometimes commercial banks do not cooperate with the central bank. Thus lack of banking facilities creates number of problems in the way of monetary policy.
  7. **Existence of inflation-** A developing economy is highly sensitive to inflationary pressure. Government incurs huge expenditure on various types of development projects. It increases the effective demand much more than the output of consumer goods. The result is a sharp rise in the internal price level. Moreover, during the course of hyper inflation, tools of monetary policy fail to work properly.
  8. **Black money-** In underdeveloped countries, large quantity of black money exists due to political and economic factors. Black money is used for activities such as hoarding and speculative motives etc. As a result, it hinders the time spirit of the various objectives of monetary policy.
  9. **Non-banking financial institutions-** According to Gurley and Shaw, non-banking financial institutions like Life Insurance Corporation, State Financial Institutions, and other Credit Financial Institutions, greatly hamper to achieve the objectives of monetary policy in an less developed country.
  10. **Deficit financing-** In the modern world, deficit financing is the main source of financing development activities. But heavy does of deficit financing has proved in operative to achieve the objectives of monetary policy. For example, monetary authority wants to check the supply of money while deficit financing helps to increase its supply. Thus how both factors can operate simultaneously?
  11. **Only persuasive policy-** Generally monetary policy in underdeveloped countries is soft, lenient, persuasive and this leads to ineffectiveness. As its role is not compulsive but permissive only which creates serious limit on the efficacy of monetary policy?

12. ***Disequilibrium in balance of payments-*** In less developed countries, monetary expansion generally leads to increased imports and unfavourable balance of payments. This puts a limitation on the monetary policy.
13. ***Investment in unproductive channels-*** The well-to-do people do not deposit money with banks but use this money in buying jewellery, gold, real state, and in conspicuous consumption etc. In other words, investment is made in unproductive channels instead of productive channel and as a result, it retards the economic development of underdeveloped countries.
14. ***Limited application of weapons of credit control-*** In the developing economies, people policy mostly rely on currency in circulation and bank deposits form only a small proportion of money policy. This being the case, weapons of credit control has only limited application.

### **20.8. Self-test questions**

9. *What is meant by monetary policy? Discuss its objectives? What are the instruments of monetary policy?*
10. *Defined monetary policy. Discuss the role of monetary policy during inflation and deflation.*
11. *What are the limitations of monetary policies? What are the factors that determine the effectiveness of monetary policy.*

### **20.9. Suggested readings**

*Shapiro, Edward, Macroeconomic Analysis, Galgotia Publications, New Delhi.*  
*Diulio Eugene, Macroeconomic, Tata McGraw Hill Publishing Company Ltd., New Delhi.*

Subject: **Economic Analysis**

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Course Code: **MC-104**

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Lesson: **21**

## **FISCAL POLICY**

**Objectives:**           **After learning this lesson, the students will be able to understand the concept of fiscal policy, its objectives, instruments, use of fiscal policy during inflation, deflation and problems.**

### ***Structure***

- 21.1. *Concept of fiscal policy*
- 21.2. *Objectives of fiscal policy*
- 21.3. *Instruments of fiscal policy*
- 21.4. *Fiscal policy in inflation*
- 21.5. *Fiscal policy in deflation*
- 21.6. *Problems or limitations of fiscal policy*
- 21.7. *Self-test questions*
- 21.8. *Suggested readings*

### **21.1.     Concept of fiscal policy**

*It is now widely accepted that the State has a *sin qua non* in the regulation of economic activity along the desired lines. Fiscal policy is traditionally concerned with the determination of state income and expenditure policy. However, in recent times, with the expanding role of state with particular reference to the need for a rapid economic growth, public borrowings and deficit budgeting has also become a part of fiscal policy. The crux of an effective fiscal policy is related to the policy decision with regard to the entire financial structure of the government such as expenditures, transfers, loans, tax revenues and debt management etc. They all are kept in a proper balance so as to achieve the best possible results in terms of economic objectives. In the ultimate sense, fiscal policy tries to achieve its objectives by regulating the working of the market mechanism while retaining the mechanism itself. In short, the extent of its success entirely depends upon numerous factors such as marking of market forces, economic stability, proper use of its tools and the flow of foreign capital and trade.*

*In simple words, fiscal policy concerns itself with the aggregate effects of government expenditure and taxation on income, production and employment. In other words, it refers to the instruments by which a government tries to regulate or modify the economic affairs of an economy keeping in view its objectives. Again, we can say that fiscal policy is a package of economic measures of government regarding its public expenditure, public revenue and public debt or public borrowings. It also outlines the influence of the resource-utilisation on the level of aggregate demand through affecting the level of aggregate consumption and investment expenditure in the economy. Moreover, it also*

suggests measures to control the economy fluctuations which may become violent and create great upheavals in the socio-economic structure of the economy.

### **21.1.1. Traditionalist view of fiscal policy**

The classical economists had a firm belief in the policy of *laissez-faire*. The Say's Law of Market was the corner-stone of all economic policies which propounds that supply creates its own demand and as a result, there is no question of general over-production or involuntary unemployment. They intend to the size of the public sector by reducing the functions of the government to the minimum possible so that the operation of market mechanism is not hindered. Thus, they believe that the free operation of market forces would achieve full-employment and ensure an optimum allocation of resources in a country. In their views, taxes were nothing more than that of unproductive expenditure resulting in a wrong diversion of resources. They felt that fiscal arrangements should not go beyond the point where the optimum allocation gets disturbed. They consider it most desirable that the government should perform only minimum essential functions and should not interfere in the working of the economic system. In other words, they repeatedly stressed that the fiscal policy should be neutral in its impact upon the economic system. For the principle of sound finance, they advocated that government is the best judge which spends the least and imposes the lowest amount of taxes. They laid down certain conditions as:

- (a) Government should spend the least and tax the little.
- (b) Taxation should have minimum adverse effect on production.
- (c) Public expenditure should be on productive fields.
- (d) There must be a balanced budget.

Further the traditionalist had the confirmed opinion regarding the principle of a balanced budget and surplus or deficit budget as undesirable. Prof. Hansen envisages two things for the principle of fiscal neutrality as:

- i) The reduction of government spending to a certain limit; and
- ii) A tax structure that leaves the product and factor prices undisturbed. Similarly, Samuelson also favoured fiscal neutrality on the following grounds:

- a) nation's budget should be administered on the same lines as a private budget.
- b) tax system should not cause distributional changes.
- c) taxation should fall on current consumption so that private savings and investments are encouraged thus resulting in higher rate of growth.

### **21.1.2. Modern views of fiscal policy**

Prof. Keynes, A.P. Lerner, G. Myrdal gave a new shape to the fiscal policy. They refuted the classical economists' concept that supply creates its own demand. As such, there is no possibility of unemployment and the equilibrium in the economy. The same are automatically achieved because of market forces, asserted famous economist Say. However, Keynes believed that in an advance economy, the propensity to consume tends to diminish as income increases. In other words, propensity to save increases with increase in income. The gap between less consumption and larger saving results in lowering demand for goods and services produced at one time, which leads to disequilibrium in the economy. Therefore, to maintain equilibrium level of income and employment, it is a pre-requisite to off-set the effects of decrease in demand and its impact on output due to decrease in consumption by a corresponding increase in public

expenditure. Therefore, it is the prime duty of the government to increase public expenditure directly by undertaking public works programme on a large scale. In this manner, modern economists stress that the government has to play a positive role to regulate and control the economy by decisive economic activities. They call it the principle of functional finance. To put it in a different sense, such financial activities are called fiscal policy which are undertaken to correct either deflation or inflation.

### **21.1.3. Keynes view on fiscal policy**

Fiscal policy has been developed under the great influence of J.M. Keynes. Post-Keynesian popularity of fiscal policy has also been due to non-effectiveness of monetary policy as an instrument of removing of economic stability and control was first of all emphasised in his well known work. The general Theory- 'Employment, interest and money'. Primarily, Keynes made a fundamental departure from the traditional fiscal neutrality. He intended that the government should interfere in an economic system through fiscal instruments for bringing stability at a higher level of employment and income. Keynes, however, did not mean to discourage private investment and enterprise. He wanted the state to play a 'balancing role' and supplement the activities of private investors through public spending.

### **21.2. Objectives of fiscal policy**

Fiscal policy aims at a number of objectives depending upon the circumstances in a country. Important objectives of fiscal policy are:

- (a) **Optimum allocation of economic resources-** It means that the fiscal policy should be framed to increase the efficiency of productive resources like men, money, materials, etc. It also means that the government should spend on those public works which give the maximum employment and are beneficial to society.
- (b) **Equitable distribution of wealth and income-** It means that difference in payments to the factor of production should be reduced to the minimum and fiscal policy should be designed to bring about an equality of income between different groups by imposing tax on rich and spending more on poor.
- (c) **To maintain price stability:** Another important objective of fiscal policy may be to maintain price stability. A fall in prices leads to a sharp decline in business activity. On the other hand, inflation may hit hard the fixed income classes and may benefit the speculators and traders. Fiscal policy has to maintain a reasonable and stable general price level to benefit all sections of the society.
- (d) **Full employment:** The most important objective of fiscal policy is the promotion and maintenance of full employment; because through it all other objectives are automatically achieved. For this, fiscal authorities should start programmes of removing unemployment. For the moment, it suffices to say that fiscal policy aimed at full employment envisages the erection of a tax structure, not with a view to raising revenue but with a view to noticing the effects that specific kinds of taxes will have on consumption, saving and investment; and the determination of the volume and direction of government spending not to provide certain services only but also to know how it will fit into the general pattern of total spending currently taking place in the economy.

These objectives are not always compatible, particularly price stability and full employment. The objective of equitable distribution of income may come in conflict with the objective of economic efficiency and economic growth. Fiscal policy may transfer



wealth from the rich to the poor through the use of taxation with a view to bringing about a redistribution of income, but it may be criticised on the ground that the transfer of income from the rich to the poor will affect savings and capital formation, which in turn, would affect investment and employment. Fiscal policy as a means for influencing the flow of income may involve either a change in the level of taxes or a change in the level of government expenditures or a combination of the two. Whatever method is adopted the basic consequences are the same. To impose restraint increased taxes or reduced expenditures may result in a surplus if tax revenues over expenditures. To encourage expansion, reduced taxes or increased spending may cause a deficit of revenue as compared to expenditures.

### **21.3. Instruments of fiscal policy**

Fiscal policy through variation in government expenditure and taxation profoundly affects national income, employment, output and prices. An increase in public expenditure during depression adds to aggregate demand for goods and service and leads to large increase in income. On the other hand, a reduction in public expenditure during inflation reduces aggregate demand, national income, output and prices. Similarly, an increase in taxes tends to reduce national income and vice-versa. Thus, the government can control inflationary and deflationary pressures in the economy by judicious combination of expenditure and taxes. Thus, the various instruments or measures which influence the economic stability of an economy are described as:

#### **21.3.1. Budget**

The budget of a nation is a useful instrument to assess the fluctuations in an economy. Different budgetary principles have been formulated by the economists, prominently known as (1) annual budget, (2) cyclical balanced budget and (3) fully managed compensatory budget. Let us briefly explain them.

1. **Annual balanced budget-** The classical economists propounded the principle of annually balanced budget. They defended it with force till the deep rooted crisis of 1930's. The Keynes and other economist criticise the concept of balanced budget.
2. **The cyclically balanced budget-** The cyclical balanced budget is termed as the 'Swedish budget'. Such a budget implies budgetary surpluses in prosperous period and employing the surplus revenue receipts for the retirement of public debt. During the period of recession, deficit budgets are prepared in such a manner that the budget surpluses during the earlier period of inflation are balanced with deficits. The excess of public expenditure over revenues are financed through public borrowings. The cyclical balanced budget can stabilise the level of business activity. During inflation and prosperity, excessive spending activities are curbed with budgetary surpluses while budgetary deficits are curbed during recession with raising extra purchasing power. This policy is favoured on the following account:

- i) The government can easily adjust its finances according to the needs;
- ii) This policy works smoothly in all times like depression, inflation, boom and recession;
- iii) Cyclically balanced budget simply ensures stability but gives no guarantee that the system will get stabilised at the level of full employment.

3. **Fully managed compensatory budget-** This policy implies a deliberate adjustment in taxes, expenditures, revenues and public borrowings with the motto of achieving full employment without inflation. It assigns only a secondary role to the budgetary balance. It lays down the emphasis on maintenance of full employment and stability in a price level. With this principle, the growth of public debt and the problem of interest payment can be easily avoided. Thus, the principle is also called 'functional finance'. The fully managed compensatory budget got widespread approval from the economists and businessmen. It was embodied in the Employment Act of 1946 in United States.

### **21.3.2. Taxation**

Taxation is a powerful instrument of fiscal policy in the hands of public authorities which significantly affect the changes in disposable income, consumption and investment. An anti-depression tax policy increases disposable income of the individual, promotes consumption and investment. Obviously, there will be more funds with the people for consumption and investment purposes at the time of tax reduction. This will ultimately result in the increase of spending activities i.e. it will tend to increase effective demand and reduce the deflationary gap. In this regard, sometime, it is suggested to reduce the rates of commodity taxes like excise duties, sales tax and import duty. As a result of these tax concessions, consumption is promoted. Economists like Hansen and Musgrave, with their eye on raising private investment, have emphasised upon the reduction in corporate and personal income taxation to overcome contractionary tendencies in the economy. No doubt, these steps will push the disposable income, yet their impact upon investment is uncertain. In the opinion of Prof. Kalecki, when general economic situation is demoralising in depression, even tax reduction cannot provide stimulus strong enough to guide entrepreneurs to alter their decision to undertake more investment. Therefore, Kalecki has totally disapproved the method of tax reduction for stimulating private consumption and investment.

### **21.3.3. Public expenditure**

The active participation of the government in economic activity has brought public spending to the front line among the fiscal tools. The appropriate variation in public expenditure can have more direct effect upon the level of economic activity than even taxes. The increased public spending will have a multiple effect upon income, output and employment exactly in the same way as increased investment has its effect on them. Similarly, a reduction in public spending can reduce the level of economic activity through the reverse operation of the government expenditure multiplier.

**Public expenditure in inflation-** During the period of inflation, the basic reason of inflationary pressures is the excessive aggregate spending. Both private consumption and investment spending are abnormally high. In these circumstances, public spending policy must aim at reducing the government spending. In other words, some schemes should be abandoned and others be postponed. It should be carefully noted that government spending, which is of productive nature, should not be shelved, since that may aggravate the inflationary dangers further. However, reduction in unproductive channels may prove helpful to curb inflationary pressures in the economy. But such a decision is really difficult from economic and political point of view. It is true, yet the fiscal authority can vary its expenditure to overcome inflationary pressure to some extent.

**Public expenditure in depression-** In depression, public spending emerges of greater significance. It is helpful to lift the economy out of the morass of stagnation. In this period, deficiency of demand is the result of sluggish private consumption and investment expenditure.

There are two concepts of public spending: (i) Compensatory public spending, and (ii) Pump priming.

(i) **Compensatory Public Spending-** It means that public spending is undertaken with a clear view to compensate for the decline in private investment. The basic idea is that when private investment declines, public expenditure expands and as long as private investment is below normal, public compensatory spending would continue. These expenditures will raise the level of income, output and employment. Public spending implies that the government should undertake additional expenditure with specific object of compensating the deficiency in aggregate demand. The compensatory public spending may assume different forms such as relief expenditure, subsidy, social insurance payments and public works. However, certain conditions of compensatory public spending are stated below:

(ii) **Pump Priming-** Pump priming refers to increase in private investment through an injection of fresh purchasing power into income stream. It is believed that public expending will help to start and revive the economic activity which later on may set in motion a process of recovery from the conditions of depression. Thus, through such a spending, the economy may move itself at a satisfactory level without further assistance from the government. It is like a little water poured into a pump to prime it, it may supply an endless flow of water. Similarly, if once the government spends some money, the flow of economic life would continue smoothly for ever. Therefore, the main criterion to determine the amount of pump priming is that the system may operate continuously afterwards on its own motive force.

#### **21.3.4. Public works**

Keynes General Theory highlighted public works programme as the most significant anti-depression device. There are two forms of expenditure i.e. Public Works and Transfer Payments. Public Works according to Prof. J.M. Clark, are durable goods, primarily fixed structure, produced by the government. They include expenditure on public works as roads, rail tracks, schools, parks, buildings, airports, post offices, hospitals, irrigation, canals etc. Transfer payments are the payments such like interest on public debt, subsidy, pension, relief payment, unemployment, insurance and social security benefits etc. The expenditure on capital assets (public works) is called capital expenditure.

Public works are supported as an anti-depression device on the following grounds:

- (i) They absorb hitherto unemployed workers.
- (ii) They increase the purchasing power of the community and thereby stimulate the demand for consumption goods.
- (iii) They help to create economically and socially useful capital assets as roads, canals, power plants, buildings, irrigation, training centres and public parks etc.
- (iv) They provide a strong incentive for the growth of industries which are generally hit by the state of depression.

- (v) *They help to maintain the morale and self respect of the work force and make use of the skill of unemployed people.*
- (vi) *The public works do not have an off setting effect upon private investment because these are started at a time when private investment is not forthcoming.*

*Limitations of expenditure on public works-*

1. ***Difficult forecasting-*** *The effectiveness of public works programmes always rests upon accurate forecasting of the ensuing depression or boom, but prediction of accurate forecasting is very difficult.*
2. ***Timing of public works-*** *Another serious problem relates to the timing of public works with the moment of cycle. Due to lack of accurate forecasting, proper timing is neither feasible nor possible. Thus this factor alone undermines the significance of public works as an instrument of stabilisation.*
3. ***Delay in starting-*** *Public works programmes is not something which can be started immediately. Actually, it is a long term programme which requires proper planning with regard to the finance and engineering. In this way, delay is the natural cause.*
4. ***Scarcity of resources-*** *The undertaking of public works programme may pose a serious threat due to non-availability of resources. It is likely that scarcity of resources may further aggravate the crisis instead of giving the pace of smoothness.*
5. ***Misallocation of resources-*** *As the slump gets deepened, there is wide spread unemployment of manpower and equipment. Generally, public works are located in only few selected areas. Thus, they may prove to be inadequate to cope with the requirements. Again, immobility in factors of production may also prevent the economic utilisation of available resources. As a result, they reduce the efficiency of public works programme.*
6. ***Burden of public debt-*** *The public works programme, generally, is financed through borrowing during depression. This will saddle the country with a heavy burden of repayment of principle amount and interest therein.*
7. ***Cost price maladjustments-*** *The public works programme may perpetuate cost price maladjustments in heavy industries where public expenditure is concentrated. During the period of boom, wages and prices in construction industries have a strong upward tendency while in recession or depression, prices move downward, wages and costs relatively remain sticky. In short, such distortion in cost price structure brings more instability in the economy.*
8. ***Effect on private enterprise-*** *In certain areas, the construction programmes; undertaken by the public agencies may compete with private investment. As a result, the latter is driven out of business. In such a case, public works will prove to be self-off setting and the aggregate demand will possibly fail to increase.*
9. ***Control over public works-*** *The success of public works mostly depends on the nature of control over them. If public works are controlled by the central authority, delay is likely to arise in selected projects.*
10. ***Political considerations-*** *Public works are often started in democratic countries in certain areas not on account of economic reasons, but because of the political pressure at national, state and local levels. Consequently, the economic utility of such works remains very limited.*

### **21.3.5. Public Debt**

*Public debt is a sound fiscal weapon to fight against inflation and deflation. It brings about economic stability and full employment in an economy. The government borrowing may assume any of the following forms mentioned as under:*

**(a) Borrowing from Non-Banking Public-** *When the government borrows from non-banking public through sale of bonds, money may flow either out of consumption or saving or private investment or hoarding. As a result, the effect of debt operations on national income will vary from situation to situation. If the bond selling schemes of the government are attractive, the people induce to curtail their consumption, the borrowings are likely to be non-inflationary.*

*If the government bonds are purchased by non-banking individuals and institutions by drawing upon their hoarded money, there will be net addition to the circular flow of spending. Consequently, the inflationary pressures are likely to be created. But funds from this source are not commonly available in large quantity. Its main implication is that borrowings from non-banking public are more advantageous in an inflationary period and undesirable in a depression phase. In short, the borrowings from non-banking public are not of much significant magnitude whether it comes out of consumption, saving, private investment or hoarding.*

**(b) Borrowing from banking system-** *The government may also borrow from the banking institutions. During the period of depression, such borrowings are highly effective. In this period, banks have excessive cash reserves and the private business community is not willing to borrow from banks since they consider it unprofitable. When unused cash lying with banks is lent out to government, it causes a net addition to the circular flow and tends to raise national income and employment. Therefore, borrowing from banking institutions has desirable and favourable effect especially in the period of depression when the borrowed money is spent on public works programmes.*

**(c) Drawing from treasury-** *The government may draw upon the cash balances held in the treasury for financing budgetary deficit. Since, it demonstrates dishoarding result in a net addition in the supply of money, it is likely to be inflationary in nature. But, generally, there are small balances over and above what is required for normal day to day requirement. Thus, such borrowings from treasury do not have any significant result.*

**(d) Printing of money-** *Printing of money i.e. deficit financing is another method of public expenditure for mobilising additional resources in the hands of government. As new money is printed, it results in a net addition to the circular flow. Thus, this form of public borrowing is said to be highly inflationary. Deficit financing has a desirable effect during depression as it helps to raise the level of income and employment but objection is often raised against its use at the time of inflation or boom. Here, it must be added that through this device, the government not only gets additional resources at minimum cost but can also create appropriate monetary effects like low interest rates and easy money supply and consequently economic system is likely to register a quick revival.*

### **21.4. Fiscal policy in inflation**

*Keynes has laid stress on the role of fiscal policy to check inflation. Basically, inflationary situation occurs due to the condition of excessive demand when the private spending on consumption and investment of goods and foreign spending exceed the full employment output. Keynes says that true inflation only starts after full employment. But in actual practice, inflationary pressures are realised even before full employment due to*

the other bottlenecks and rigidities of factor supply. For checking such situations in the economy, the following fiscal measures can be adopted:

1. **Control over public expenditure-** The best solution to curb inflation is the control over public expenditure. Therefore, efforts should be made to curtail unnecessary expenditure to the maximum possible extent.
2. **Increase in Taxes-** Another way to check inflation, government should impose new taxes. The rate of old taxes may also be raised. But the government must be careful that taxes should not adversely affect the production in the country.
3. **Increase of public borrowing-** In order to reduce private expenditure, steps may be taken to mop up the purchasing power of the private sector through public borrowing. This can be done by the sale of bonds, shares and debentures.
4. **Delay in the payment of old debts-** To check inflation, government should try to defer the repayment of old debts. This will restrict the current flow of money in the country.
5. **Surplus budget-** Still another method to check inflation which can be adopted by the government is to prepare surplus budget. People will have less purchasing power when the revenue of the government is more than its expenditure. As a result, demand and price level will fall.

### **21.5. Fiscal policy in deflation**

During deflation, there is a tendency for the prices to fall. Hence, following measures can be adopted to control deflation.

1. **Increase in Public Expenditure-** Under depression, public expenditure must increase. As a result, demand will increase. Increased demand will check the tendency of the prices to fall. Therefore, additional doses of public expenditure will help to lift the economy out of the morass of stagnation.
2. **Decrease in taxes-** During depression taxes should be decreased. As a result of decrease in direct taxes like income tax, corporation tax etc., investors will prompt more investment and spend more on consumption. Thus, the aggregate demand will increase and depression be brought under control.
3. **Increase in social welfare expenditure-** Government should spend more on such social welfare activities as education, public health and medical services, social security, grants, roads, canals etc., which in turn raise public welfare. Such government spending serves as compensatory spending. It will encourage investment and increase aggregate demand. Thus tendency of falling prices would be checked.
4. **Prices support policy-** Another method to control deflationary forces, is the price support policy. It is because prices generally fall heavily. Therefore, government has to pursue price support policy. During this period, government buys itself and stocks/essential at a fixed price is called support price. By this method, tendency of the falling prices is arrested.
5. **Deficit financing-** The additional doses of deficit financing can help to increase aggregate demand. This will push the prices upward.
6. **Pump priming-** Pump priming means to increase private investment through an injection of fresh purchasing power into income stream. As we know that private investment is at lowest ebb during depression. To increase it, public investment is essential which set in motion a process of recovery and move itself at a satisfactory level. It encourages investment in two ways:

(i) In order to increase public investment government borrows from the banks. The banks lend their idle cash to the government. Thus, credit is created by the banks and investment gets boosted.

(ii) On account of increase in public investment there is many times more increase in total income under the impact of multiplier. It also promotes private investment. Because of multiple increases in income there is also a corresponding increase in effective demand. Therefore, pump priming proves very effective in increasing private investment especially during depression.

## **21.6. Problems or limitations of fiscal policy**

Although fiscal policy gained prominence during world depression of 1930's, yet its practical application has a number of problems or limitations. In view of such a situation, let us understand fully and limitations which are associated with a fiscal policy. They are:

**1. Policy lags-** During the recent times, there is not much argument about the desirability or otherwise of a discretionary fiscal policy. The burning question in this context is related with the timing of the fiscal measures. Unless the variations in taxes and public expenditure are neatly timed, the desired counter-cyclical effects cannot be realized. There is generally some interval between the time when a particular action is needed and the time when a fiscal measure has its impact felt. The duration of this interval determines the extent to which a specific fiscal measure can be effective. This time interval comprises of following three types of lags:

(a) **Recognition Lag-** This is the interval between the time when action is needed and when it is recognized that action is needed. This lag may exist when a change in the economy and report concerning the change do not coincide. Such a lag has duration of 3 months. It can be reduced if the forecasting is satisfactory.

(b) **Administrative lag-** This is the interval between the time when need of an action is recognized and the time when the action is actually taken. This is perhaps the most difficult lag to deal with. Even when the need of action has been recognised, the sanction from legislature and executive must take some time and that may involve about 1 to 15 months of time. In order to reduce such a lag and to minimize the legislative and executive red-taps, it is important to keep a shelf of public works in readiness. The recognition and administrative lags together determine the inside lag of the fiscal policy and its length, according to some experts, is 4 to 18 months.

(c) **Operational lag-** The time interval between when action is taken and when it has its impact on income and employment is known as the operational or the outside lag. Albert Ando and E.C. Brown has pointed out that the change in personal income taxes produce significant changes in disposable money income and consumption within a month or two; changes in the corporate tax structure produce changes in corporate spending in about 3 or 4 months. Willes was of the view that the outside lag of fiscal policy has a short duration of 1 to 3 months only. J.G. Ranlett, however, considers that these estimates need modification. On the basis of U.S. income tax data of 1960's, he emphasized that the variation in income tax rates affected changes on consumption spending with a lag of about 3 to 9 months. Even this estimate of outside lag of fiscal policy is much lower than that of the monetary policy.

**2. Forecasting-** Another most serious limitation of fiscal policy is the practical difficulty of observing the coming events of economic instability. Unless they are

correctly observed the amount of revenue to be raised, the amount of expenditure to be incurred or the nature and extent of budget balance to be framed can not be suitably planned. In fact, success of fiscal measures lastly depends on the accurate predictions of various economic activities. In its absence, it proves to be a little bit erratic.

**3. Correct size and nature of fiscal policy-** The most important necessity on which the success of fiscal policy will depend is the ability of public authority to frame the correct size and nature of fiscal policy on the one hand and to foresee the correct timing of its application on the other. It is, however, too much to expect that the government would be able to correctly determine the size, nature of composition and appropriate execution-time of fiscal policy.

**4. Fiscal selectivity-** When monetary policy is general in nature and impersonal in impact, the fiscal policy, in contrast, is selective. The former permits the market mechanism to operate smoothly. The latter, on the contrary, encroaches directly upon the market mechanism and gives rise to an allocation of resources which may be construed as good or bad depending upon one's value judgements. A particular set of fiscal measures may have an excessively harsh impact upon certain sectors, while leaving others almost unaffected.

**5. Inadequacy of fiscal measures-** In anti-depression fiscal policy, the expansion of public spending and reduction of taxes are always more elements. The question arises naturally, whether a specific variation in public spending or taxes will bear the desired results or not. In case the injections or withdrawals from the circular flow are more or less than what are required, the system will fail to move in the desired direction. This results exaggeration of instability in the economy.

**6. Adverse effect on redistribution of income-** It is felt that fiscal policy-measures redistribute income, the actual effect will be uncertain. If income is redistributed in favour of the low-income classes whose marginal propensity to consume is high, the effect will be increase in total demand; but the fiscal action will be contractionary if larger part of the additional income goes to people having higher marginal propensity to save.

**7. Reduction in national income-** Balanced budget multiplier as a fiscal weapon can be gainfully applied during depression is conditioned by the fact of marginal propensity to spend of the recipients of public expenditure being larger than or, at least, equal to that of the tax-payers. In case it becomes smaller than for the taxpayers, the fiscal programmes under balanced budget will bring about reduction in the national income.

**8. No solution for unemployment-** The purpose of fiscal policy will be defeated if the policy can not maintain a rising supply level of work effort. The national income will rise with increase in productive efficiency and increased supply of work effort. But if the tax measures are stringent and too high, they will certainly affect the incentive to work. This is an important limitation of fiscal policy.

**9. Adverse psychological reaction-** Large deficit programmes financed by borrowings bring about adverse psychological reactions. Rumours of government bankruptcy discourage investors and often flight of capital takes place.

**10. Hardships in U.D.C.-** The creation of additional income through compensatory fiscal measures are not easily possible in underdeveloped countries as in advanced economies. This is mainly because a stagnating agricultural sector dominates the largest



part of their economy where marginal propensity to consume is so high that most of the additional income is consumed in the peasant farm and the marketable surplus is the least.

**11. Administrative problems in democratic countries-** In a democracy fiscal policy measures must be a time-consuming process. Legislative actions, administrative tasks and the executive process are often delayed and the original estimates of revenue earnings and government expenditures often become irrelevant. The operational lag relating to fiscal measures results in a considerable erosion of effect and the gap between expected achievement and the real attainment often becomes vast.

**Limitations in under-developed countries-** In U.D.C., there are other several limitations which act as an obstacle in the successful working of fiscal policy. They are summarised below:

In under-developed countries, there are other several limitations which act as an obstacle in the successful working of fiscal policy. They are summarised below:

- (a) Tax evasion leading to generation of black money.
- (b) Existence of barter Economy.
- (c) Poor performance of public sector.
- (d) Limited scope due to wide-spread poverty and unemployment.
- (e) Lack of confidence and sense of cooperation among people towards fiscal measures.
- (f) Low elasticity of taxes.
- (g) Dominance of non-monetised sector.
- (h) Narrow and unorganised money and capital market.

In view of the above-mentioned inflexibility, limitations and shortcomings, the role of fiscal policy cannot be underestimated. Fiscal policy, if properly planned and co-ordinated, may yield desired results to bring economic stability. Prof. Musgrave has rightly pointed out that fiscal policy has now its days. Therefore fiscal mechanism can play a vital role in economic development in conjunction with other policy instrument like monetary policy and income policy.

### **21.7. Self-test questions**

12. What is meant by fiscal policy? What are its objectives? Explain the instruments of fiscal policy.
13. How the fiscal policy can be useful during inflation and deflation? What are the limitations of fiscal policy.

### **21.8. Suggested readings**

Branson, W.H., *Macroeconomic Theory and Policy*, A.I.T.B.S. Publishers and Distributor, New Delhi, Ch. 5.

Musgrave, Richard A., *The Theory of Public Finance*, Mc-Graw Hill, New York.

Rangarajan, C. and Dholakia, B.H., *Principles of Macroeconomics*, Tata McGraw Hill Publishing Company Ltd., New Delhi.

Shapiro, Edward, *Macroeconomic Analysis*, Galgotia Publications, New Delhi.

**COURSE: ECONOMIC ANALYSIS**

**COURSE CODE: MC-104**

**AUTHOR: Dr. S. S. Kundu**

**LESSON: 22**

**VETTER: Dr. Karam Pal**

***CONTEMPORARY ISSUES IN ECONOMIC ANALYSIS***

**OBJECTIVE:** After going through this lesson the students should be able to explain the economic scenario of India and potential of Indian Economy at global level.

### **STRUCTURE:**

- 22.1 Introduction
- 22.2 Global and Asian Economies' Scenario
- 22.3 Indian Economy and Sustainability in terms Of Economic Growth
- 22.4 Globalization
- 22.5 Privatization
- 22.6 Disinvestments and Foreign Direct Investments
- 22.7 Indian Agriculture in Market Friendly Regime
- 22.8 Social Justice, Human Rights Vs. Market Friendly Economic Policy
- 22.9 India under Globalization and its Future
- 22.10 Summary
- 22.11 Self-Test Questions
- 22.12 Suggested Readings

### **22.1 INTRODUCTION**

India has come a long way since its independence in 1947. Its economy has been characterized by a diversified industrial base, a growing, world-class IT and software development sector and a relatively large and sophisticated financial sector, with a population of over one billion to support. India has been gradually transforming its economic base from agrarian to industrial and commercial. The agricultural sector accounts for 25 percent of GDP, the industrial sector 34

percent, and services sector 51 percent. India's economic performance over the past several decades is generally thought to have lagged that of China, its northern neighbor. However, a close look at what India has accomplished over the past decade when it began to seriously pursue economic reform suggests that it has also made dramatic progress. What is especially remarkable is that India has made such great economic progress under a democratic governmental structure that protects the individual freedom of its citizens. Such a task is pretty unusual in recent times, especially in the Asian region, where rapid economic progress has often been the precursor to political reform and liberalization. For many years after independence, Indian economic policy emphasized central planning, with the government setting goals for, and closely regulating, private industry. In the late 1970s, the government began to reduce state control of the economy, but made very slow progress toward this goal. By 1991, the government still ran many of the major industries and maintained most of the infamous 'government permit raj' that required government permission for many routine business decisions. During the Persian Gulf conflict in 1991, India faced a financial crisis because of rising oil prices, which stimulated economic reforms and liberalization. These reforms removed most of the government regulations on investment, including many on foreign investment, and eliminated the quota and tariff system that had kept trade at low levels. Reforms also de-regulated a number of industries and privatized many public enterprises. Apparently, the reforms were good for the economy; GDP grew at an average of more than six percent through the year 2000. The economy even weathered the Asian financial crisis in 1997-98 with only a slight

depreciation of the rupee and a bit less foreign direct investment. Perhaps the major reason for India's avoidance of the contagion that swept through Southeast Asia during the crisis is that it never opened its economy to free movement of international capital or made the rupee fully convertible. The recognition that its institutions were not fully ready for the rigors of internationally mobile capital was, in retrospect, a great blessing. Private investment has been the fuel for India's recent economic success; domestic savings and investment now run at about 22 percent of GDP. While foreign direct investment reached a record high of US\$3.6 billion in 1997, 20 times higher than it was before the reforms in 1991, inflows of direct and portfolio investment from abroad are miniscule as compared to those received by China. India has more work to do to become a truly attractive destination for foreign investment. An earthquake on January 26, 2001, in Gujarat state collapsed villages, homes and high rises and killed an estimated 30,000 people. Tens of thousands more were injured and hundreds of thousands left homeless. The government estimated damage at more than US\$4.2 billion, equivalent to well over one percent of GDP. And, the impact of the dramatic global slowdown in IT-related investment hit India's software/technology sector—a major exporter to just those markets most affected by the IT investment depression. Agricultural output growth was also very low in 2001. Yet, the economy still managed to grow five percent on the strength of consumption and domestic investment demand. The BJP-led coalition government is not in a strong position to push the further reforms the economy needs to avoid a further slowdown in growth. Fiscal policy cannot be used to stimulate growth because the

budget deficit is already too high. Real progress needs to be made in getting real interest rates lower, de-regulating agriculture, getting reasonably-priced and reliable electricity service more widely established and eliminating restrictive, outmoded labor practices. An outbreak of domestic violence between Hindus and Muslims in early 2002 is a most unfortunate distraction for the nation's political leaders from urgent reform business.

## **22.2 GLOBAL AND ASIAN ECONOMIES' SCENARIO**

The global economy stimulated by strong monetary and fiscal measures recorded robust growth and favourable economic expansion. It facilitated the Indian economy to continue in the accelerated growth path with considerably improved performance of industry and services sectors for the second consecutive year. Despite a commendable performance, both the global and domestic economies were plagued by inflationary pressure during 2004-05 as a result of persistently high oil prices. Consequently, inflation coupled with less than normal South-West monsoon had an adverse effect on the performance of the Indian economy. This section discusses the macro economic and developmental changes in agriculture and rural economies of the world in 2004 and in India during 2004-05.

The world output is projected to have grown at 5.1 per cent in 2004, the highest in three decades, on account of robust growth in both advanced and emerging market economies. The growth of output in 2004 in the advanced economies and Newly Industrialized Asian Economies (NIAEs) was higher by 1.4 and 2.4 percentage points, respectively, compared to 2003. The growth impetus emanated from buoyant performances by USA, Japan and NIAEs. Other emerging markets

and developing economies and the Commonwealth of Independent States (CIS) exhibited positive growth trends (Table 22.1).

**Table 22.1: Overview of Global Economy (Percent)**

Growth	2003	2004*	2005*
<b>A. GDP (Real)</b>			
a. World	4.0	5.1	4.3
b. Advanced Economies	2.0	3.4	2.6
i. United States	3.0	4.4	3.6
ii. European Union	0.5	2.0	1.6
iii. Japan	1.4	2.6	0.8
iv. Newly Industrialised Asian Economies	3.1	5.5	4.0
c. Other Emerging Markets and Developing Economies	6.4	7.2	6.3
i. Asia (Developing Nations)	8.1	8.2	7.4
ii. China	9.3	9.5	8.5
iii. India	7.5	7.3	6.7
iv. ASEAN - 4@	5.4	5.8	5.4
d. Commonwealth of Independent States (CIS)	7.9	8.2	6.5
<b>B. World Trade Volume (goods &amp; services)</b>	4.9	9.9	7.4

\* Projected.  
@: Includes Indonesia, Malaysia, Philippines and Thailand  
Source: World Economic Outlook, IMF, May 2005

Among Asian nations, China continued its robust growth in 2004 contributing significantly to the growth momentum of the region. The impressive increase in global output manifested itself in an increase in the demand for merchandise exports, resulting in a sharp increase of 5 percentage points in the volume of world trade in 2004. However, despite encouraging recovery of the global economy, high oil prices and its uncertain supply continue to threaten the sustainability of the global growth process. The world food grains production increased to 2.31 billion tonnes (7.9%) in 2004 from 2.14 billion tonnes in 2003. This was due to substantial increase in food grains production in Europe (29.2%), N.C. America (9%) and Asia (3.9%) (Table 22.2).

**Table 22.2: Share of Continents in World Production of Agricultural Commodities (Million Tonnes)**

Region/Year	Cereals		Pulses		Foodgrains		Oilseeds		Fibre Crops	
	2003	2004*	2003	2004*	2003	2004*	2003	2004*	2003	2004*
Asia	997.0	1,034.7	27.0	28.9	1,024.0	1,063.6	59.4	64.0	16.1	17.7
Africa	129.8	128.1	9.4	9.3	139.2	137.4	7.2	7.3	1.8	2.0
Europe	355.0	460.8	7.8	8.0	362.8	468.8	14.5	15.1	0.7	0.7
N.C. America	435.6	474.0	7.0	8.6	442.6	482.6	18.7	22.4	4.1	5.1
S. America	123.0	118.0	4.2	3.9	127.2	121.9	20.5	19.7	1.3	1.8
Australia	38.0	35.2	2.1	2.2	40.1	37.4	0.7	0.7	0.3	0.4
<b>World</b>	<b>2,078.4</b>	<b>2,250.8</b>	<b>57.5</b>	<b>60.9</b>	<b>2,135.9</b>	<b>2,311.7</b>	<b>121.0</b>	<b>129.2</b>	<b>24.3</b>	<b>27.7</b>

\* Provisional Source: Agricultural Database, FAO, 2004.

The world production of oilseeds and fibre crops also witnessed an increase of 6.8 and 14 per cent, respectively. Further, as in 2003, the world cereals production constituted 97.4 per cent of the world food grains production.

Rice, wheat and coarse cereals constituted 27, 26 and 44 per cent, respectively, of the total world food grains production in 2004. India accounted for 15 per cent of world production of rice. Despite being the primary food source of Asian economies, rice production is facing serious constraints such as decline in yield, depletion of natural resources, gender-based conflicts, etc. Keeping this in view, the United Nations General Assembly declared 2004 as the International Year of Rice with the theme 'Rice is life', drawn from an understanding that rice-based systems are essential for food security. Further, rice based production systems and their associated post harvest operations employ nearly one billion rural people in developing countries and about four-fifth of the world's rice is grown by small - scale farms in low income countries. India continued to be one of the fastest growing economies among the major emerging nations, despite facing constraints like the deficient South-West monsoon, hardening of international oil and steel prices and extensive damage to life and property due to the tsunami along her southern coast. As per the advance estimates of Central Statistical Organization (CSO), growth of

was projected at 6.9 2004-05 (Table

**Table 22.3: Economic**  
The growth in services sectors was 8.3 and 8.6 per cent, during 2004-05. The from agriculture and

TABLE 22.3. ECONOMIC INDICATORS			
Particulars	2002-03	2003-04	2004-05
Growth in (%)			
(a) Overall GDP	4.0 <sup>P</sup>	8.5 <sup>Q</sup>	6.9 <sup>A</sup>
(b) GDP from Agriculture & Allied Activities	-7.0 <sup>P</sup>	9.6 <sup>Q</sup>	1.1 <sup>A</sup>
(c) Agriculture Production	-16.0	21.3	-0.6
(d) Foodgrains Production	-18.9	23.0	-1.2
(e) Industrial Production	6.6 <sup>P</sup>	6.5 <sup>Q</sup>	8.3 <sup>A</sup>
(f) Services	7.9	8.9 <sup>Q</sup>	8.6 <sup>A</sup>
(g) Exports	20.3	21.1	24.9
(h) Imports	19.4	27.3	48.4
Gross Domestic Savings (as % of GDP)	26.1 <sup>P</sup>	28.1 <sup>Q</sup>	24.2 <sup>A</sup>
Gross Domestic Capital Formation (as % of GDP)	24.3 <sup>P</sup>	26.3 <sup>Q</sup>	NA
Inflation as measured by WPI	3.4	5.4	6.4 <sup>E</sup>
Gross Fiscal Deficit (as % of GDP)	5.9	4.5	4.5 <sup>R</sup>
Trade Balance (US \$ billion)	-10.7	-15.5	-38.1
Foreign Exchange Reserves (US \$ billion)	71.9	107.4	141.5
External Debt (US \$ billion)	105.4	111.7	123.3
<i>P : Provisional Estimates A : Advance Estimates</i>			
<i>Q : Quick Estimates R : Revised Estimates E : Estimated</i>			
<i>NA : Not Available</i>			
<i>Sources : 1. Economic Survey 2004-05</i>			
<i>2. CMIE, Monthly Review of the Indian Economy, May 2005</i>			
<i>3. RBI Bulletin, May 2005</i>			

the economy per cent during 22.3).

**Indicators**  
industry and broad based at respectively, growth in GDP allied sector,

however, declined to 1.1 per cent during 2004-05 from 9.6 per cent during 2003-04, on account of the deficient South-West monsoon, certain supply side constraints, etc. The share of agriculture and allied activities in total GDP (at 1993-94 prices) declined from 21.7 per cent during 2003-04 to 20.5 per cent during 2004-05, while that of industry and services sectors increased from 21.6 and 56.7 per cent to 21.9 and 57.6 per cent, respectively, during the same period. On account of reduced public dissavings and improved private savings (household and corporate), the savings rate improved to 28.1 per cent during 2003-04 from 26.1 per cent during 2002-03. Similarly, investments also improved to 26.3 per cent from 24.8 per cent during the same period mainly due to increased private sector investments. The fiscal deficit as a proportion of GDP declined sharply to 4.5 per cent during 2003-04 from 5.9 per cent during 2002-03, and is estimated at 4.5 per cent during 2004-05. Revenue deficit also declined to 3.6 per cent during 2003-04 from 4.4 per cent during 2002-03 and further to 2.7 per cent during 2004-05, owing mainly to various fiscal consolidation measures and reforms initiated by GoI. The Fiscal Responsibility and Budget Management (FRBM) Act, 2003, and State Level Value Added Tax (VAT) became operational from July 2004 and April 2005, respectively. India's overall balance of payments improved from US\$ 17 billion during 2002-03 to US\$ 31.4 billion during 2003-04 due to current account surplus and expanding capital account. The foreign exchange reserves registered an increase of 31.8 per cent to US\$ 141.5 billion during 2004-05 compared to 2003-04 (Table 22.3). Improved reserves and continuous surge in capital inflow in the preceding two years caused hardening of the domestic



currency in the foreign exchange market. The Indian rupee appreciated vis-à-vis the US dollar by 5 and 2.2 per cent and the average exchange rate worked out to Rs.45.83 and Rs.44.84 during 2003-04 and 2004-05, respectively. Though India's outstanding external debt increased by 6 per cent to US\$ 111.7 billion as at end-March 2004 compared to the previous year, the total external debt to GDP ratio improved to 17.8 per cent, indicating consolidation of external debt. By March 2005, the ratio reached to 17.4 per cent. B.

### **22.2.1 Poverty**

Poverty estimates by the Planning Commission, based on the 55th Round of NSSO, revealed that the number of people living below poverty line (BPL) declined significantly from 328.9 million (51.3%) during 1977-78 to 260.3 million (26.1%) during 1999-2000. Further, while the proportion of poor people (BPL) in rural areas declined from 53.1 per cent during 1977-78 to 27.1 per cent during 1999-2000, it declined from 45.2 to 23.6 per cent during the same period in urban areas. The GoI introduced the Swarnajayanti Gram Swarozgar Yojana (SGSY) in 1999 by restructuring various poverty alleviation and self-employment programmes, viz., IRDP, TRYSEM, SITRA, DWCRA, etc., envisaging the formation of SHGs by 'swarozgaris' and financing them by banks at different stages. Since its inception, a total number of 20.03 lakh SHGs have been formed of which 2.15 lakh groups have been assisted to take up economic activities. During the year, 2.62 lakh SHGs were formed, of which 0.43 lakh SHGs were assisted. So far, 56.96 lakh swarozgaris, including individuals have been assisted. NABARD is a member of the Central Coordination Committee, State and District

Level SGSY Committees as also the Central Monitoring Committee on SGSY, constituted by Ministry of Rural Development (MoRD), GoI, and convened by RBI, to assess the ground level operational problems in implementation of the scheme.

### **18.2.2 Inflation**

The annual average rate of inflation, as measured by the wholesale price index (WPI), was 5.4 per cent during 2003-04 compared to 3.4 per cent during 2002-03. From a low of 4.5 per cent in April 2004, it inched up to 8.5 per cent in August 2004. However, it exhibited a declining trend thereafter and the annual average rate of inflation during 2004-05 was estimated at 6.4 per cent. Inflationary pressures were, *inter alia*, due to hardening of international crude oil prices, minerals and metal related products, while inflation in the case of agro-based products was caused due to erratic and delayed monsoon with uneven distribution of rainfall over time and space.

### **22.1.3 Trade Prospects**

The Foreign Trade Policy: 2004-09, aims to achieve an export target of US\$ 150 billion by 2008-09, thus, implying an annual growth of 20 per cent, with maximum emphasis on sectors having prospects for export expansion and potential for employment generation. India's trade witnessed robust growth during the year, with exports registering an increase of 24.9 per cent, up by 3.8 percentage points over 2003-04 and also higher by 8.9 percentage points than the targeted 16 per cent for 2004-05. This could be attributed to good industrial performance. During 2004-05, imports also grew at a rate of 48.4 per cent, up by

21.1 percentage points from 2003-04 and higher than the export growth rate by 23.5 percentage points.

### 22.2.3 Employment

As per the results of the 55th Round (1999-2000) of the Survey conducted by NSSO, the rate of growth in employment at aggregate level, on Current Daily Status basis, declined from 2.7 per cent (1984-94) to 1.1 per cent (1994-2000) (Table 22.4), mainly on account of near stagnation of employment in agriculture.

**Table 22.4: Annual Growth in Employment**

As a result, the share of agriculture in total employment declined from 60 per cent during 1993-94 to 57 per cent during 1999-2000.

Particulars	(Per cent)					
	1983-84 to 1993-94			1993-94 to 1999-2000		
	Rural	Urban	All India	Rural	Urban	All India
Population	1.79	3.04	2.00	1.67	2.74	1.95
Labour Force	2.15	3.33	2.43	0.96	2.40	1.31
Workforce	2.40	3.59	2.70	0.67	2.32	1.07
No. of Unemployed	-1.19	0.49	-0.08	5.26	3.45	4.74
<i>Source : Planning Commission</i>						

share of employment per cent during cent during

### 18.2.4 Small Scale Industries Sector

The number of Small Scale Industries (SSIs) units (registered and unregistered), increased to 122.5 lakh (4%) during 2004-05 from 114 lakh during 2003-04. During 2004-05, the value of production and employment increased by 11.5 per cent and 4.4 per cent to Rs.3, 99,020 crore and to 28.3 million persons, respectively, over the previous year. GoI also initiated measures during the year to encourage the development of SSIs, such as formation of the National Commission on Enterprises in the unorganized/informal sector, raising the investment limit in plant and machinery to Rs.5 crore from Rs.1 crore and the

composite loan limit from Rs.50 lakh to Rs.1 crore. Further, 85 items were dereserved from the SSI list reducing the total number of reserved items to 605.

### **22.3 INDIAN ECONOMY AND SUSTAINABILITY IN TERMS OF ECONOMIC GROWTH**

The Indian economy has continued its buoyant performance in the first half of 2005-06. GDP in the first quarter has accelerated to 8.1 per cent with strong manufacturing growth (12.1 per cent) and every observer is busy revising the GDP forecast for the year upwards to 7-7.5 per cent. With a near normal monsoon, agricultural revival is certain. The buoyant performance of the manufacturing sector continues, as seen from the trends in commercial credit. The services sector continues to perform well. Thus, the growth is all-round - in the primary, secondary, as well as services sectors. The optimism is not confined to growth performance alone. Despite persisting fiscal imbalances and a steep increase in oil prices, there are no immediate dangers to macroeconomic stability. The RBI predicts the inflation rate to be 5 to 5.5 per cent for the year. Although interest rates may slightly harden with increasing commercial credit, overall it is likely to remain benign. Increasing oil prices may create a current account deficit of about 2 per cent of GDP during the year, but an increasing flow of invisibles will ensure comfortable external payments. The savings rate has reached 28 per cent of GDP in 2003-04, and in later years, further fiscal improvements must have enhanced it further. What is needed is a more efficient intermediation of savings into capital formation to increase it from the stagnant level of 23 per cent. While the optimism in the present environment is natural, it would be inappropriate to

ignore the risks. The persisting fiscal imbalance may worsen if the expected revenues are not realized and the competitive populism of coalition politics causes expenditure profligacy. Another major risk factor is infrastructure bottlenecks.

The important sectors presenting binding constraints include power, transport, including ports, railways, and airports, and urban infrastructure. An important external shock that has added to the risk is the sharp increase in the international price of crude. When the effect of this works itself out, it could constrain manufacturing growth and increase the price level. The most worrisome issue is the difficult political environment for reforms. The buoyant performance of the economy for the third consecutive year has raised expectations that the economy has accelerated to a higher growth trajectory. Many now feel that achieving 8 per cent growth during the Eleventh Plan period is no longer a dream.

It has been suggested that there has been significant productivity growth in Indian manufacturing, and demographic as well as institutional factors support higher growth. Is this optimism well-founded? If it is, then it is a case of growth acceleration without reforms, which is nothing less than a miracle. Unfortunately, such things do not happen. Even in the past, there were spurts in growth, but they were temporary. The growth of the agricultural sector continues to depend on monsoons and manufacturing growth has shown wide fluctuations since the middle of the 1990s. Since 1997-98, almost 70 per cent of the growth was contributed by the services sector, the sector in which liberalization was effective. If the economy has to grow at 8 per cent during the Eleventh Plan, both agriculture and manufacturing should show better performance. Continued

stagnation in agriculture will not only drag the overall performance of the economy but will also result in jobless growth and stagnation in the material living conditions of the majority of the people. Similarly, lasting performance in the manufacturing sector will require larger investments and increase in productivity.

It is important to understand that the sustained growth of the services sector was possible because the reforms have liberalized this sector. Accelerating growth and sustaining it in agriculture and manufacturing would require implementing reforms. Wide-ranging reforms to free the agricultural sector from the shackles of various controls on the movement and sale of products, increased investments in harnessing water resources in a sustainable manner, creating enabling conditions for contract farming through a promotional and regulatory framework, promoting agricultural extension, and ensuring adequate credit are some of the measures.

On the manufacturing side, reforms are required to make the sector competitive in the international market. This requires significant improvement in infrastructure through increased public investments, creating enabling conditions for public-private partnerships, and reforms to enhance productivity. In areas such as power supply and policy, institutional reforms will have to continue. Other important measures required include ensuring more flexible labour market conditions, further small-scale industry de-reservation and creating an enabling environment for attracting foreign direct investments. Indeed, excessive protection given to 7.5 per cent of the workforce has placed serious constraints on expanding employment opportunities for the rest. Fiscal reforms are critical in accelerating

growth. The Finance Commission has recommended a restructuring plan and the central government should show leadership in adhering to it. Reforms in the tax system are necessary not only to improve revenue productivity but also to remove micro level inefficiencies. The important tax reforms include rolling back many of the exemptions and tax preferences, continued improvements in the tax administration and information system, and the levy of full-fledged VAT. The objective of the last measure should be to create an unhindered common market in the country. A recent NIPFP study has shown that the annual cost of exemptions and concessions could be as high as Rs 48,000 crore (Rs 480 billion).

## **22.4 GLOBALIZATION**

Globalization broadly speaking means “integration of economies and societies through cross-country flows of information, ideas, technologies, goods, services, capital, finance and people. The essence of globalization is connectivity.” This laudable concept originally intended to sub-serve a more just and equitable world order. The implementation of NEP in India was also on the same note. But this very concept on the one hand, destroyed the traditional web of Indian economy, and on the other hand, it is unable to fulfill the very promise it made at its inception. Increasing export – orientation of national economies, the dismantling of tariff barriers to imports, the linking of national currency to International markets, the privatization of nationally owned assets etc. lead to serve contraction of public expenditure.

The gains and losses from globalization can be analyzed in the content of the three types of channels of economic globalization.

- (i) Trade in goods and services
- (ii) Movement of capital and
- (iii) Flow of finance.

Rapid development of capital market and expansion in foreign exchange market are the important features of globalization. In the last decade, what the experts analyzed is of great concern. According to them poverty ratio had decreased considerably in last decade. Quality products with consumer friendly rates are available in the market. Therefore, opting out of globalization is not a viable choice at all. “Through the Bretton Woods Conference (1944) marked the beginning of a New World Trade Order which triggered economic changes based upon a paradigm shift implicit in the draft crafted by Arthur Dwnkel, eventuating in the Uruguay Round and the Final Act. One of the major objectives of this Dwnkel Draft Text was the creation of a new world wide market grab system – the hidden agenda – highlighted by the Orwell Ian Double speak: “globalization” “liberalization” and “privatization”. The thrust of course, was the capture of world markets by the International Corporate Power incarnate, under the hegemony of American Incorporated.<sup>18</sup> We are going ahead towards Globalization without realizing the very effect of it on Indian economy. Though we are not in a position to go back but certainly, we have to control the implication of Globalization according to our norms and means. On the contrary, WTO, IMF and other great economic giants are controlling not only the economic policies of India but they are also influencing the political decisions of Indian political system. Our foreign economic policy is being directed by the WTO regulations, which are binding on



us. In the words of honorable justice V. R. Krishna Iyer, “Globalization is the latest game of corporate cannibal trying to occupy the economic space of the third world, a déjà vu of the old East India Company but with exponential potential aided and abetted by fifth columnist enterprises. The world is one. It is united by market hungry multinational corporations of the first world monopolizing the resources of third world, with the single Global objective of maximum profits and dismantling national private pigmies and public sector industries.”

## **22.5 PRIVATIZATION**

Another important concept and phenomenon which is continuously influencing the Indian Economic System is Privatization. Adam Smith was the first to adduce economic reasons to justify privatization. He observed: “no two character seem more inconsistent than those of trader and sovereign. In the words of S. R. Maheshwari, “Privatization is the transfer of control of ownership from the public to private sector, such a transfer being necessarily associated with market liberalization and deregulation, changing the macro economic context, the competitive environment and the labor market of the country. It refers to “full conversion of property rights from the state of collective owners to private owners.” Privatization is an emotionally charged term in countries like India and is viewed as an ideologically and politically explosive issue. In the words of Samir Amin Globalization and Imperialism is nothing new. The history of capitalism since the very beginning has been the history of imperialist expansion. And the system was always global – globalization has always been imperialist globalization. It has never been achieved by peaceful and equal negotiations

between peoples. Over this, Rightist has their own view. According to them “change is always for better and happens spontaneously Change is always painful, but it is always transitional. The market, that is capitalism, will itself solve the problem in the long run when everybody is dead.” It is not ideology but propaganda. G-7, W. H. O., I. M. F., and World Bank is not global organizations but organization of Global North. Privatization is the backbone of globalization. In India privatization of crucial and core industries had already taken place. Blind privatization of each and every industry is not the proper solution for hanging Indian economy. Innovative solutions are needed to solve this problem. Indeed, evidence from all over the world is accumulating to declare that the private sector has failed miserably in urban water supply. Yet, the Asian Development Bank (ADB), the World Bank and the WTO/GATT’S continue to push this policy exhibiting an ostrich - like attitude to the realities. There is no doubt that public systems failed miserably in providing efficient water services to the poorer sections of society because of lacking managerial skills, inefficient, corrupt and ineffective officials. Yet, this is not the correct cause to privatize water industry. According to Hon’ble justice V.R.Krishna Iyer, “It is unconstitutional, unethical and violative of Human Rights to sell or negotiate disposal of publicity owned water resources for mineral water rackets by industrial giants. The locus classicus on this point is blazed in M. C. Mehta v/s Kamal Nath. “The notion that public has a right to expect certain lands and natural areas to retain their natural characteristics is finding its way into the laws of the land. The ancient Roman Empire developed a legal theory known as the ‘Doctrine of Public Trust’. The

Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have such a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to every one irrespective of the status on life.” The Pamba of the Malampuzha (the Ganga or the Narmada) belong to the people and the state cannot abandon its fiduciary obligation. It is unconstitutional, unethical and violative of human rights to sell or negotiate disposal of publicly owned water resources for mineral water rackets by industrial giants. Unfortunately, the liberalization ideology has become a synonym with privatization of not only the economy as a whole but also of marketisation of governmental functions and public services thus, resulting in creation of a ‘ police state’ which is against the ethos of a welfare state. Surprisingly entire world is converted into a big market.

## **22.6 DISINVESTMENTS AND FOREIGN DIRECT INVESTMENTS**

Disinvestment of public sector units (P. S. U's) was the next step taken by the Indian economic and political policy makers. Disinvestments of government's equity in P.S.U have opened closed areas for private participation. The government on March 8, 2002 opened the gates for more private sector companies, to market petrol and diesel across the country. This led to the end of exclusive rights of HPCL, IOC, IBP and BPCL in market transportation fuels. The Effluvia of globalization can be clearly felt now. The end of small-scale industries led to the downfall of number of indigenous industrialists. Now even cooperative societies have to face the siren of Multinational Companies. India is

showing the clear signs of egress from welfare model. The present global village has forced even the European countries to form a union to survive; while we are trying our best to destroy the beautiful well knit country into bits and pieces, as if the previous invaders had not done enough to damage the Indian culture. After the disinvestments of public sector units and privatization of number of firms such as Delhi Vidhyut Board (DVB), Mahanagar Telephone Nigam Ltd. (MTNL) etc; now foreign direct investment (FDI) is the another step towards the process of globalization. Government on March 7,2002 permitted 100% foreign direct investment (FDI) in the automobile policy. In view of the highly competitive automobile industry in India, the new policy does not prescribe any minimum investment norms. Foreign direct investment in the country by M. N. C's and non-resident Indians (NRIs), public disinvestments policy undertaken by the Union government and several state governments etc., have forced the state to withdraw not only from the economic sphere but also from the social field.

## **22.7 INDIAN AGRICULTURE IN MARKET FRIENDLY REGIME**

India is an Agricultural country. India's main source of income is agriculture. Being a member of W. T. O. and under the influence of Globalization, India adopted the provisions of the Agreement on Agriculture (AOA). The 'Human Development in South Asia 2002: Agriculture & Rural Development report' reveals that the real challenge before the region is to build a system of agriculture and rural development that is both growth oriented and human centered. As per Mahbub-ul-haq, compiler of report, human development and economy are linked with each other intrinsically. Human development can only be achieved through

the equitable distribution of the benefits of economic growth among the people.

Human development report 2002 draws a few logical conclusions:

1. High levels of human development cannot be achieved, if, development priorities do not focus on the occupation of the majority of the people, that is, farm and non-farm employment, and where they live that is, rural areas.
2. The focus of the policies for food security is on the “welfare” of the people instead of their “empowerment”. The availability of and access to food must have close association with the people’s purchasing power.
3. The region’s agriculture is facing cultivable land constraints and the negative consequences of over-dependence on chemical inputs; future agriculture productivity increases must come from an advancement of agricultural research, technology and extension services.
4. Small farms should be the center of the revival of agriculture and rural development. The incentive system that is being offered to corporate farming in South Asia should not be at the expense of the vast majority of the rural populace.
5. South Asian Agriculture marketing and trading systems have not been effective and efficient owing to both internal constraints and an inequitable external trading environment.

In Kerala, the A. K. Antony government set up a commission on W. T. O concern in Agriculture in 2001. Primary aim of this commission is to search new opportunities out of WTO regulated trading system, which is “inherently asymmetric in its impact. The experience of the last eight years has shown that the

WTO. has no visible agenda for resource poor farming families. It is clear that the AOA needs to be redesigned on a pro-poor, pro-small farmer, pro-livelihoods and pro-environment framework.” Commission has made 19 specific recommendations for Kerala. To promote Trade and Intellectual Property Rights literacy is one of the most important recommendations made by the commission. Agriculture is proving to be the principal bottleneck for those within and outside the World Trade Organization (WTO) trying to push through a new international trade agreement. The Cairns group of exporting countries (Argentina, Australia, Bolivia, Brazil, Canada, Chile, Columbia, Costa-Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, South Africa, Thailand, Uruguay) has proposed an efficient agenda of liberalization in the agricultural area. Through “Swiss Formula”, they proposed to reduce Tariffs sharply. According to ‘Swiss Formula’ the larger the proportionate reduction in the tariff rate, the higher is the bound or applied tariff in a country. WTO is strictly Business oriented Organization. An immediate result of this type of International Rural Politics is that close to half of rural families have gained very little from the process of planned development all the rhetoric about the commitment of the state and polity to the cause of the poor.

Indian agriculture is suffering the most under these WTO regulations because our emphasis is on the industrial sector. But the ground reality is that India is much suited for the agricultural reforms. The cut in farm subsidies are surely going to affect the farmers. Now the problem is that India actually adopts these policies under the pressure of WTO. The era of giving subsidies and benefits to the

individuals is over. The WTO regulations have wiggled the traditional web of Indian welfare model. Therefore, the development of infrastructure is the first important step, which should be taken by the Indian policy makers.

## **22.8 SOCIAL JUSTICE, HUMAN RIGHTS VS. MARKET FRIENDLY ECONOMIC POLICY**

Human Rights are more than legal concepts: they are the essence of the man. A decade back, we have a different traditional concept of human rights. There we have violations of human rights by the Police persons, Military officials, and Terrorists etc. Now with these traditional violators of human rights, we have certain other deadliest partners too. The advent of Globalization and privatization add certain intriguing causes, which are violating human rights quite consistently in developing countries under the umbrella of WTO. Within the past few years, the world has witnessed numerous changes. The major change was the upcoming of MNC'S and Trans-National Corporations at the upfront.

The term 'health' signifies more than absence of sickness. In the words of Steinbeck the fields were fruitful, starving men moved on the roads. The granaries were full and the children of the poor grew up rachitic, and the pustules of pellagra swelled on their side. The great companies did not know that the line between hunger and anger is a thin line. Life in good health and free from disease is the foremost human right. Supreme Court in a case observed that the right to health is an integral facet of meaningful right to life, to have not only a meaningful existence but also robust health and vigor without which worker would live life of misery; lack of health denudes livelihood. Health is the very basic of development. Due to the advent of MNC'S the rich is becoming richer and the poor is becoming poorer. The right to health is hampered by the TRIPs. Multinational Corporations (MNC'S) having no soul and working strictly on the



one ground of accumulating capital have no concern for the health of the masses. Environmental pollution, ecological destruction, human rights violations, etc. have no concern for the MNC'S. Monopolies are market-friendly and morality-deadly. When a few corporations control the access to markets, there is very little to prevent them from manipulating the market to maximize profits, forcing prices down to buy up the commodity cheap from producers and then pushing them up so as to unload at a nice profit. The 'Humanistic jurisprudence', has nothing to do in a corporate society. Our Republic, with an ancient composite culture and modern socialist texture, suffered a value torture in the 90s of the 20th century. Socialism slumbered in the constitution; secularism slowly lost its vigor and re-colonization 'red in tooth and claw' pressured the mughals in Delhi to abandon the marvelous values of humanism and compassion and substitute them with globalization, liberalization, privatization and marketisation.

The constitution of India made India an egalitarian country. We consider an existing income distribution relatively egalitarian when the differences between the highest and lowest incomes are relatively small. To restructure the social order of India by giving egalitarian direction is to fulfill the spiritual mission of Marx and Mahatma. In the words of Mahatma Gandhi," Working for economic equality means abolishing the eternal conflict between capital and labor. It means the leveling down of the few rich in shoes hands is concentrated the bulk of the nation's wealth on the one hand, and the leveling up of the semi-starved, naked millions on the other. A non-violent system of government is clearly impossibility so long as the wide gulf between the rich and the hungry millions persists. The

contrast between the palaces of New Delhi and the miserable hovels of the poor laboring class nearby cannot last one day in a free India in which the poor will enjoy the same power as the richest in the land. A violent revolution and bloody revolution is a certainty one day, unless there is a voluntary abdication of riches and the power that riches give and sharing them for the common good. Social Justice has an intrinsic value and a missionary message for the developing country like India. The Constitution was to foster the achievement of many goals; transcendent among them was that of social revolution. Through this revolution fulfilled the basic needs of the common man, and, it was hoped, this revolution would bring about fundamental changes in the structure of Indian society- a society with a long and glorious cultural tradition, but greatly in need, Assembly members believed, of a powerful infusion of energy and nationalism. The theme of social revolution runs throughout the proceedings and documents of the Assembly. The ultimate thing is that we have to go with the WTO, if we have to survive in this global world. Below we will see how we can sustain ourselves.

## **22.9 INDIA UNDER GLOBALIZATION AND ITS FUTURE**

Do not find fault find remedy. There are at present 142 members in the WTO. What is needed is to evolve an appropriate framework to wrest maximum benefits out of international trade and investment. This framework should include (a) making explicit the list of demands that India would like to make on the multilateral trade system, (b) measures that rich countries should be required to undertake to enable developing countries to gain more from international trade, and (c) steps that India should take to realize the full potential from globalization.

To get the fruits of globalization is not a tough task at all. We have to maintain a healthy environment in which both (MNC'S and local companies) will survive in a proper way. The only requirement is to build a state of the art infrastructure. WTO has given ample time to the developing countries to comply with the requirements of the WTO regulations. Though India to an extent fulfilled the requirements of WTO still a lot is required to do. In the words of Justice V.R.Krishna Iyer," the deeper diagnosis of the sinister syndrome of dastardly contradictions is easy and uneasy.' Boneless wonders' in political office, under pressure from the North, are in power as proxies of the MNC.- IMF. - World Bank Axis! Swadeshi is dead, Socialism is *bete noire*, the Barabasque Order is in Command and Jesus is on the Cross? The middle class, under the circean spell of foreign life style, is collaborating in this echelons are tending to be MNC. limpets. Courts are casinos, dockets are log-jammed and litigation is pauperization. Where is hope?" Therefore, the problem is not without but within. The flexible and boneless politicians of India are only involved in the game of coalition politics. The Indian economy is going on target. Though, the profound psychology of the public is against the phenomenon of globalization as such. The reason may be the very fact that media is reluctant to accept the ever increasing globalization. Journalists are often mere messengers of news and views to brainwash the public and fail to convey the great message needed for the people. Will our rulers trade our freedom in the guise of free Trade? The time to protest is late. Mark Twain holds good for the Indian intelligentsia: It is by the goodness of the God that in

our country we have those three unspeakably precious things: freedom of speech, freedom of conscience, and the prudence never to practice either of them.

The entrance of globalization in India proved good for us. Now even Indian companies become conscious of the fact that they have to not only manufacture the quality products but also have to control the prices of the products too. This proves beneficial for the consumers because they are getting superior goods at the cheaper price. Truly, “thoughts are things,” and powerful things at that, when they are mixed with definiteness of purpose, persistence, and a burning desire for their translation into material desires. Opportunity has a sly habit of slipping in by the back door, and often it comes disguised in the form of misfortune, or temporary defeat. Perhaps this must be the reason why India fails to capitalize the opportunity of developing one self. India must use all its sources to utilize the resources we have. Infrastructure must be modernized with immediate effect. A committee will be organizing with the scholars and professionals to look after the reforms require in the infrastructure of the country. With the help of organized planning we can crystallize our desire of a strongest economy of the world. Success requires no explanations and a failure permits no alibis. Now we are living in the global world and we have to develop ourselves so as to compete with the world economy.

India now being the member of number of International Conventions and Treaties is in a better position to utilize the benefits of transfer of technologies. Development is human right, not an elite luxury. There is no achievement without preparation. India should prepare herself for the globalization. There is no other

way out. Global finance, which is highly mobile, does not move with the purpose of “development” but on the strength of “conditionalities”. We have to use this highly mobile money according to our own norms. The adoption of NEP was a good step towards development. But unless the public sector moves out of the control of politicians and bureaucracy sitting on the revolving chairs, with short tenures and hence little commitment to the enterprise there is no hope for an improved performance from the public sector. We can utilize the benefits of this buzzword globalization only when a state regulated Market Economy will come forward. Retreat of the state is not the ideal condition in fact this thin line between the liberalization and the state must be broadened so as to put India in to the driver seat of the World Economy. Organized planning is the need of the hour. Definiteness of purpose is the starting point of all achievement. Indian Economy is no more bounded in red tapism as such; it also opened its feathers to touch the limits of the sky. Now we have to think positive and made our infrastructure capable enough and flexible to the extent so that we can accommodate foreign giants in India too but on our norms and regulations. We have to apply the real meaning of the term “development”. The concept of justice as fairness must be seen in a broader perspective. Where on the one hand the social and economic justice required perspective reorientation, on the other hand implementation of the Liberalization needs total commitment from the citizens of India as a whole.

## **22.10 SUMMARY**

It is appreciable that the Indian economy has continued its buoyant performance in the first half of 2005-06. GDP in the first quarter has accelerated to 8.1 per cent

with strong manufacturing growth (12.1 per cent) and every observer is busy revising the GDP forecast for the year upwards to 7-7.5 per cent. With a near normal monsoon, agricultural revival is certain. The buoyant performance of the manufacturing sector continues, as seen from the trends in commercial credit. The services sector continues to perform well. But, we have to concentrate on the critical areas of infrastructure reforms including the railways, power, urban infrastructure, ports, and airports. The railways have been used to distribute political patronage by successive ministers, with little heed to commercial performance and reinvestment for renewal and expansion. The time has come to corporatise the sector and remove political control over it. Similarly, the monopoly status provided to the Airports Authority of India has done little to ensure adequate investments and performance in the sector. These are only some of the important reforms needed to set the economy on a higher growth trajectory. If the reforms indicated above are implemented, the economy can grow consistently at 8 per cent, or even 10 per cent during the Eleventh Plan. The critical question is, whether the special interest groups will allow the reforms to be carried out, and will we be able to create an enabling environment to unleash creative energies to improve the living standards of the people?

## **22.11 SELF-TEST QUESTIONS**

1. Explain the global view of Indian economy.
2. What do you mean by LPG concept in Indian Economy?
3. How can India compete at international level in different sectors?
4. Explain the different sectors of Indian economy, which can be focused in future.

## **22.12 SUGGESTED READINGS**

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