Part I
Nature and Methodology of Economics

1 NATURE OF ECONOMICS : DEFINITIONS

Dr. J. N. Keynes was not far wrong when he said that "Political Economy is said to have strangled itself with definitions."[1] There are, therefore, economists like Richard Jones and Comte who would do away with the definition altogether. Economists like Pareto, Myrdal and Hutchinson think that any search for a precise definition of Economics is a barren enterprise.[2] Pareto thinks it "a waste of time to investigate what it (*i.e.*, economic phenomenon) may be." According to Mydral, "Economics is the only term regarding the precise definition of which the economist need not be concerned." In Hutchinson's opinion, "the actual assignment of a definition to the word 'Economics' does not appear to solve, or even help in the solution of any useful scientific problem whatsoever." That is why it is said that it is needless to waste words in defining Economics. It will be an exercise in futility.

Robbins, however, has stoutly denied that it is a waste of time to attempt a precise delimitation of the field of Economics. According to Macfie, lack of clear definition can prove harmful.

In our opinion, it is very essential for a student to have some definition in mind as a working basis. Besides, the discussion leading to a definition is very useful in giving a clear understanding of the subject. Let us, therefore, examine some of the definitions put forward from time to time.

EARLY DEFINITIONS: SCIENCE OF WEALTH

According to Adam Smith, Economics was concerned with "An Enquiry into the Nature and Causes of Wealth of Nations." The early economists called Economics, the Science of Wealth. J. E. Cairnes in his book, **'The Character and Logical Method of Political Economy'** clearly said that Economics, "deals with the phenomenon of wealth."[3] According to the French economist. J. B. Say, Economics is the science which treats of wealth. The American economist F. A. Walker says that Economics is that body of knowledge which relates to wealth.

Thus, in these definitions, a key position was assigned to wealth in the study of Economics.

Comments. At a time when religious sentiment was strong and spiritual values held sway over men's minds, exclusive emphasis on wealth could only cause repulsion in the enlightened mind. This was specially due to the pampered and degenerating ways of the rich. This concept of Economics rightly called for righteous indignation from men of letters like Carlyle (describing it as a 'pig science') and Ruskin.

The early economists, the votaries of the new cult of Mammon-worship, therefore, came to be looked down upon. Economics was supposed to teach selfishness and came to be called a **"dismal science."** S. Bailey in 1835 discussed the popular view of Economics as "a man-degrading, sordid inquiry." "The unworthiness of political economy in public opinion stemmed directly from its explicit preoccupation with so degrading a subject-matter as wealth." (Kirzner). Thus, all the vices attributed to wealth became attached to the science of wealth (i.e., Economics).

Luckily, Economics has now been extricated from this unenviable position. Exaggerated emphasis on wealth is gone. Even in the last quarter of the 19th century humanistic character of Economics had come to be well recognised. Schaffle in Germany and Droz in France placed the role of man in

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1. Keynes, J.N.—*Scope and method of Political Economy* (1930), p. 153.
2. Kirzner, I. M.—*The Economic Point of View* (East-West Edition), 1967, p. 7.
3. Ibid., p. 31.

Economics higher than that of wealth. No undue importance is now attached to wealth as such. It is now fully recognised that wealth is only a means to an end, the end being human welfare. Economists do not now regard wealth as the be-all and the end-all of human endeavour, nor can it be expected to be the sole cause contributing to human happiness.

Thus, **emphasis has now shifted from wealth to man.** Man occupies a primary place and wealth only a secondary one. As Marshall rightly puts it, Economics is **"on the one side a study of wealth; and on the other, and more important side, a part of the study of man."** [4] Economics, thus, is not a science of wealth but a science of man primarily. It may be called the science of human welfare.

Recently, Robbins has completely freed Economics from the accusations of its detractors who called it sordid or mean. According to Robbins, Economics is not concerned with ends as such. The ends may be noble or ignoble. If their achievement involves the use of scarce resources, they have an economic aspect. Thus, Economics embraces all conduct, good or bad, provided it comes under the influence of scarcity. Hence, we can no longer blame Economics for occupying itself with bad or ignoble aims. [5]

Fraser classified the definitions of Economics into two: Type A dealing with wealth and material welfare and Type B dealing with the phenomenon arising out of scarcity of means and multiplicity of ends. Since Robbins wrote his book **'Nature and Significance of Economic Science'**, in 1930, there has been a marked transition from A Type to B Type definitions.

MARSHALLIAN DEFINITION: SCIENCE OF MATERIAL WELFARE

For a long time, the accepted view was that Economics is concerned with those human activities which centre round wealth not for its own sake, but for the sake of material welfare that it promotes. The following definitions represent this traditional view:

"Economics is the study of the general methods by which men cooperate to meet their **material** needs." (Beveridge).

"The aim of Political Economy is the explanation of the general causes on which the **material welfare** of human beings depends." (Cannan).

"The range of our inquiry becomes restricted to that part of **social welfare** that can be brought directly or indirectly into relation with the **measuring rod of money.**" (Pigou).

"Political Economy, or Economics, is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the **material requisites of well-being."** [6] (Marshall).

We can see that one thread seems to run through the definitions given above, viz., that of material welfare. Beveridge speaks of meeting "material needs", Cannan of "causes of material welfare" and Marshall of "material requisites of well-being". According to these economists, the aim of Economics is to study human activities which are conducive to human welfare in its material aspect. Wealth furnishes man with material means of satisfying his wants and of promoting his welfare. Economists, in so far as they study wealth, can be legitimately regarded as studying causes of material welfare.

We can see that Marshall's definition emphasises four points:

(a) Economics does not regard wealth as the be-all and end-all of economic activities. Wealth is sought for promoting human welfare. Hence, wealth is relegated to a secondary position.

(b) Economics is not concerned with what is called in Economics 'economic man', *i.e.*, a man whose only motive is to acquire wealth for its own sake and who is not influenced by human considerations in the pursuit of wealth. Rather, Economics deals with ordinary men and women who are swayed by love, affection and fellow-feelings and not merely motivated by the desire to get maximum monetary advantage.

(c) Economics is a social science and not one which studies isolated individuals or Robinson Crusoes. We study persons living in society influencing other people and being influenced by them.

(d) Economics studies only 'material requisites of well-being' or causes of material welfare. It has thus a materialistic aspect and ignores non-material aspects. Actually, however, as Robbins has shown, Economics embraces both material and non-material things.

Criticism of Marshallian View

Lionel Robbins led a frontal attack on the Marshallian view. The main points of criticism are:

(i) Robbins does not think it right for the economists to confine their attention to the study of **material welfare,** because in the actual study of economic principles, both the "material" and "immaterial" are taken into account.

(ii) Robbins rejected Marshall's definition as being classificatory because it makes a distinction

4. Marshall, A.—*Principles of Economics. 6th edition,* p. 1.

5. Robbins, L.—*Nature and Significance of Economic Science,* 1945, p. 27.

6. Marshall, A.—*Principles of Economics* (6th Ed.) p 1.

between material welfare and non-material welfare and says that Economics is concerned only with material welfare.

(iii) It unduly restricted the scope of Economics. "A theory of wages, which ignored all those sums which were paid for 'immaterial' services or spent on 'immaterial' ends would be intolerable."[7] The economists have also adopted unanimously a "non-material" definition of productivity.

In his book **"Nature and Significance of Economic Science"**, Robbins has given numerous examples of goods which are highly conducive to human welfare but which have nothing material in them, e.g., services of doctors, lawyers, etc. These services have economic significance. They are scarce and have value. "It is not the **materiality** of even material means of gratification," says Robbins, "which gives them their status as economic goods; it is their relation to valuations." Economics is thus concerned with both material as well as non-material things provided they have value.

(iv) Robbins' objection is, however, not merely to the word "material". He would also not tie economics with welfare. The anomalous position of those who study economics in terms of welfare is evident. Intoxicants are regarded as wealth, but by no stretch of imagination can they be regarded as conducive to human welfare. Being scarce they are subject to the "pricing process". They have, in short, economic significance, though human welfare is not promoted by them. Robbins would say, "Why talk of welfare at all? Why not throw away the mask altogether?"

Apart from the anomalies into which the welfare economists have fallen, there are other reasons for discarding the welfare idea from discussions which are strictly economic. Ideas of welfare vary from age to age, from country to country, and from individual to individual. Welfare is too vague and indefinite an ideal to provide a sound foundation for building up a respectable science.

(v) There is the further objection that, in assessing human welfare, we shall be called upon to give our verdict as to what we regard as conducive to human welfare and what is not so conducive. We shall be transported to the world of ethics, whereas Economics, according to Robbins, is neutral as regards ends. It is not supposed to be its function to pass moral judgments and say what is good and what is bad.

Thus, according to Robbins, Economics is not to be regarded as a study of the causes of material welfare. **"Whatever Economics is concerned with, it is not concerned with the causes of material welfare as such."** (Robbins).

(vi) According to Marshall, Economics deals with persons living in society. It ignores all others who also may have an economic problem, i.e., of using scarce means for the satisfaction of unlimited ends.

Robbins's main quarrel with the Marshallian definition is that, whereas Economics deals both with material goods and non-material services, the definition points only to the material aspect. Hence, though the contents are correct, the label is wrong.

ROBBINS' DEFINITION: SCIENCE OF SCARCITY OR SCIENCE OF CHOICE

Marshall seemed to have settled the matter of the definition of Economics long ago and a large consensus of expert opinion had been mobilised behind him. But the publication of Robbins' book, **"Nature and Significance of Economic Science"** in 1931, set the ball of controversy rolling once again.

Lionel Robbins challenged the traditional view of the nature of economic science. We have noticed some of his objections in the above section. He calls the hitherto accepted and well-known definitions of Economics classificatory and unscientific. The word "material" imposed unnecessary limitation. The welfare conception of Economics lacked universality and scientific precision. Robbins defined Economics thus:

"Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses."

Robbins claimed that his definition did not suffer from any of these defects. His definition was analytical rather than classificatory. Instead of discussing a certain type of human behaviour, it focussed its attention on a particular aspect of human behaviour; *i.e.*, behaviour concerned with the utilisation of scarce resources to achieve unlimited ends.

On analysis, we shall find that this definition lays down the following three fundamental propositions which constitute the basis of the structure of economic science:—

(a) "Ends" refer to wants. Human beings have wants which are unlimited in number. If one want is satisfied another crops up. Multiplicity of wants calls forth ceaseless effort for their satisfaction, and the unending cycle of economic activity moves on. If wants had been limited, they would have been adequately satisfied and there would have been no economic problem; all incentive to economic effort would have ceased. Also, since human wants are unlimited, one is compelled to choose between the more urgent and the less urgent wants. That is why Economics is also called a **science of choice.**

(b) Although wants are unlimited yet the means to satisfy them are strictly limited. No doubt, there are certain free goods which also satisfy human wants. Yet most of the things that we want are scarce. Had the means of satisfaction been unlimited, no economic problem would have arisen. But as it is, the resources at the disposal of a community

7. Robbins, L., *op cit.*, p. 6.

are scarce, and they must, therefore, be economised. Economic resources are the various types of labour, capital, land and entrepreneurship used in producing goods and services. Since these resources are limited, the ability of the community to produce goods and services is also limited.

The term **"scarcity"** is used here in a relative sense. It is scarcity in relation to requirements. Scarcity is not to be taken in an absolute sense. A commodity may exist in a small quantity but if nobody has any use for it, we shall not call it scarce in the economic sense. Thus, rotten eggs, though much fewer than good ones, are not scarce in the economic sense. On the other hand, there may be huge stocks of a commodity like wheat or coal, yet it is called scarce because the demand is even larger than the supply. It is the demand, in relation to supply, for a commodity, and not its quantity alone, which determines whether a commodity is scarce or not. Scarcity is thus a relative term.

(c) The third proposition underlying Robbins' definition is that the scarce means are capable of alternative uses. If a commodity could be put only to one use and to none else, few economic problems would arise in its connection. After it has met that use, it will become a free good and will have no further economic significance. Actually, however, the uses to which a commodity can be put are numerous, almost unlimited. Hence, the demand in the aggregate for that commodity is almost insatiable.

Further, these alternative uses are of varying importance; some are more urgent and others less urgent. And we can select the use to which a commodity may be put. Choice comes in again.

Thus, in the Robbinsian sense, economic activity lies in man's utilisation of scarce means having alternative uses, for the satisfaction of multiple ends. "Means" refer to time, money or any other form of property. They are all limited. But since the ends are unlimited, choice-making is essential. That is why Economics has been called a science of choice.

From the point of view of the State, Economics may be defined as the "study of those principles on which the resources of a community should be so regulated and administered as to secure the communal ends without waste." (Wicksteed). In Stigler's words, "Economics is the study of the principles governing the allocation of scarce means among competing ends when the objective of allocation is to maximise the attainment of the ends."[8]

In other words, **"Economics is a study of the allocation of scarce means, capable of alternative uses, among competing ends for the attainment of a maximum result in the achievement of these ends."**

Superiority of Robbins' Definition

Robbins demolished the old structure of Economics based on material welfare and raised a new one with two foundation-stones, *viz.*, multiplicity of wants and scarcity of means.

Robbins claims that his definition is superior to the earlier definitions: (a) It is more scientific, since it is not based on artificial classification of wants, as material and non-material. It is independent of such classification.

(b) As defined by Robbins, Economics has a much wider content. It takes into account all types of human wants, material or non-material, as well as of all types of persons whether living in society or not.

(c) Robbins greatly widened the scope of Economics. Marshall had restricted it to wealth and activities which related to the material welfare of man only.

(d) Robbins raised Economics to the level of a science whereas earlier economists regard it as both, a science and an art. As an art, it could only be an imperfect art. Thus, to Robbins belonged the credit of elevating Economics to the perfection of a science.

(e) Robbins made Economics a positive science whereas earlier economists regarded it also as a normative science. Economics was thus freed from the responsibility of making value judgments. It had only to enunciate general economic principles. It was no longer its function to examine the right or wrong of an economic activity. Right and wrong are relative terms.

(f) According to Robbins, Economics transcends the narrow boundaries within which the materialist definition confined Economics. It lays down a maxim which is true of all times and places. As Wicksteed puts it, "Its laws are like the laws of life and are applicable to fields that have no connection whatsoever with the business or production of wealth."

(g) Moreover, when Economics is defined; as Robbins does, no charge of sordidness or preaching of Mammonism can be levelled against it. It can no longer be called a "dismal" science, because it takes no responsibility for selecting the ends. They may be good or bad; Economics is not concerned. Wherever the ends are many and the means are scarce, Economics is directly concerned.

Thus, Robbins' definition is superior both to the early definition (science of wealth), and Marshall's definition (science of material welfare).

Criticism of Robbins' Definition

Robbins is not without his critics. The Marshallian spirit is not altogether dead. Economists like Durbin, Fraser, Wootton and Beveridge have put a strong defence of Marshallian Economics. Wootton urges "that it is very difficult for economists to divest their discussions completely of all normative signifi-

[8] Stigler, G. J.—*Theory of Price* (1947), p. 12.

cance." Robbins' idea of Economics, though admittedly more scientific, is colourless, impersonal, neutral as regards ends. He says, "Equilibrium is just equilibrium." If Economics is to serve as an engine of social betterment, it cannot divest itself of normative significance. As Prof. Thomas says, "the function of the economist is not only to explain and explore but also to advocate and condemn."

The ethical neutrality of Economics emphasised by Robbins has exposed it to two main criticisms: (a) Since search for particular ends has been abandoned, the scope of Economics has been widened to include phenomena which are not strictly economic. (b) Lack of concern for the nature of ends has resulted in an academic detachment from reality making economic theory a purely formal affair. Souter's essay (1933) denounced Robbins as "a juggler with a static verbal logic" and a "profane sunderer of 'form' and 'substance'."[9]

Secondly, Robbins' 'ends and means' formulation has been criticised as not being in conformity with human actions. It excludes the concept of purpose which is fundamental to human action. Actually, the ends are seldom presented simultaneously with the means.

Further, there is obvious reality of the ends-means scheme. Ends are generally means to further ends just as means may be ends of earlier actions.

Besides, Robbins regards ends as given, but the means may be equally given. Actually few ends are given; they are, on the other hand, deliberately chosen. Professor Knight has also criticised the attitude that Economics is only concerned with means and not ends. Economics should discuss the alternative ends and not only means for a given end.

Thirdly, Robbins, it is said, has reduced Economics merely to valuation theory. Other aspects of the study of Economics have been relegated to the background. Robbins s definition does not circumscribe an aggregate already in existence, but it leaves outside the city wall a part of the city already existing.[10] As Fraser says, "Economics is more than a value theory or equilibrium analysis or resource allocation."

In Economics, we study not only how resources are allocated and how prices are determined, but we also study how total national income is generated. Keynesian Economics, which explains the determination of national income and employment, is not covered by Robbins' definition which merely assigns to Economics an **'allocative role'**. In an era in which study of economic fluctuations or of national income and employment has assumed great importance in the work of economic theorists and policy-makers, this omission imposes a serious limitation on Economics as conceived by Robbins.

Fourthly, choice of individuals as such has no particular significance. As Prof. Cairncross points out, we study choices if they have social repercussions. Individual choices having no social implications cannot form the subject-matter of Economics as we know it.

Fifthly, the theory of economic growth or economic development has recently become a very important branch of Economics. But Robbins's definition does not cover it. Economics of growth explains how an economy grows and the factors which bring about increase in national income and productive capacity of the economy. Robbins takes the resources as given and discusses only their allocation.

Sixthly, Robbins's definition of Economics does not explain the problem of unemployment. For some countries this is an urgent problem. There is abundance of man-power rather than scarcity of it, whereas Economics, according to Robbins, studies the problem of scarcity.

Seventhly, in Robbins's definition, the human touch is entirely missing. It is well to emphasize with Ely that "Economics is something more than a science, a science shot through with the infinite variety of human life, calling not only for systematic thinking but for human sympathy, imagination and in an unusual degree for the saving grace of commonsense."[11]

Eighthly, there is no doubt that Robbins has made Economics more abstract and complex and hence difficult and unfruitful. This detracts from its utility for the common man. Utility of Economics lies, in a large measure, in its being a concrete and realistic study.

MODERN DEFINITION

During the last 40 years or so, economic thinking has moved much further from Robbins' view. According to Robbins, Economics is concerned with the best possible use of the limited resources. But it is now considered that Economics is much more than merely a theory of value or of resource allocation.

The credit for bringing about a revolution in economic thinking goes to late Lord J.M. Keynes. According to him, Economics studies how the levels of income and employment in a community are determined. Thus, in Keynesian terms, Economics is defined as the **study of the administration of scarce resources and of the determinants of income and employment.** In other words, it studies the causes of economic fluctuations to see how economic stability could be promoted.

9. Kirzner, I. M. *op. cit.*, p. 121.

10. A paper read by M. H. Gopal at the Indian Economic Conference in 1940.

11. Ely and Others—*Outline of Economics*, 1930, p. 4.

In Benham's words, Economics is **"a study of the factors affecting the size, distribution and stability of a country's national income."**[12]

More recently, the theory of Economic growth has come to occupy an important place in the study of Economics with reference to under-developed economies. It studies how the national income grows over years. An economy like that of India which is at the mercy of monsoons needs economic stability besides economic growth. Thus, a study of **economic growth and of economic stability** forms an integral and important part of the study of Economics. A good and adequate definition of economics must cover them.

CONCLUSION REGARDING DEFINITION

We have seen that no short definition of a growing science like Economics would serve the purpose. To define it as a science of wealth is too narrow or uncharitable. To define it as 'a study of mankind in the ordinary business of life' is too broad and to define it as the study of material welfare is too narrow. To define it as a science of scarcity or choice or of human valuation is again too wide and to define it as "that part of social welfare that can be brought directly or indirectly into relation with the measuring rod of money" is too narrow.

Thus, every time we face a dilemma. One may, therefore, agree with Prof. Viner that **'Economics is what economists do'.** We know that the economists study resource allocation or resource utilisation. They also study size, distribution and stability of national income and now they study the fascinating subject of economic growth. A proper definition must cover this wide field to indicate correctly what Economics is.

In short, Economics may be defined as **"a social science concerned with the proper uses and allocation of resources for the achievement and maintenance of growth with stability."** OR "Economics is a social science concerned chiefly with the way the society chooses to employ its limited resources, which have alternative uses, to produce goods and services for present and future consumption."[13] It describes and analyses the nature and behaviour of the economy.

Definition given by Professor Henry Smith seems to be very suitable. He defines Economics as the "study of how in a civilised society one obtains the share of what other people have produced and of how the total product of society changes and is determined."[14] This definition covers important aspects of the study of Economics, viz., production and distribution of wealth and the determination of the level and changes in the total product of the nation which implies the theory of economic growth.

MAJOR ECONOMIC PROBLEMS

What is an Economic Problem

In view of the scarcity of means at our disposal and the multiplicity of ends we seek to achieve, the economic problem lies in making the best possible use of our resources so as to get maximum satisfaction in the case of a consumer and maximum output or profit for a producer. Hence economic problem consists in making decisions regarding the ends to be pursued and the goods to be produced and the means to be used for the achievement of certain ends.

Fundamental Problems Facing an Economy

From the definition of economic problem given above we can derive the following fundamental problems which an economy has to tackle:

(1) **What to Produce.** The first major decision relates to the quantity and the range of goods to be produced. Since resources are limited, we must choose between different alternative collection of goods and services that may be produced. It also implies the allocation of resources between the different types of goods, e.g., consumer goods and capital goods.

(2) **How to Produce.** Having decided the quantity and the type of goods to be produced, we must next determine the techniques of production to be used, e.g., labour-intensive or capital-intensive.

(3) **For Whom to Produce.** This means how the national product is to be distributed, i.e., who should get how much. This is the problem of the sharing of the national product.

(4) **Are the Resources Economically Used?** This is the problem of economic efficiency or welfare maximisation. There is to be no waste or misuse of resources since they are limited.

(5) **Problem of Full Employment.** Fullest possible use must be made of the available resources. In other words, an economy must endeavour to achieve full employment not only of labour but of all its resources.

(6) **Problem of Growth.** Another problem for an economy is to make sure that it keeps expanding or developing so that it maintains conditions of stability. It is not to be static. Its productive capacity must continue to increase. If it is an under-developed economy, it must accelerate its process of growth.

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12. Benham, F.—*Economics*, 1960.

13. Spencer, Milton, H.—*Contemporary Economics*, 1971, p. 2.

14. Smith, Henry, *A Prospect of Political Economy*, 1968, p. 20.

2 NATURE OF ECONOMICS : SCOPE AND METHOD

Introduction

In discussing the nature and scope of Economics, we consider the nature of economic laws and limitations of Economics. We also discuss its subject-matter and consider whether it is a science, positive science or a normative science and whether it can solve practical problems.

SUBJECT-MATTER: MICRO AND MACRO ECONOMICS

The study of Economics is divided by the modern economist into two parts, *viz.*, **micro-economics** and **macro-economics.**

An economic system may be looked at **as a whole** or in terms of its innumerable **decision-making units** (such as consuming units, *e.g.*, individual consumers and households), producing units, (*e.g.*, firms, farms business and mining concerns), individual factors of production, (*e.g.*, labourers, land-owners, capitalists, entrepreneurs), and individual industries, (*e.g.*, cotton textiles, iron and steel, toy-making). When we are analysing the problems of the economy as a whole, it is macro-economic study. While an analysis of the behaviour of any particular decision-making unit, such as a firm, an industry, a consumer, constitutes micro-economics.

Micro-economics is also called Price Theory and Macro-economics is called Income Theory. "Price theory explains the composition, or allocation, of total production—why more of some things is produced than of others. Income theory explains the level of total production and why the level rises and falls."[1] We explain below these terms in some detail:

1. Watson, Donald Stevenson—*Price Theory and Its Uses* (Indian Edition), 1967, p. 5.

MICRO-ECONOMICS

The word 'micro' means a millionth part. When we speak of micro-economics or the micro approach, what we mean is that it is some small part or component of the whole economy that we are analysing. For example, we may be studying an individual consumer's behaviour or that of an individual firm or what happens in any particular industry. If it be an analysis of price, in micro-economics what we study is the price of a particular product or of a particular factor of production and not the general price level in the country. Similarly, if it be a demand that we are analysing, in micro-economics it is the demand of an individual or that of an industry that is studied and not the aggregate demand of the entire community. Likewise, the income of an individual or of an industry, and not the national income of a country, comes within the purview of micro-economics. In respect of employment, it is the employment in a firm or in an industry that is considered in micro-economics and not the aggregate employment in the whole economy.

Thus, micro-economic theory studies the behaviour of individual decision-making units such as consumers, resource owners and business firms. In the circular flow of economic activity in the community, micro-economics studies the flow of economic resources or factors of production from the resource owners to business firms and the flow of goods and services from the business firms to households. It studies the composition of such flows and how the prices of goods and services in the flow are determined.

A noteworthy feature of micro-approach is that, while conducting economic analysis on a micro basis, generally an assumption of full employment in the economy as a whole is made. On that assumption, the economic problem is mainly that of

resource allocation or of theory of price. That is why, till recently, Economics concerned itself mainly with the theory of value and distribution, and ignored the study of the economic system as a whole.

Importance of Micro-economics

Micro-economics occupies a very important place in the study of economic theory. It has both theoretical and practical importance. From the theoretical point of view, it explains the functioning of a free enterprise economy. It tells us how millions of consumers and producers in an economy take decisions about the allocation of productive resources among millions of goods and services. It explains how through market mechanism goods and services produced in the community are distributed. It also explains the determination of the relative prices of the various products and productive services. It explains the conditions of efficiency both in consumption and production and departure from the optimum. As for practical importance, micro-economics helps in the formulation of economic policies calculated to promote efficiency in production and the welfare of the masses.

Thus, the role of micro-economics is both positive and normative. It not only tells us how the economy operates but also how it should be operated to promote general welfare. In Professor Lerner's words, "Micro-economic theory facilitates the understanding of what would be a hopelessly complicated confusion of billions of facts by constructing simplified models of behaviour . . .".[2] Micro-economic analysis is also applicable to the various branches of economics such as public finance, international trade.

Limitations. Micro-economic analysis suffers from certain limitations: (a) It cannot give an idea of the functioning of the economy as a whole. An individual industry may be flourishing, whereas the economy as a whole may be languishing.

(b) As has been pointed out above, it assumes full employment which is a rare phenomenon, at any rate in the capitalist world. It is, therefore, an unrealistic assumption.

MACRO-ECONOMICS OR THE THEORY OF INCOME AND EMPLOYMENT

In recent years, thanks to the late Lord Keynes, increasing attention has been given to the analysis of economic system as a whole. This is macro-economics. In macro-economics, we study, as it were, the forest, whereas in micro-economics we study the trees. Macro-economics is concerned with aggregates and averages of the entire economy, such as national income, aggregate output, total employment, total consumption, savings and investment, aggregate demand, aggregate supply, general level of prices, *etc.* In other words, in macro-economics, we study how these aggregates and averages of the economy as a whole are determined and what causes fluctuations in them. From theoretical reasoning and on the basis of empirical knowledge, we now know that the old assumption of full employment is not valid and, therefore, it is very vital that we should investigate how these aggregates of the economy are determined, and having known their determinants, how to ensure the maximum level of income and employment in a country.

Macro-economics deals also with how an economy grows. In other words, it analyses the chief determinants of economic development and the various stages and processes of economic growth. This part of economic theory has been largely developed in the last two-three decades.

Economic growth is a long-run problem and as such it is a post-Keynesian development as Keynes was pre-occupied with short-run problem of economic fluctuations. It was Harrod and Domer who extended the Keynesian analysis to the long-run problem of growth and stability. The theory of economic growth has greatly developed these days. General growth theory applies to both developed and under-developed economies. But special growth theories have been propounded for accelerating the growth of under-developed economies. Theory of growth is, in fact, long-run macro-economics.

The justification of a separate macro approach to the study of several economic problems lies in this that micro approach is not only inadequate but may lead to altogether misleading conclusions. In Economics, what is true of the parts is not necessarily true of the whole. After all, the problem of the aggregate is not merely a matter of adding or of multiplying what happens in respect of the various individual parts of the whole. It may be quite different and far more complicated than a mere summation or multiplication. Take the example of saving. In times of depression, while savings by an individual may be beneficial to him, saving on the part of the entire community will deepen the depression further.

Utility of Macro-Analysis. The importance that macro-analysis has come to acquire is not without reasons. The macro-approach is useful in several ways:

(a) It is helpful in understanding the functioning of a complicated economic system. It gives a bird's eyeview of the economic world. Micro-analysis, *i.e.*, study of individual aspects of the economy will lead us nowhere. Undoubtedly, the economy is more important than the individual.

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2. Watson, Donald Stevenson.—*Price Theory and Its Uses* (Indian Edition), 1967, p. 5.

(b) For the formulation of useful economic policies for the nation, macro-analysis is of the utmost significance. Economic policies cannot be obviously based on the basis of the fortunes of a single firm or even a single industry or the price of an individual commodity. It is far more fruitful to regulate aggregate employment and national income and to work out a national wage policy.

(c) Macro-analysis also occupies an important place in economic theory in its pursuit of the solution of urgent economic problems. These problems relate to aggregate output, employment and national income. Economic theory seeks to explain fluctuations in the level of national income, output and employment. Thus, we are able to study the economy in its dynamic aspect.

Limitations of Macro-Analysis. Macro-analysis has limitations of its own: (a) Individual is ignored altogether. It is individual welfare which is the main aim of Economics. Increasing national saving at the expense of individual welfare is not a wise policy.

(b) The macro-analysis overlooks individual differences. For instance, the general price level may be stable, but the prices of foodgrains may have gone spelling ruin to the poor. A steep rise in manufactured articles may conceal a calamitous fall in agricultural prices, while the average prices were steady. The agriculturists may be ruined. While speaking of the aggregates, it is also essential to remember the nature, composition and structure of the components.

Need for Integrating Macro and Micro-economics

It may be emphasised that neither of the two approaches outlined above can alone adequately help us in analysing the working of the economic system. What is true of the parts may not be true of the whole and what is true of the whole may not apply to the parts. It is very essential therefore to integrate the two approaches, if we wish to get correct solutions of our main economic problems. Take a period of unprecedented prosperity in an economy. Even in such boom conditions, it is not uncommon to come across examples of individual industries which may be languishing or may be more dead than alive. Likewise, in a period of deep depression, there may yet be some individual industries which may be enjoying great prosperity. Now to apply the macro-approach to such individual industries would obviously be wrong; and it would be equally wrong to apply the micro-analysis of these industries to the economic system as a whole.

What is needed is a proper integration of the macro and micro approaches to such problems. In fact, there are few macro-problems which have no micro-elements involved and few micro-problems that are without macro-aspects. It is, therefore, only proper to marry the two approaches both in analysing the economic problems and in prescribing policy measures for tackling them. Ignoring one and exclusively concentrating attention on the other may often lead not only to inadequate or wrong explanation but also to inappropriate or even disastrous remedial measures.

Conclusion

Thus, according to the views of the economists today, the subject-matter of Economics includes **price theory** (or micro-economics), **income and employment theory** (macro-economics) and **growth theory.** Hence, broadly speaking, Economics may be described as a study of the economic system under which men work and live. It deals with decisions regarding the commodities to be produced and services to be rendered in the economy, how to produce them most economically, distribute them properly and to provide for the growth of the economy.

SOME MAJOR ISSUES AND PROBLEMS IN ECONOMICS

1. **What to Produce** that is (a) which goods are to be produced and (b) in what quantities.

2. **Allocation of Resources.** The economy has further to determine the *allocation of scarce resouces* in money, men, and materials among the goods and services to be produced. The allocation of resources has also to be determined between the present and the future use *i.e.* between consumer goods and producer or capital goods.

3. **How to Produce.** Another major issue relates to the *production techniques* to be used in production e.g. whether the techniques should be labour intensive or capital-intensive.

4. **For whom to Produce.** This problem relates to the distribution of the national product *i.e.* who should get how much. In the matter of distribution, it is necessary to provide incentives to produce more and disincentives to curb unnecessary consumption.

5. **Problems of Efficiency and Growth.** This involves problems of efficiency of resource use and provision for further growth and development of the economy.

NATURE AND SCOPE OF ECONOMICS

Is Economics a Science?

While discussing the nature and scope of Economics, we may consider (a) the subject-matter of Economics (already discussed above), (b) whether Economics is a science or an art (and we think it is both, since is has both the theoretical and applied aspects; it is both light-giving and fruit-bearing), (c) whether it is a positive science or normative science,

(d) whether it is a social science and (e) whether it can solve practical problems.

In the nature of Economics, we consider (a) whether it is a science and (b) what is the nature of economic generalisations?

We discuss below these aspects of economic science.

While considering the nature of Economics, we have to see whether Economics is entitled to be called a science. "Whenever six economists are gathered," says Wootton, "there are seven points."[3] Bernard Shaw once remarked: "If the economists of this world were laid end to end, they wouldn't reach a conclusion". In view of the absence of unanimity among economists, the claim of Economics to be regarded as a science has been challenged. Wootton says again, "Economists are under the suspicion of being charlatans and they cannot afford to arrogate honourable titles to themselves. . . . In the increasingly common application by theoretical economists of the term science to their studies, there is an element of wishfulment." Further, "The zealous student of Economic Science would do well from time to time to remind himself that of all the demand and supply schedules, cost surveys or indifference curves that give so formidable appearance to his text-books, not one (unless by accident) is founded upon fact . . . . The reader would search far and wide through the works of analytical economists before he came upon single prediction endorsed by the weight of authoritative opinion of the course of events to be anticipated in any concrete historical situation."[4] How can, then, Economics be called a science?

It is further pointed out that since men are endowed with a freedom of will, economic phenomena are highly complex, varied and variable. It is difficult, nay impossible, to build up a science on such a slender foundation. The claim of Economics to be called a science seems therefore to have been completely demolished. The cynics often say, "where it is really scientific, it does not have much to do with economics and what it is economics, it is not scientific."

But it is not so. Whether a particular branch of learning is entitled to be regarded a science or not, depends on what we consider a science to be. If we expect a science to formulate laws applicable everywhere and to all times, and if we expect it to predict the future course of events, then, frankly speaking, Economics is not a science. But, these requisites of a science do not accord with the modern notion as to what a science is.

By science we merely understand a systematized body of knowledge. It is not merely a collection of facts. But the facts are so arranged that they speak for themselves. That is, some laws are discovered, which explain and elucidate the facts. Only when laws have been formulated does a branch of knowledge become a science. In the words of Poincare, "Science is built up of facts as a house is built up of stones; but all accumulation of facts is no more a science than a heap of stones is a house."

Judged by this standard, Economics is certainly a science. The economist has collected his facts. The facts have been carefully analysed and put under suitable classification, and general principles governing these facts have been discovered and enunciated. What more is needed to make Economics a science? Like other sciences, Economics can claim a number of important discoveries that have improved our understanding and our economic performance. Economic theorists have taught us that a country cannot become rich merely by multiplying its currency; but later on under the leadership of Keynes, we have been taught that when resources are lying idle, money can be created with great advantages. These are no mean achievements, no less than those of other scientists, and these are just a few from among those and others.

It is now fully agreed that Economics is a full-fledged science. In fact, it is in no way less than other sciences. "Economic Laws are on all fours with the propositions of all other sciences."[5]

Both a Science and an Art. Economics is not only a science but also an art. It is a science in its methodology and an art in its application. It has a theoretical aspect and is also an applied science in its practical aspects.

True Nature of Economics

It is, however, necessary to understand the true nature of Economics. The paradox of Economics is that it is a science and yet it cannot predict future course of events as the natural sciences like Physics and Chemistry can. Man is endowed with a freedom of will. Prediction in human behaviour is, therefore, difficult. To quote Durbin, "Certainty will always escape us, and prediction miss the mark. . . . Just because men can learn from experience they can learn from Economics itself, and so the subject destroys its own conclusions by its own discoveries."[6] Economics thus presents a "continually changing body of doctrine." But this does not prevent Economics from taking its due place among the well-established sciences.

Economists are handicapped in a number of ways: (a) Economic realities are complex and not easy to grasp. Just think of millions of purchasers and sellers, hundreds of thousands of commodities bought and sold. Who can advise?

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3 Wootton—*Lament for Economics* (1938), p. 14.

4. Ibid., pp. 111-18.

5. Robbins, *op. cit.*, p. 104.

6. Economics, *Man and His Material Resources* (New Educational Library), pp. 333-34.

(b) Further, the economist cannot hold his facts to observe them. Economic facts are constantly slipping through the fingers.

(c) Besides, in the economic sphere, experimentation is not possible as is possible in other sciences. The economists can only gather experience from the operation of the measures adopted on their advice. But no deliberate experimentation is possible in which environments can be controlled and repeated. Statistical tools are a poor substitute.

(d) Moreover, we cannot fully understand people's present actions nor appraise their future intentions. Hence, sudden trends or changes in fashions and tastes upset economists' calculations.

Conclusion. In view of all this, nothing is certain. In Economics, anything is possible and everything depends on everything else. No wonder that the economists cannot agree on a certain point. But it is well to remember that the economists do agree on many things. For instance, there is substantial agreement on the policy to be pursued during recession and development policies for underdeveloped economies or on war-time economic policies. The disagreement is only at the frontiers of knowledge. We may, however, take comfort in the thought that "absolute certainty is vouchsafed to no science and that complete conviction in this world can come only from ignorance". Hence, we may safely conclude that Economics is a Science though it has its own limitations.

Positive or Normative Science

In discussing the scope of Economics, we have also to consider whether Economics is a positive or a normative science. A positive science only explains **what is** and normative science tells us **what ought to be,** *i.e.*, right or wrong of a thing. In other words, positive science describes, while the normative science evaluates. When we say, for instance, that the businessmen, while making decisions, use profit maximisation as the criterion, it is positive economics, but when we ask "ought they use this criterion", we enter the field of normative economics.

We have to consider whether Economics can pass moral judgments (normative science) or simply explain the "why" of things (positive science).

Classical view: Positive Science. The English Classical School was of the view that it was none of the functions of the economists to comment on the rightness or wrongness of an economic situation. "Almost all leading economists, from N. Senior and J. S. Mill onwards" had declared "that the science of economics should be concerned only with what is and not what ought to be."[7] Senior thought that the economist could not add even one word of advice. Cairnes said that Political Economy stood neutral as regards ends as mechanics stands neutral between rival schemes of railway construction. In the classical view, therefore, Economics was a positive Science.

Robbins' View. In recent times, Robbins has reaffirmed this neutrality and supported the above view. According to him, Economics is not concerned with the desirability or otherwise of the "ends". "The role of the economist is more and more conceived of as that of the expert who can say what consequences are likely to follow certain actions but who cannot judge as an economist the desirability of these actions." Introduction of value judgments into economic analysis is considered a transgression of the proper scope of economic theory. It is said that the **function of the economist is merely to explore and explain and not to advocate and condemn.**

Our View. This, in our opinion, is not a correct view. We agree with Hawtrey that Economics cannot be dissociated from ethics. There is an "economic ought". Having analysed, for example, the causes of the maldistribution of wealth, why should the economist fight shy of saying that it ought to be better distributed? "A non-psychological Economics must, therefore, be regarded as either a superficial figment or as positively non-scientific. It is Hamlet with Hamlet left out."

Economics is, therefore, **both a positive and a normative science.** We do not agree with Robbins when he says that the gulf between Positive Economics and Normative Economics is so wide that no human ingenuity can bridge. It is the function of a sound economist to bridge this gulf. Even when the ends are given, Economics can pronounce on the means that ought to be adopted to achieve these ends.

The position is very well summed up by Cairncross thus: "However reluctant economists may be to introduce the brittle thread of ethics (so often snapped by disagreement) into their analysis, they cannot offer the guidance which is so urgently sought of them unless they do. They can explain how the economic system works without putting the mantle of philosophy over the rather drab working clothes of economic science. But they cannot say how the system can be made to work better. They can offer light, but not fruit; and it is fruit for which most people turn to Economics. Immediately the economist does venture to offer counsel—as is expected of him—he appears in the role of sheep in wolf's clothing, economist turned philosopher. This is a role which he must play consciously—not sheepishly, as if there were no wolf's clothing there!—if his conclusions are to command attention and respect."[9]

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7. Myrdal, G.—*Value in Social Theory,* 1958, p. 237.

8. Wolf in Tugwell's *Trends of Economics* (1935), p. 466.

9. Cairncross, A.—*Introduction to Economics* (1944), p. 9.

Macfie lucidly brings out the normative character of Economics. He says that "Economics is fundamentally a normative science, not merely a positive science like Chemistry."[10] Faced with scarce resources and competing ends, the choice of a final end is to pass a value judgment. To try to achieve optimum satisfaction is to realise an objective which may be considered good and reasonable. The economic agent has to act on the principle that the scarce means should be put to the best advantage and should not be wasted. This is obviously "a universal human value" affecting all economic endeavour.

Conclusion

Hence, economic act consists not merely in allocation of scarce resources among competing ends but in maximising total satisfaction according to one's own judgement. The choice resulting from subjecting competing desires to judgement makes Economics obviously a normative science.

Ends and Means. It has been remarked that Economics is concerned with means and ends lie outside its scope That is, economics is neutral as regards ends. It expresses no opinion about the desirability or otherwise of the economic objectives to be pursued. It simply means that in the determination of ends or objectives, Economics has no voice. It takes the ends as given. It is for the Government or the individuals to determine what they want to have or want to achieve. When that is settled, the economist will come in and suggest how best to achieve those ends with the minimum expenditure of resources. The economist will simply recommend the most economical use of the means for the realisation of particular ends. As stated already, Economics takes ends as given in scales of relative valuation. It can only comment on the utilisation of means for the achievement of these ends. It is in this sense that ends are said to lie outside its scope.

It follows, therefore, that the economist takes no responsibility about the nature of the ends. The ends may be noble or ignoble, the economist is not concerned. Hence, there is no such thing as economic ends. "In so far as the achievement of any end is dependent on scarce means, it is germane to the preoccupation of the economist." [11]

However, as we explained in the preceding section, economists cannot altogether avoid pronouncing moral judgments, and it is good that they do. The economist today is expected to give guidance in the selection of ends or objectives considering the resources available.

Economics—a Social Science

Economics is primarily a study of man and not of wealth. **But it does not study man as an isolated individual** who has renounced the world. It studies, on the other hand, men who live in society affecting society by their actions and themselves exposed to social influences. Economics is not so much concerned with the **"economic man"**—an abstraction—but with the man of flesh and blood swayed by ordinary human motives, noble or ignoble, and having his ordinary share of human virtues and vices.

In order to understand the social aspect of economics, we should bear in mind that the workers are working in factories on materials drawn from all over the world and producing commodities to be sold all over the world in order to get in exchange goods from all other parts of the world to satisfy their wants. There is thus close inter-dependence of millions of people living in distant lands utterly unknown to one another.

In this way, the process of satisfying wants is a social process, not an individual process. Economics has thus to study social behaviour, *i.e.*, behaviour of men in groups.

However, Economics is not a social science in the sense that it studies social acts as distinguished from the acts of the individuals.

Can Economics Solve Practical Problems?

The English economists generally hold the view that it is not the function of Economics to solve practical problems. The economic aspect of these problems may be very important and the economist's opinion is of very great value. But no problem can be solved on economic grounds alone, for political and moral considerations may also be involved. **"The theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking which helps its possessor to draw correct conclusions."** (Keynes).

We do not quite agree with this view. No economist has lived up to this ideal. Adam Smith, Ricardo, Malthus and, in our times, the late Lord Keynes himself, have all actively interested themselves in the problems of their time. In the words of Fraser, **"An economist who is only an economist is a poor pretty fish."** According to Tugwell, it is only a premature flowering of Economics, which is responsible for its separation from practical life. Wooton complains that "we spend too much time forging theoretical tools and too little time in trying to make practical use of them." It is, therefore, increasingly felt that the economist must tackle practical problems. **When we study Economics, "our impulse is not the philosopher's impulse. knowledge for the sake of knowledge but rather the physiologist's knowledge for the healing that knowledge may help to bring."** (Pigou).

10. Macfie, A. L.—*An Essay on Economy and Value*, p. 69.

11. Robbins, L.; *op. cit.*, p. 24.

Our view, therefore is that the economist must lend a helping hand in the solution of the practical problems. And he is in a much better position to do so than the statesman who may be devoid of the knowledge of economic theory. Everyday the economists are being called upon to give advice on practical problems. To quote Pigou again, "Economics is chiefly valuable neither as an intellectual gymnastic, nor as a means of winning truth for its own sake, but as a handmaid of Ethics and a servant of practice."

Limitations of Economics. It is necessary, however, to emphasise the limitations from which the science of Economics necessarily suffers. Apart from the fact that Economics cannot predict the course of future events since its laws lack definiteness, it must be recognised that economic analysis by itself cannot provide answers to questions that arise in individual or social conduct. It can furnish no magic formula by which schemes of social betterment can be tested nor a sovereign remedy to economic ills.

Boulding observes: "It is not, for instance, the business of the economist as such to decide whether large armaments are necessary, whether a marriage is successful, a religion efficacious, or even whether a law is wise. The attention of the economist is directed principally to the area in which values can be measured in numerical terms, and consequently he cannot claim jurisdiction over the great region of valuation where such imponderable realities as friendship, patriotism, sincerity and loyalty are assessed. In all political questions such imponderable valuations are of vital importance, and economic analysis is an important witness, but is not the sole judge."[12] It is, therefore, necessary to bear in mind the limitations of Economics when an economist is called upon to tackle a practical problem.

LAWS OF ECONOMICS

Definition

Like every other science, Economics, too, has drawn its own set of generalizations, which are called the laws of Economics. These laws are supposed to govern and explain all economic activity. In the words of Marshall, economic laws may be defined thus:—

"Economic laws, or statements of economic tendencies, are those social laws, which relate to branches of conduct in which the strength of the motives chiefly concerned can be measured by money price." In terms of Robbins's definition of economic activity, we might say that economic laws are statements of uniformities which govern human behaviour concerning the utilisation of limited resources for the achievement of unlimited ends. These, in short, are the principles according to which we act when engaged in our ordinary business of life or in an economic activity.

Nature of Economic Laws

What is the nature of economic laws? What are they like? How do they compare with other laws? Are they like the government laws, or like the laws of morality or like the laws of natural sciences? The laws of the government are coercive; there is a penalty attached to their breach. The laws of morality are not so obligatory; they merely indicate how we should act in order to satisfy public opinion or our conscience. The laws of natural sciences can be stated with precision and have a universal validity. Economic laws are unlike all these, The nature of economic law is not indicated by the word "must", as in the case of statute law, or by "ought", as in the case of moral law; but their nature is indicated by the phrase, **"other things being equal"** *(ceteris paribus).*

Some economic laws are axiomatic in character, *e.g*, greater gain is preferred to smaller gain. There are other economic laws which are of the nature of physical laws, *e.g.*, the law of diminishing returns.

Lack of Exactitude. The material of Economics is complex and ever-shifting. There is a great deal of economic friction arising out of custom and law. Social disabilities and legal restrictions thwart the operation of an economic law. There is also a preponderance of the human element. All these factors impart an element of uncertainty to economic laws. They lack the definiteness and exactitude found in laws of sciences like Physics. It is for this reason that Marshall has **compared** economic laws to the laws of tides rather than to the simple laws of gravitation. Economic laws are not exact; they lack definiteness.

It should, however, be remembered that the laws of Economics are more exact than those of any other social science, because the economic phenomena are capable of being measured in money price. This measuring rod of money is not available to any other social science like History and Political Science.

Hypothetical. Economic laws are said to be hypothetical or conditional since their validity depends upon the fulfilment of certain conditions. We say, for example, that if wages in Bombay are raised it will attract labour from other industrial centres. But some other conditions must be satisfied, if other workers are actually to move to Bombay, *e.g.*, cost of living. We also say that an increase in demand for a commodity will raise its price. But the supply of the commodity must not change in the meantime. Thus, if economic laws are to hold good, other things must remain the same. Economic law

12. Boulding, K. E.—*Economic Analysis*, Vol. I, 1965, p. 9.

simply states that given certain conditions certain results will follow.

Statement of Tendency. Economic laws are inevitable and inescapable if some necessary conditions are fulfilled. But these conditions are not always fulfilled. Hence, economic laws **lack predictability.** "There is no convenient yardstick by which to measure the currents in business affairs, for these are subject to gusts of fear or perhaps of fantastic optimism as unpredictable as earthquakes."[13] We cannot, therefore, say what will happen next because it depends on the fulfilment of so many conditions. We can only say what is likely to happen. Economic laws are, therefore, merely statements of tendencies or of statistical probabilities. If demand increases, price tends to rise. Actually, it may rise or may not rise. It will depend also on the supply conditions.

Applicability of Economic Laws

One controversial point about economic laws is about their applicability. The Classical Economists were of the opinion that economic laws were immutable, eternal, inexorable and so universally applicable, without any exception whatsoever. The Historical School, on the other hand, emphasized their relativity and insisted that they had only a limited application to a given environment. Bagehot, for example, declared that the laws of Economics propounded in England were applicable to "a grown-up society of competitive commerce."

Modern economic opinion inclines to the view that inasmuch as economic laws are based on essentials of human nature, they hold good of almost all communities. They are simplified models of reality. They are good approximations. They are a useful guide to economic events and serve as a basis for the formulation and evaluation of economic policies. But, in the formulation of actual economic policies, allowance must be made for varying local conditions. Who can doubt that Gresham's law, the quantity theory of money, the law of diminishing utility, the law of choice and lots of other economic laws are independent of sociological and political conditions? Given the conditions under which they are true, the conclusions to which they point are inescapable. "If the data they postulate are given, then the consequences they predict necessarily follow."[14]

To say that economic laws are historico-relative and that they have no relevance outside certain historical conditions is wrong. The fact is that they are based on very wide human experience and have almost a universal applicability, though, we repeat, economic policies have to be different for different countries, and for the same country at different times.

BASIC ASSUMPTIONS IN ECONOMICS

It is seen above that economic laws are governed by the phrase "other things being equal." This means that, while reasoning out economic phenomena, we take certain things for granted. These are the various assumptions that underlie economic reasoning.

There are three broad types of these assumptions: The first group relates to the behaviour of individuals, *e.g.*, consumers, producers, workers, *etc.* For instance, we assume that the consumers act in a rational manner and seek maximum satisfaction, that there is mobility of labour in search of higher wages and the entrepreneurs seek maximum profit. This is known as the maximisation principle. In Mrs. Joan Robinson's words, "The fundamental assumption of economic analysis is that every individual acts in a sensible manner and it is sensible for the individual to balance marginal cost and marginal gain". This sensible conduct results in maximisation of money gains. Actually the principle may not work. But, in order to simplify things, we have to assume all these things.

It is further assumed that the consumers' tastes remain unchanged for fairly long periods of time. That is, they do not suddenly change the components of their diet or their mode of dress. For instance, a vegetarian remains a vegetarian and a person continues wearing Indian dress. In other words, we assume 'economic rationality' both on the part of consumers and businessmen. We take the 'economic man' as our basis of discussion who is a sort of average or an abstraction different from 'real men' living in society. The assumption that the consumers seek maximum satisfaction out of the money they spend is fairly realistic. The assumption about the businessmen seeking maximum profits may be a little less plausible because there may be several other motives which may inspire businessmen. But it is worthwhile making this assumption because it helps us in constructing a simple theory of firm and industry. It is possible that these assumptions may not hold good in certain cases. But it seems sensible to make a simple and plausible assumption about consumers' and producers' behaviour as a basis for our study.

Then, there is the assumption of perfect competition on which the working of a competitive economy stands. It is assumed that there is a large number of buyers and sellers in the market, the commodity is homogeneous in character, that there is perfect knowledge and perfect mobility of resources and that none of the individual buyers and sellers are in a position to influence price. These assumptions are obviously unrealistic and do not hold good in the

13. Moore and Others—*Modern Economics* (1940), p. 3.
14. Robbins, L.*op. cit.*, p. 121.

world of reality. There is no perfect knowledge, nor perfect mobility of resources, nor are the goods turned out by individual producers identical. But in discussions of economic theory, we proceed on the basis of a perfectly competitive model, because it has a fairly good predictive and explanatory value, *i.e.*, the inferences drawn on the basis of this model fairly correspond to reality even if the assumptions only approximately hold good.

There is still another assumption which lies at the basis of economic analysis *i.e.*, the concept of equilibrium. Equilibrium refers to a situation from which no departure is desired. It is a point of rest *i.e.*, where a consumer is supposed to have attained maximum satisfaction and an entrepreneur maximum profit. We discuss consumers' equilibrium, equilibrium of the firm and industry. A firm is said to be in equilibrium when it is making maximum profit and an industry is in equilibrium when it gives only normal profit. When these positions have been attained, there is no incentive to make any change.

A student of economics will also observe that most of the statements of economic laws are preceded or end with the phrase 'other things being equal' or *ceteris paribus*. This means that the law will hold good if there are no other changes taking place at the same time in the related economic phenomena. That is, economic laws are based on the assumption of 'no other change'. Actually, the world is dynamic and changes are simultaneously taking place. But this assumption isolates a particular change and thus facilitates understanding of the principles under discussion.

Conclusion

Whether the assumptions of economic analysis are true or not, it is necessary to bear them in mind so that we are all the time aware of the limitations of the conclusions at which we may have arrived. This is specially necessary when economic policies have to be formulated for the solution of certain economic problems.

The second group relates to the social, economic and political institutions. For example, we assume the existence of private property and capitalistic order of society. We assume law and order and stable political system. The existence of markets is also assumed. The market keeps the buyers and sellers of a commodity in touch with one another. That is how prices are determined and a uniform price comes to prevail in the market for a particular commodity.

Finally, there is a category of assumptions that relates to facts of geography and biology. We must base our conclusions on what is physically or climatically possible.

For example, the economist has to accept while discussing agricultural problems that harvest time is determined by nature. In the field of industry, it has to be assumed that the workers must have suitable rest pauses. We have also to assume that technical factors put a limit on industrial output. This leads us to the basic assumption of economic analysis, *viz.*, that goods are scarce. Economics simply would not exist in the absence of scarcity. The basic task of economics is to distribute the available goods and services in the community in some reasonable manner.

METHODS OF ECONOMICS

One of the grounds on which Economics has been recognised to be a science is that, like other sciences, it, too, uses scientific methods. Let us now see what these methods are.

Deductive Method

The early English economists, known as the Classical School, tried to build up the science of Economics from a few simple generalizations. The method that they used is called the Deductive, Analytical, Abstract or *A Priori* method. Among these economists may be mentioned Senior, Mill, Cairnes and Ricardo, the last one being its chief exponent. The advocates of this method start with a few indisputable facts about human nature and draw inferences about concrete individual cases. For example, they believe that self-interest alone guides men in their daily life, and they try to explain and predict all human behaviour in terms of self-interest, which is obviously wrong.

Senior in his book **"An Outline of Political Economy"**, explains the deductive method thus. The economists' "premises consist of a few general propositions, the result of observation or consciousness and scarcely requiring proof or even formal statement which almost every man, as soon as he hears them, admits as familiar to his thoughts or at least as included in his previous knowledge and his inferences are nearly as general and, if he has reasoned correctly, as certain as his premises". J. S. Mill too advocated the use of the deductive method in his **'Essays on Some Unsettled Questions on Political Economy'**. Cairnes in his book **'Character and Logical Method of Political Economy'** pointed out that the right method for arriving at conclusions in economic theory was the deductive method. Thus, the classical economists by and large supported the deductive method as a means of economic enquiry.

Merits of Deductive Method

(i) The deductive method is useful in analysing the complex economic phenomenon where cause and effect are inextricably mixed up. The deductive method takes a few simple general principles and applies them to draw conclusions in such complicated cases. But for this simple method it would have

been perhaps impossible to establish any general relationship between two sets of facts.

(ii) The application of the deductive method yields exact and true conclusions provided the premises on which they are based are true. If we accept the general proposition that man prefers a greater gain to a lesser gain, the conclusion that Mr. A will work for a maximum profit inevitably follows. Hence, the deductive method has been praised for its simplicity and exactitude. In the words of Cairnes, "the method of deduction is incomparably, when constructed under proper checks, the most powerful instrument of discovery ever wielded by human intelligence".

(iii) Deductive method is very simple and easy of application. There is no need for collecting elaborate statistical information. We just take some well known and accepted generalisation and draw inference by applying to a particular case; that is how Ricardo and his followers were able to develop pure economics on the basis of a few principles and by abstract reasoning.

(iv) In the economic field, where we have to study human behaviour, observation and experiments are simply out of the question. Also, the data are either not available at all or are inadequate. In such a situation, we have to rely on the deductive method for drawing inferences.

Limitations

(i) This deductive method has the merit of being simple, effective and certain, only if the underlying assumptions are valid. This is a very big "IF" indeed. More often than not, the assumptions turn out to be untrue or only partially true. The application of deductive method is thus misleading.

(ii) This method makes Economics dogmatic, for it refuses to admit that there can be some flaw in the premises.

(iii) The Deductive Method proves particularly dangerous when universal validity is claimed for generalizations based on imperfect or incorrect assumptions, and when attempts are made to formulate practical policies of a nation in the light of these generalizations.

In view of the above shortcomings of the deductive method, the German historical school of economists bitterly attacked the classical economists for their indiscriminate use of this method for drawing hasty conclusions based on inadequate and incorrect data. It was pointed out that the use of this method led to conclusions which were unrealistic. As Professor Gide pointed out that these economists often mistook the abstraction for the reality. In a world of continuing economic changes, their conclusions had only a limited application. As Nicholson put it, "the great danger of the deductive method lies in the natural aversion to the labour of verification". No wonder that the historical school of economists came to advocate the use of inductive method in preference to the deductive method.

Inductive Method

The Historical School represents a reaction against the dogmatic attitude of the followers of deductive method. The reaction was specially marked in Germany and was represented by economists like Roscher, Hildebrand and Frederick List. The Historical School had also its supporters in England, *e.g.*, Cliff Leslie. These economists advocated a method which has come to be known as Historical, Inductive or Realistic. This method insists on the examination of facts and then laying down general principles. Here we go up from "particulars" to "generals", whereas in the Deductive Method we come down from "generals" to "particulars".

Merits of the Inductive Method

The following merits are claimed for the inductive method:—

(i) The inductive method can be applied for the verification of conclusions based on deductive reasoning. In this way, deficiencies in their treatment can be brought out and their conclusions amplified or restated. Hence the inductive method proves a useful compliment to the deductive method.

(ii) The exponents of the inductive method have drawn pointed attention to the fact that economic phenomena are too complex to lend themselves to deductive reasoning. It is thus impossible to draw conclusions which may have universal validity. Rather, they are relative to time and place and have, therefore, limited applicability. Hence, inductive method is more suitable since it is based on facts rather than on abstract reasoning.

(iii) Inductive method is more suitable and useful in the formulation of economic policies for particular countries and for the same country in a particular situation. This is due to the fact that in the inductive method we proceed by examining important facts in a situation. That is how we may conclude that free trade policy may be more useful to a developed country and harmful to an under-developed economy.

Shortcomings of the Inductive Method

The main weapons in the hands of the inductive economists are observation and experiment. This method has the merit of being based on facts and having, therefore, a surer foundation. But the danger is that hurried conclusions may be drawn from insufficient number of facts. Some important facts may have been ignored, and the conclusions may be unwarranted. To use Colin Clark's words, it will be

"effectively putting the theoretical cart before the factual horse." Besides, observation and experimentation have very limited application in a science which deals with human activities.

But as against this it may be pointed out that although conscious experimentation is out of the question in economic science, yet history affords a number of experiments in the form of economic measures adopted from time to time. The granting of discriminating protection in India was one big experiment. In modern times, the application of the inductive method has been very much extended. There is a spate of statistical publications in every country. The "blue books" are full of facts and figures and the economist has a large and reliable supply of the material from which to draw his conclusions. That is why the modern era has been called the Inductive Era.

Proper Method

The modern economist, however, does not rely on one method to the exclusion of the other. It is realised that theories without facts are barren, while facts without theories are meaningless. He uses both. **"Induction and Deduction are both needed for scientific thought as the right and left foot are both needed for walking."**[15] The economist first starts tentatively with a certain hypothesis based on deductive reasoning and then tests it on the touchstone of facts, and the hypothesis is elevated to the plane of a theory. Further checking in the light of the prevailing situation has to be done before the theory can be changed into a law. There is, thus, what Eric Rolls calls "interpenetration of deduction and induction." Thus the two methods are complementary to one another rather than rivals. One is not to be used to the exclusion of the other.

Thus, **"true solution of the contest about method is not to be found in the selection of deduction or induction but in the acceptance of deduction and induction."** (Wagner). Which of the two methods is to be used in a particular situation depends on the nature of the inquiry, the material in hand and the stage at which the inquiry has reached. The deductive method seems to be more suitable in the field of pure theory and the inductive method for formulating practical policies.

In short, the true scientific method consists of three different stages, *viz.*,

(i) Construction of Theories.
(ii) The deduction of Conclusions from the Theories.
(iii) The testing of Theories.

VALUE OF ECONOMIC ANALYSIS

The economists are called upon to play two distinct roles: (a) as educationists and (b) as professional economists. As teachers, they are concerned with explaining past economic experience and to instruct in the tools and techniques of economic analysis. The professional economists are involved with discovery and prediction. They are interested in developing and applying techniques that will help them in predicting future economic events. The tools are expository, analytical and illustrative devices. But they do not represent facts. They can be used to illustrate a case, but they can seldom be used to demonstrate a case (i.e. prove it).

It should be recognised that many assumptions made in economic analysis are really analytical tools. They may even help us purposefully to misrepresent real world conditions. Economic theory provides us with a basis for better understanding of economic behaviour. It is primarily procedural rather than substantive. We are more concerned with **how** and **why** man behaves and chooses than with **what** he actually does.

Economics is a composite discipline. It contains quantitative and very precise statements as well as statements touching on ethical and moral issues. Because of intrusion of ethical issues in so many economic problems, it is necessary to bear in mind the distinction between positive economics and normative economics. Positive economics is a scientific discipline, whereas normative economics is largely a branch of ethics. The resolution of normative problems is usually brought about through the political process and the ballot box. It is said that the economists' opinion on a normative question is of no more value than guessing the result of a football match.

In economics a great deal of attention is focussed on the study of the underlying axioms of the economic systems, their relevance and consistency. In the final analysis, it is the verification of the theory through observation that determines the usefulness or otherwise of the axioms employed in the theory. The axioms can turn out to be highly controversial statements and may have to be revised or rejected from time to time in keeping with the progress of ideas. "The history of science is strewn with the discarded bodies of defunct but once thriving statements that at one time or another were taken to be true by definition."[16] "An economic model is like a geographical map. It does not show every aspect of the terrain, but only those features that are of interest for any task at hand. The map is not the territory nor is the model the real world. But neither can be understood without a map or a model. Economic models, like maps, increase the degree of certainty about what is likely to turn up over the hill, in the economic landscape."[17]

15. *Economics of Industrial Corporation*, p. 241.

16. Calvo Peter and Waugh Geoffrey - Micro - Economics: *An Introductory Text*, 1979, P. 7

17. Ibid., Pp 10

3 PARTIAL EQUILIBRIUM AND GENERAL EQUILIBRIUM ANALYSIS

Meaning of Equilibrium

The term 'equilibrium' has often to be used in economic analysis. In fact, Modern Economics is sometimes called equilibrium analysis. Equilibrium means a state of balance. When forces acting in opposite directions are exactly equal, the object on which they are acting is said to be in a state of equilibrium. Tie a cord to a piece of stone and dangle it in the air. After oscillating from side to side, the stone will come to rest, if no further disturbance is caused. The stone is then in a state of equilibrium.

Types of Equilibria

Stable Equilibrium. There is stable equilibrium, when the object concerned, after having been disturbed, tends to resume its original position. Thus, in the case of a stable equilibrium, there is a tendency for the object to revert to the old position.

Unstable Equilibrium. On the other hand, the equilibrium is unstable when a slight disturbance evokes further disturbance, so that the original position is never restored. In this case, there is a tendency for the object to assume newer and newer positions once there is departure from the original position.

Neutral Equilibrium. It is neutral equilibrium when the disturbing forces neither bring it back to the original position nor do they drive it further away from it. It rests where it has been moved. Thus, in the case of a neutral equilibrium, the object assumes once-for-all a new position after the original position is disturbed.

Pigou thus describes these three equilibria: A ship with a heavy keel is in stable equilibrium; an egg lying on its side is in neutral equilibrium; an egg poised on one of its ends is in unstable equilibrium.

When the word equilibrium is used to qualify the term value, then according to Prof. Schumpeter, "**stable equilibrium** value is an equilibrium value that, if changed by a small amount, calls into action forces that will tend to reproduce the old value; a **neutral equilibrium** value is an equilibrium value, that does not know any such forces; an **unstable equilibrium** value is an equilibrium value, change in which calls forth forces which tend to move the system farther and farther away from the equilibrium value."

Of these types, the stable equilibrium is the one most commonly used in economic analysis. Dr. Marshall made a very extensive use of it in discussion on the determination of value.

The figure below illustrates the three types of equilibria, *viz.*, stable, unstable and neutral.

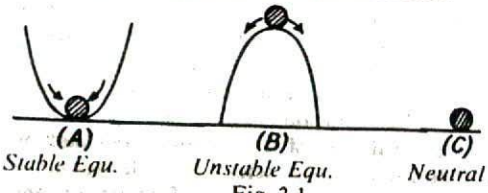


Fig. 3.1

Part (A) of Fig. 3.1 shows a ball resting at the bottom of the bowl. This is a case of **stable equilibrium,** because the ball tends to come back to its original position when disturbed.

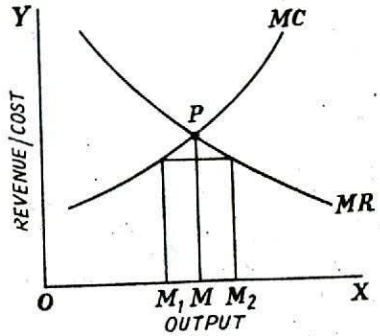
Part (B) depicts a ball at the top of an inverted bowl, which is a case of **unstable equilibrium,** since the ball will not return to its original position, if disturbed.

Part (C) shows a ball lying on the ground. This is a case of **neutral equilibrium,** because the ball does not regain the same old position but obtains a new equilibrium position, where it comes to rest after being disturbed initially.

Diagrammatic Representation. These three types of equilibria can also be illustrated by making use of the marginal revenue and marginal cost curves.

The Fig. 3.2 represents **stable equilibrium** at the

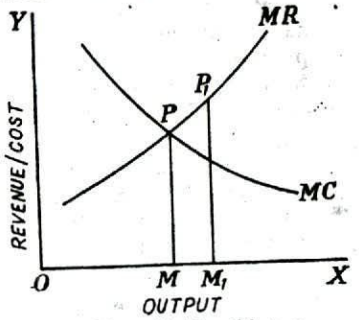
point P, where MR = MC. When in equilibrium at P, the producer produces an output OM and maxi-



Stable Equilibrium

Fig. 3.2

mizes his profits. In case the producer increases his output to OM_2 or decreases it to OM_1, the size of his profits is reduced, This automatically brings in forces that tend to establish equilibrium again at P.

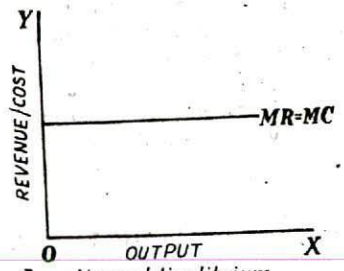


Unstable Equilibrium

Fig. 3.3

Fig. 3.3 illustrates the case of **unstable equilibrium.**

Initially the producer is in equilibrium at Point P, where MR = MC and he is producing amount OM of output and maximizing his profits. If now he increases his output to OM_1, he would be in equilibrium output at P_1, where he will obtain higher profits, because, at this output, marginal



Netural Equilibrium

Fig. 3.4

revenue is greater than marginal cost. Thus, there is no tendency to return to the original position at P.

In this case, MR = MC at all levels of output so that the producer has no tendency to return to the old position and every time a new equilibrium point is obtained, which is as good as the initial one.

Short-term and Long-term Equilibria. Equilibrium may be short-term equilibrium or long-term equilibrium as in case of short-term and long-term value. In the short-term equilibrium, supply is adjusted to change in demand with the **existing** equipment or means of production, there being no time available to increase or decrease the factors of production. In the case of long-term equilibrium, however, there is ample time to change even the equipment or the factors of production themselves. That is, a new factory can be erected or new machinery installed.

Partial or General Equilibria. There is another classification of equilibrium—partial equilibrium or general equilibrium, which we discuss at some length below:

PARTIAL EQUILIBRIUM ANALYSIS

Meaning

Partial equilibrium analysis is the analysis of an equilibrium position for a sector of the economy or for one or several partial groups of the economic units corresponding to a particular set of data. This analysis essentially entails a process of simplification, whereby, it excludes certain variable and relationship from the totality and studies only a few selected variables at a time. In other words, this method considers the changes in one or two variables keeping all others constant.

The equilibrium of a single consumer, or producer, single firm or single industry are examples of partial equilibrium analysis. Marshall's theory of value is a case of partial equilibrium analysis. Referring to this aspect of Marshallian economics, Hicks in his book **Capital and Growth** observes:

"Marshall (fixed) attention . . . . not upon the whole economy, but a sector (it had better be a rather small sector) of it: the partial equilibrium of the single "industry" . . . . Marshall never tired of emphasizing, the theory made no claim to be a precise theory it would be quite sufficient if (its) assumptions . . . . were very approximately true."

It is clear from this statement that if the Marshallian method (*i.e.*, partial equilibrium analysis) is to be effective, even in its own terms, when applied to a hypothetical and idealized market, it is necessary that the market should be small enough so that its inter-dependence with the rest of the hypothetical economy could be neglected without much loss of accuracy. This procedure involves the reduction of an n-dimensional model to a two-dimensional cross-section. What it implies is that though in reality there may be n inter-dependent variables,

the partial equilibrium analysis enables us to study only two of them at a time, keeping the others constant.

It is thus a case of abstraction, a process of simplification that works by choosing a few variables—we can let the others go, which do not matter for us or which are assumed not to matter. The importance of the phrase 'other things being equal' or what is also called thus *ceteris paribus* becomes obvious. For instance, in a complete demand-supply model, we know that the quantity demanded depends on a host of variables, *viz.*, the price of the product concerned, income and its distribution, prices of substitutes, selling costs, taste, *etc.* Similarly, the quantity supplied depends upon a large number of factors or variables. The partial equilibrium analysis works by picking up the most essential variable influencing the quantity demanded or supplied and assumes all other variables to be constant. It is on such assumptions that the demand and supply curves are drawn to determ ne the equilibrium price.

Thus. *ceteris paribus* is the crux of partial equilibrium analysis.

Applicability

There are two types of problems that the partial equilibrium analysis can deal with. In the first category fall those problems which pertain to some specific facets of economic behaviour of certain individual, firm or industry. Such a case may indeed be the market for a single product and that market alone is taken into account, while others are assumed to be constant. In the second category are included only those economic problems where the analysis is to be conducted for the first order consequences of the economic phenomena alone and it ignores the secondary effects.

With the application of partial equilibrium analysis, consumer's equilibrium is indicated when he is getting maximum aggregate satisfaction from a given expenditure and in a given set of conditions relating to price and supply of the commodity. A producer is in equilibrium when he is able to maximize his aggregate net profit in the economic conditions in which he is working. A firm is said to be in long-run equilibrium when it has attained the optimum size which is ideal from the point of view of profit and utilization of resources at its disposal. There is no tendency for it either to expand or to contract. Equilibrium of an industry shows that there is no incentive for new firms to enter it or for the existing firms to leave it. This will happen when the marginal firm in the industry is making only normal profit, neither more nor less. In all these cases, those who have incentive to change it have no opportunity and those who have the opportunity have no incentive.

By focussing attention on a limited range of economic entities and reducing the scope of enquiry, the partial equilibrium analysis renders the study of economic problems simple and understandable.

Thus, for practical problems, this method is indispensable because of its much greater simplicity in comparison with the general equilibrium analysis.

Significance

The partial equilibrium analysis is, in fact, the threshold to the general equilibrium analysis which involves the inter-dependencies of various variables. After having conducted the partial analysis, we can go on varying one more variable successively and thus by degrees explore the general working of the economic system.

Thus, the partial equilibrium analysis cannot be said to be incompatible with the general equilibrium. In Prof. Schenieder's words: "This notwithstanding, the general interdependent system may be seen as a network of particular interdependencies, a point of view which provides a complete justification for partial analysis."

The fact is that one can sometimes obtain a better notion of the properties of the general interdependencies with the help of partial analysis than one can do from Walras' highly mathematical procedure of general equilibrium.

Partial analysis also helps us in obtaining a comprehension of the causes, *viz.*: the causes of a change in the product or the factor prices. Besides, discovering the causes of change, partial analysis also enables us to predict the consequences of such changes.

Limitations

All the same, partial equilibrium analysis suffers from a serious drawback. It makes use of the most unrealistic assumption of studying a market or an entity in isolation from the rest of the economy. In the real world, the totality of all the economic dispositions and plans in an exchange economy forms one great interdependent system. The result is that economic disturbance in one market generates a chain of causation travelling from one market to another and ultimately engulfing the entire economy. Hence, the genuine course of an economic process as a whole can be visualized by means of general analysis and not by a partial one. Partial equilibrium may be regarded as a worm's eye-view, whereas the general equilibrium is a bird's eye-view.

GENERAL EQUILIBRIUM ANALYSIS

We have seen that the partial equilibrium analysis enables us to study the relationship between only a selected few variables, keeping others unchanged. For example, in the conventional price theory, the law of demand is stated thus: $(q = f\ p)$ *ceteris*

paribus, meaning thereby that the quantity demanded of a commodity X is functionally related to its price and the relationship is inverse. This functional relationship considers price as the prime variable and holds all other variables such as income, tastes, prices of substitutes and complements, *etc.*, constant. Under such an abstract approach, price of every factor and commodity is a variable for the analysis of its own market and a parameter for the analysis of all other markets. This is only a piecemeal solution and there is no certainty that a consistent set of prices will result for the entire economy. However, the partial equilibrium analysis lies at the foundation of general equilibrium analysis.

Why General Equilibrium Approach

Fundamentally speaking, the price of any good or factor depends on the prices ruling in other markets. Commodities or factors must be either complementary or competitive, for there is nothing that stands unrelated (goods or factors). The complementarity arises out of the incompleteness of any single good or factor taken alone to satisfy a want. On the other hand, the goods or factors are competitive either because they are substitutable or else because with a given budget constraint, a large bundle of wants is to be satisfied. Thus, the demand for, and the price of, a good depends upon the price of its substitutes or complements.

In the same way, the demand for, and the price of, a factor are influenced by the prices of other factors that can be used with or for it, Not only that; the prices of goods and of factors in turn depend upon each other because the firms enter the product market as suppliers and enter the factor market as buyers. Households, on the other hand, are buyers in the product markets and suppliers in the factor markets.

However, looking from this angle, it would be committing a logical fallacy to say that the product prices are determined first and then conveyed to the consumers who thereafter make their optimum quantity adjustments. Similarly, it would be erroneous to say that the consumers first determine the quantities they wish to purchase and the market prices are decided only afterwards. This is so, because the factor prices cannot be determined till the firms have decided about the levels of output to be produced. The levels of output to be produced cannot be decided unless the product prices are known. How can the product prices be known unless the consumers have received their incomes from the sale of their factor services at certain prices? No market can adjust in isolation. It cannot adjust without disturbing the equilibrium of other markets and without having these disturbances reflect back on itself.

In fact, the economy cannot be divided into watertight compartments. The various aspects of the economic system are closely related and the whole process hangs together. It is just like an organic being that works as an integrated whole. No economic units are mutually exclusive; rather they are knit together in a mutually dependent way to form a unified whole. Every economic change will bring repercussions of a greater or less magnitude in every part of the economy. The ripples of effects of such a change pervade the entire economic system.

Repercussions of Change in Consumers' Preferences. Suppose there is a change in the tastes of the consumers which increases their relative preference for handloom cloth. The first effect that this change will produce will be to increase its price. This will impinge upon the factor prices used in its manufacture so that these will rise and that may raise their supply. Now these changes in the handloom cloth market and the handloom factor market will produce a chain of repercussions in the other markets and these in turn will react upon the handloom cloth market thus:

(i) The demand for goods complementary (if any) to handloom cloth will increase, thereby increasing their prices and the prices of factors of production used in their production.

(ii) The relative preference for handloom cloth will lead to a decrease in the demand for substitutes like mill-made cloth, thereby decreasing their prices and the prices of the factors of production used in their production.

(iii) As a consequence of the aforesaid changes, the relative prices of handloom cloth and its substitutes will be changed in favour of the former.

(iv) The consumers will, therefore, be confronted with new price-ratios and this will go to modify the increase in demand for, and the prices of handloom cloth and its complements. At the same time, a similar modification will occur in respect of the demand and the prices of substitutes. Similar arguments will also apply for the factors of production in each market.

(v) The firms engaged in the production of handloom cloth and its complements will be forced to pay higher prices to the factors of production employed by them.

(vi) The magnitude of increase in the price of any such factor will in turn depend upon the magnitude of increase in the production of handloom cloth and on its elasticity of supply.

(vii) Whether or not the prices of all factors will rise by the same percentage and their effect on the prices of handloom cloth and other commodities will depend on the relative importance of the different factors of production in different firms or industries.

(viii) Whatsoever the degree of the rise in the prices of factors, it will invariably stultify the fall in

the price of substitutes for handloom cloth, assuming that they use the same factors. These changes in the various price-ratios will produce repercussions on the relative demands, and vice versa.

(ix) Owing to a change in the relative prices of the factors of production, there will occur a substitution of dearer factors by the relatively cheaper factors.

(x) This process of substitution of factors shall in turn bring about a change in the demand for the factors (and in their prices), and in the costs and prices of all industries using them. The effect of all this will be to modify the changes in the relative factor prices mentioned in (v) and the changes in the relative prices of products mentioned in (iii).

(xi) Due to changes having occurred in the relative prices of factors of production, personal income distribution will also undergo a change.

(xii) The changes in the personal income distribution will further bring about changes in the pattern of demand, which will in turn impinge upon several markets.

Essence of General Equilibrium Approach

This inherent simultaneity of numerous mutual interdependencies and decisions necessitates the abandonment of partial equilibrium approach and the adoption of an approach general enough to take account of the basic mechanics of the whole economy. An analysis that treats the various individual economic units and markets as inter-related and attempts to trace the ramifications of an economic event to bring out their mutual determinations, is known as general equilibrium analysis.

Equilibrium in this general sense requires the harmony of the multitude of forces emanating from the multitude of decision-making units so as to equate the demand for, and supply of, each product and each factor at completely inter-related and consistent set of prices.

General Equilibrium and Macro-economic Equilibrium

General equilibrium is different from the aggregate or macro-economic equilibrium. In macro-economic equilibrium models, the entire system is described by relatively few, appropriately defined aggregates and functional relationships connecting aggregate variables such as total consumption expenditure, total investment, total employment, aggregate output and the like. In a macro-economic equilibrium system, such as the Keynesian type, the relations are fundamentally macro-analytical because they involve aggregate concepts and macro-interpretations. In such types of analyses, many important variables and relationships tend to disappear in the process of aggregation.

Viewed from the methodological angle, the macro-economic models stand shorn of much of their appeal since their basic behavioural assumptions and relations are not derived from the individual decision-making units. However, the attraction of the aggregative analysis lies in its simplicity and the availability of data required for testing of macro-economic equilibrium models.

On the other hand, the general equilibrium models are disaggregated models which are basically atomistic and micro-analytical in nature. They intend to take cognizance of every single economic decision maker and every economic good in the economic system. The basic ingredients of a general equilibrium approach can be at once traced back to the individual decision-making units such as the consumers and the firms. The properties of the general equilibrium model relate directly to the ultimate economic units.

Further, the macro-economic equilibrium analysis, unlike the general equilibrium analysis, fails to spotlight the mutual interrelatedness and determination of the individual units and markets.

It would be pertinent to ask: Can we analyse the **putative** influences of interdependent economic forces that the general equilibrium analysis claims to cover in its ambit? While it would be difficult, in fact impossible, to analyse millions of such interdependencies that exist in any economy, the competitive markets automatically take them into account. Such types of markets are in a position to perform such a complex task because of two reasons:

(i) Firstly, in a competitive system no individual or organization has to make all the decisions. All individual decision-making units pursue their own interest and the general equilibrium solution is the outcome of all those decisions taken together.

(ii) Secondly, the competitive markets give out signals through prices which communicate to the numerous individual decision-making units the information to plan their expenditures or production.

In the process of making their decisions, the consumers and the firms affect the prices of commodities. The changes in the prices serve as signals to the various consumers and firms which adjust their decisions accordingly. In this way, the changes in prices will go on bringing forth changes in quantities supplied and demanded until equilibrium in all markets is achieved simultaneously. This solution is what we call general equilibrium.

Thus, in such a system the various individual units go on pursuing their own ends—utility in case of consumers and profit in case of entrepreneurs and the resources shall be allocated according to those ends in the state of general equilibirum. While highlighting the situation in a general equilibrium in a static state Prof. Albert L. Meyers contends that it refers to "a condition in which all prices are long-run prices, each person is spending his income

in the manner which yields him the greatest satisfaction; each firm and industry is in a state of equilibrium with respect both to prices and output, and supply and demand for factors of production are equated at general equilibrium prices. In short, general equilibrium is a condition in which there are no economic motives for change".

Walras was the first person to build a model of general equilibrium of a purely competitive economy in order to express theoretically and identify practically the various markets through which the mechanism of interdependence works to bring about general equilibrium.

Uses of General Equilibrium Analysis

The general equilibrium has many theoretical and practical applications:

(i) To get an overall complete picture of the economy and study the problems involving the economy as a whole or even large segments of it, necessitates the consideration of the interrelations of production, consumption and the prices of all commodities and factors simultaneously. This requires the use of general equilibrium analysis.

(ii) The general equilibrium shows that the quantities of demanded goods are equal to the quantities supplied of them. Similarly, the quantities of factors demanded are equal to the quantities of factors supplied. Such a condition implies that the resources are being fully employed. Thus, in a state of general equilibrium, the amount of factor services which resource owners wish to supply is exactly equal to the amount which the various firms want to purchase.

In other words, all resources which seek employment are able to find it at the general equilibrium set of prices. In the absence of general equilibrium, there could be excess supply of some of the factors and, therefore, some of the resources will remain idle against the wishes of the resource owners.

Thus, we get the golden rule which states that the necessary condition for the resources to be fully employed is the existence of general equilibrium. Only in a state of full employment can the society strive to raise its standard of living.

(iii) The general equilibrium system also provides us with an ideal datum of economic efficiency. It brings out the fact that long-run competitive equilibrium is a standard of efficiency for the entire economy. Only when the competitive economy obtains general equilibrium shall its economic efficiency be at its peak and there shall be no further gains made by any reallocation of resources.

(iv) The general equilibrium system also represents the coveted state from the vantage point of welfare. The consumers in this state obtain the maximum satisfaction of their wants. Maximization of satisfaction implies maximization of welfare. Not only that, the general equilibrium also represents the state of optimum production of all commodities, because there can be no over-production or under-production under such conditions. All the markets are simultaneously cleared.

(v) The theory of general equilibrium also provides an insight into the way the multitudes of individual decisions are integrated by the working of the price mechanism. It, therefore, solves the fundamental problems of a free market economy, *viz.*: What to produce, how to produce, how much to produce, *etc.* This analysis shows that such decisions with regard to innumerable consumers and producers are co-ordinated by the price mechanism.

(vi) The general equilibrium analysis also gives us clues for predicting the consequences of an economic event. We have simply to peep through the complex chain of interrelationships embodied in the general equilibrium to gauge the sequence of consequences expected to be produced by the happening of an economic event.

(vii) The theory of general equilibrium also unravels the determinants of distribution of income in a community. Each individual performs certain services in the society for which he receives income. The size of the income depends on the amount of factor services which he supplies at the established prices.

As regards the functional income received by the different resources, there are two economic forces upon which it hinges: the relative productivities and the structure of demand for the output. The marginal revenue product and the equilibrium price of a factor increase or decrease in accordance with its marginal productivity. Given the state of full employment of the available resources, the income shares of the various factors will depend upon their relative marginal products. Similarly, the income shares of the various factors are also governed by the structure of demand because the income paid to a factor depends upon value attached by consumers to the product.

(viii) The general equilibrium analysis also finds application in the field of public policy. The formulation of a logically consistent public policy designed to influence business conduct requires a complete understanding of the various sector markets and aspects of individual decision-making units. General equilibrium provides the required information in this respect.

(ix) Yet another practical application of general equilibrium analysis is to be found in the input-output analysis. The conceptual framework of Walrasian general equilibrium forms the basis of Leontiff static input-output system. In these days, it is being employed in the formulation of plans for economic development of underdeveloped countries.

Limitations of General Equilibrium Analysis

The general equilibrium analysis suffers from several drawbacks also:

(i) The Walrasian general equilibrium system is essentially static. It treats the coefficient of production as fixed. It considers the supply of resources to be given and constant. It also takes tastes and preferences as fixed. But, in the real world, nothing is fixed; on the other hand, everything is constantly changing.

(ii) The general equilibrium system ignores leads and lags, for it considers everything to happen instantaneously. It is supposed to work just in the same way as an electric circuit does. In the real world, all economic events have links with the past and the future.

(iii) Apart from the unrealistic assumptions on which it stands, the Walrasian general equilibrium analysis is of little practical utility. It involves astronomical volumes of calculations for estimating the various quantities and practices. This makes its application practically impossible. Even the electronic computers cannot be of much help because they can at best solve the great many equations of such a system but cannot aid in collecting and recording the innumerable sets of prices and quantities that are required to formulate these equations. It is a tremendous problem.

(iv) It assumes the existence of a unique consistent real set of prices which will simultaneously equalize the demand and supplies of all goods and factors. The critics point out that the solution obtained by solving the simultaneous equations may give answers which lie in the domain of imaginary numbers. No economic meaning can be attached, for instance, if the price of any commodity comes out to be $\sqrt{-2}$ or numbers like that. Thus, the model of general equilibrium cannot be applied unless a unique real solution is obtained from the simultaneous equations. The critics further argue that even if such a solution exists, the price mechanism may not necessarily converge to it.

(v) The general equilibrium analysis is also found to flounder when the theoretical conclusions are juxtaposed with the empirical results. Large-scale unemployment has occurred under several price mechanisms. For instance, 20 per cent of the labour force was unemployed in the U.K., the U.S.A., and Germany during the 1930's. Thus, the prescription of general equilibrium analysis that in a free enterprise economy, the price mechanism shall bring about full employment is simply a myth.

(vi) Last but not least, the general equilibrium analysis falls to the ground as its star assumption of perfect competition is contrary to the actual conditions prevailing in the real world.

Conclusion

In spite of these drawbacks, however, the general equilibrium represents a bold attempt to view the numerous interdependencies of an economic system. As the methods of computation improve, its practical utility may considerably increase.

Summing up

In Economics, equilibrium analysis is of two kinds: Partial Equilibrium analysis and General Equilibrium analysis. In the partial equilibrium analysis, we focus our attention on individual economic units i.e. the consumer, the firm, an industry or a particular sector of the economy. It takes into account a number of variables for intensive study assuming that the economic process is not disturbed by influences external to the part of the economy we are studying. To use Schneider's words "the surrounding world is regarded as fixed or frozen over the period for which it is being studied." This type of theory discusses the determination of prices and outputs of particular commodities assuming those of others remaining unchanged. In other words, in partial equilibrium analysis, we isolate a particular type of activity for special investigation in great depth even though we know that there is, in fact, much interdependence between that under investigation and that held aside.

In contrast to the partial analysis, there is the general equilibrium approach. This approach stresses the inter-relationships among the prices and outputs of the various commodities and factors. Thus the general equilibrium analysis attempts to deal with all the variables of the economic system simultaneously. Obviously it is a much more difficult proposition. In this analysis, we collect and integrate the separate individuals and markets in order to examine how they are inter-related and influence they have on one another. It is thus extremely sophisticated and requires advanced mathematical knowledge.

The partial equilibrium analysis has obvious limitations. It assumes that disturbances in a particular sector of the economy have only localised effects. In reality it is not so. Inspite of such limitations, the partial economic analysis occupies an important place in price, and resource allocation theory. According to Marshall, it is easily comprehensible and more effective. It provides simpler propositions and simpler analysis. On the other hand, general equilibrium approach is more complicated than the partial equilibrium approach. But with the advancement of mathematics this approach is becoming more popular among the economists.

4 STATICS, DYNAMICS AND COMPARATIVE STATICS

A student of modern economic analysis frequently comes across the terms 'economic statics' and 'economic dynamics'. It is, therefore, very necessary for him to understand them clearly before he embarks upon the study of economic theory proper. In fact, some economists divide economic theory into two main branches, *viz.*, economic statics and economic dynamics.

The words 'Statics and Dynamics' have been borrowed from mechanics. August Comte first introduced these words in social sciences. It was John Stuart Mill who first made use of these concepts in Economics. However, the use of these remained clouded and ambiguous till 1928, when Ragnar Frisch made a scientific distinction between them. This has been followed by a conceptual controversy between some of the leading modern economists giving rise to a great deal of confusion and fallacy. Let us, therefore, be very clear about them.

ECONOMIC STATICS

Meaning

Literally the word 'statics' implies 'causing to stand'. In common usage, the term 'statics' connotes a position of rest or absence of movement. However, economic statics does not imply absence of movement, rather it denotes a state in which there is a continuous, regular, certain and constant movement without change. It is a state wherein economic activity goes on regularly and constantly on an even keel. Thus, remarks Pigou, "Just as the drops of water that form a stream are always changing but its form remains the same so do, in a static state, the factors change but they are not of any consequence."

Clark maintains that a static state is characterized by the absence of five kinds of change: the size of population, the supply of capital, the methods of production, the forms of business organization and the wants of the people; but all the same the economy continues to work at a steady pace. Marshall states that "It is to this active but unchanging process . . . . that the expression static economics should be applied".

Harrod is of the view that static analysis is concerned with a state of rest. State of rest does not signify a state of idleness but simply lack of investment with the result that the economy repeats itself over time. Harrod, of course, does not confine his concept of statics to such a rigidly defined state of affairs. He includes in it the once-for-all change whereby the economy shifts from one state of rest to another.

Prof. Hicks has a somewhat different notion of statics. According to him, we should call economic statics those parts of economic theory where we do not trouble about dating. He means to say that economic statics studies stationary situations which are devoid of any change and which do not require any relation to the past or the future. Thus, the static economy of his vision is a timeless economy in which the various phenomena and their effects are analysed without reference to time. For instance, when we say that if price is lowered by 5 per cent demand rises by 3 per cent, we are in the field of static analysis.

Frisch maintains that by static analysis is meant a **"method of dealing with economic phenomena that tries to establish relations between elements of the economic system—prices and quantities of commodities—all of which have the same point of time."** In other words, in economic statics we do not study anything about the connection between conditions at various points of time, *e.g.*, sequences, lags, *etc.* The ordinary theory of demand and supply is an illustration of the static analysis. It builds up a relationship between demand and supply as they are supposed to be at any moment of time. The market situation is assumed to be immune from the in-

fluences of the decisions of past or by the future expectations of value (although actually it is not so).

Thus, static analysis being a timeless analysis assumes instantaneous adjustment of the indices. Prof. Samuelson states in this connection: "Economic statics concerns itself with the simultaneous or instantaneous determination of the economic variables by mutually interdependent relations." Since instantaneous determinations keep no link with the past or future, we can infer that economic statics contains no element of uncertainty in it. Prof. Kuznets, while commenting on this aspect, remarks that, "Static economics deals with relations and processes on the assumption of uniformity and persistence of either the absolute or relative economic quantities involved."

In simple words, economic statics presupposes that the manner in which an economic unit changes is the same as it changed in the past and will change in the future. It suffices, therefore, under economic statics, to study the economy in its present position. It gives only a "still picture" of the economy, a vision of the moment, disappearing as soon as it makes its appearance.

Stationary State

The method of economic statics is generally associated with the concept of a stationary state where everything repeats itself from year to year. The economy churns steadily like a gramophone repeating itself endlessly. However, the concept of a stationary state is a mere methodological fiction devoid of any reality, although backward economies of India and China at one time showed symptoms of stationariness.

Further, this concept does not mean a method of analysis but an object of analysis, *viz.*, an economic process which goes on at an even rate or which merely reproduces itself. The values of all variables such as tastes, resources and technology, *etc.*, are not supposed to change over time. The factors which control production, consumption, distribution and exchange are assumed to be constant, yet there is movement, though at a uniform rate. People continue to be born and die, but births equal deaths so that there is no change in numbers, though the composition of population is changing.

Thus, it does not mean a frozen fixity. To use Pigou's words, "Individual drops composing the waterfall are continually in movement, though the waterfall itself remains." The economic system itself may remain static, though individual constituents may undergo change. The three fundamental sets of data, *viz.*, tastes, resources and techniques remain the same.

Significance of Economic Statics

Simplicity. Though economic statics is mostly unrealistic and unsuitable for most of the purposes, yet it enjoys the virtue of simplicity which has value of its own. None can deny that the study of the working of a propeller, while it is standing, is much easier than while it is in motion. In the same way, it is not only useful but necessary to possess complete understanding of the each and every part of the economic machine before it moves. Of course, economy can never stop, but it is the beauty of the static analysis that it allows the machine to move but at a constant rate so that the task of understanding is facilitated. That is why Leuthen points out that "we should emphasize that static theory has an introductory pedagogical value."

Clarity. The justification for such a value is to be found in the gain in clarity and the precision that results by studying the economic phenomena in isolation with the past and the future through higher degrees of abstraction. In Marshall's words, "The economist segregates those disturbing causes whose wanderings happen to be inconvenient for the time being in a phrase called "ceteris paribus". It is a simplifying device.

Hypothetical Model. Simplicity and clarity apart, the method of static analysis provides us with a hypothetical model of the economic phenomena in a state of unchangeability which helps us in comprehending the consequences of certain changes. This, in itself, is of no small value, for the crux of any scientific discipline lies in the discovery of the consequences. The policies can be snapped accordingly to deal squarely with the consequences.

End-View. Static theory is a study of the states of equilibria and thus it provides us an end-view of the forces in operation. In a sense, end is more important than what happens along the path to the end. Hence, utility of static theory is beyond question.

Behaviour of Variables. Static analysis also provides us with understanding regarding the behaviour of the variables in the economy. Prof. Marshall stresses that the central idea of "equilibrium" is statical rather than dynamical and the analysis of states of equilibria throws valuable light on the likely behaviour of the variables of an economy. For example, the study of equilibrium price tells us about the possible behaviour of the prices in the economy. Likewise, to know how demand and supply affect prices can be better understood when both demand and supply are in an equilibrium state. Economic statics builds up a relationship between demand, supply and price as they are supposed to be at any given moment; nothing else is considered even though several other things may also be changing at the same time. But we shut our eyes to other changes and focus our attention only on demand, supply and price to simplify matters.

Simplifying Process. Marshall has very clearly described the simplifying process thus: "The forces

to be dealt with are so numerous, that it is best to take a few at a time; and to work out a number of partial solutions as auxiliaries to our main study. Thus we begin by isolating the primary relations of supply, demand and price in regard to a particular commodity. We reduce to inaction all other forces by the phrase 'other things being equal'. We do not suppose that they are inert, but for the time we ignore their activity . . . .In the second stage, more forces are released from the hypothetical slumber that had been imposed on them. Gradually the area of the dynamical problem becomes larger; the area covered by provisional statical assumptions becomes smaller."

Step to Reality. This method is known as the method of "decreasing abstraction," "successive approximation" or the "isolating, one-at-a-time procedure". Recently, it has been called the "optimistic" approach. In the words of Joan Robinson, "an optimist appears to be analytical economist who is prepared to work stage-by-stage towards the still far distant ideals of constructing an analysis which will be capable of solving the problems of the real world."

Allocative Problems. Again, it is only through the method of economic statics that the various types of allocative problems of the economy are studied. We study how an individual allocates his income on the purchase of various commodities to maximize his satisfaction, how a producer combines his inputs in an optimal way to maximize his profit, and how the national product is distributed. Thus, the significance of economic statics lies in penetrating the complex problems in a simple way.

Applicability. Further, as Harrod states, the central core of the doctrine and the principles related to Robbins's definition of economics fall within the purview of economic statics. **The theory of comparative costs, case for free trade and marginal analysis, etc., are all exercises in static analysis.**

Prof. Harrod also holds that **Knight's theory of profits falls within the ambit of static analysis.** He argues that "Since change and round about production involve uncertainty—and once-over change generates more uncertainty than continuing change—I conceive the theory of profit to lie within the field of statics. I do not see anything specifically dynamic for instance in the theory of profit elaborated by Prof. F. H. Knight".

Harrod again maintains that **Keynes's General Theory is also essentially static in character.** Except for the concept of positive saving, all other variables of the Keynesian analysis such as involuntary unemployment, liquidity preference, marginal efficiency of capital, marginal propensity to consume and the multiplier are static in character because Keynes is concerned to show once-over changes in explaining these variables.

There is also a great scope for the development of static input-output analysis with regard to **distribution of national income, internal** and **international trade** which can be of immense use in planning.

Static analysis these days is also being increasingly made of the **institutional determinants of the economic systems.**

Comparative Statics. Fundamentally speaking, the Theory of Comparative Statics has its roots in economic statics. This enables us to study the change from one equilibrium position to another.

Facilitates Dynamic Analysis. Above all, the dynamic analysis can be considered to be a sort of running commentary on static analysis. It is only the full knowledge about static analysis which enables us to apply the dynamic analysis to the problems We cannot see what is moving and what is changing. We can study the moving picture of a functioning economy, but the picture has to be conceived as a static one. A change has thus to be broken up in bits and the bits have to be broken up into smaller bits, till each small bit is devoid of change.

Thus, the dynamic analysis has to be looked upon as if composed of innumerable small static pieces. To use Robbins' words: "We study these statical problems not merely for their own sake, but in order to apply them to the explanation of change . . . . their chief significance lies in their application in economic dynamics. We study the laws of rest in order to understand the laws of change."

Conclusion. Thus. economic statics occupies an important place in economic analysis today. It has a very wide application indeed. Its significance cannot be over-emphasised. It facilitates the understanding of economic theory and helps in the solution of economic problems. It can be applied to all branches of Economics.

Limitations of Economic Statics

The static analysis suffers from a few serious shortcomings: It takes us far away from the reality. It assumes variable data such as population, tastes, resources. and techniques, *etc.*, to remain constant. But the actual world is a dynamic one where the data are continuously changing. Aptly Prof. Edgeworth remarks, "The treating of a constant what is variable is the source of most of our fallacies in Political Economy."

Static analysis assumes away time. We cannot, therefore, pump in much meaning into our statements regarding economic changes since they take place over time. Hence, static analysis has only a limited scope to deal with the real economic problems.

ECONOMIC DYNAMICS

Meaning

The word 'dynamics' means causing to move. In

economics, 'dynamic' refers to the study of economic change. The essence of any knowledge lies in formulating relationships between phenomena There must be thus a sequence of events for the knowledge to be born. The main purpose is to know as to how a complex of current events will shape itself in the future. To do so, it is necessary to visualize the way it has itself arisen out of the past events. In this view, economics essentially assumes a dynamic character. The moment we talk of sequence of events, the element of time creeps into our analysis. It is this time element and its passage that imparts a dynamic flavour to our economic problems.

In economic statics, the relations between the relevant variables refer to the *same point or period of time.* In economic dynamics, however, the relations between relevant variables refer to *different points of time.* Economic Dynamics is thus a process of change through time. Since dynamic is that which changes and static which does not involve change, it is pertinent to ask what is it that changes ? An economic unit may undergo a change with respect to itself at a different place or a different time. We can, therefore, say that the change may occur with respect to matter, space or time. For instance, in the process of manufacture, the matter may undergo change or in the process of transportation space undergoes a change. Similarly, in the process of hoarding, time undergoes a change.

While the economy is in the process of change through time, the economic variables may change in two ways: One way is that, though the time element has undergone a change, the economy may not change its pattern and thus the values of the economic variable remain the same. The second way is that the economy may evolve through time and change its pattern so that the economic variables are non-stationary through time. The former way of happening of the change relates to the stationary state, while the latter type relates to economic dynamics. When the economy assumes a different pattern, the economic system will change its magnitude and direction.

We can explain this idea with the help of Fig. 4.1 given below.

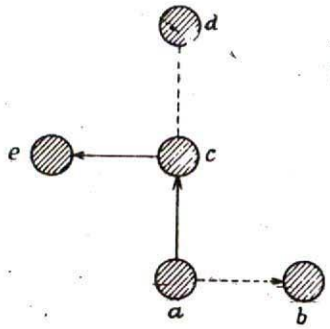


Fig. 4.1

Assuming certain given values of the economic variables, the economy would have moved from the position **a** to **b.** But in case there occurs a sudden change in the pattern so that the various indices undergo some change at the initial position **a,** the economic system will change its direction and traverse towards the position **c.** Again, had there been no further change in the pattern of the economy, it would have driven the economy to the position **d.** But again, if the pattern undergoes a sudden change at **c,** the economy would in that case proceed towards **e.** Economic dynamics studies the process of change from positions such as **a** to **c** and **c** to **e.** On the other hand, the analysis of the traverse from **a** to **b** and **c** to **d** would come under the subject-matter of economic statics.

However, a great deal of conceptual controversy has been raked up in recent times with regard to the notion of economic dynamics.

Hichs's View. Prof. J. R. Hicks defines Economic Dynamics *"as those parts where every quantity must be dated."* He contends that economic statics is concerned with those situations which are perfectly devoid of change and, therefore, do not require any relation with the future or the past, and need no dating. Hence, Hicks's view is that it is only change which makes the analysis dynamics. Change is the force that makes the things to differ at different dates and this alone is sufficient to give a dynamic colour to the analysis. Hicks goes to the extent of including a once-over-change in the realm of dynamic analysis. However, this makes his view erroneous for it unnecessarily drags many problems in the field of dynamic analysis where static analysis would do

Harrod's View. Criticising Hicksian definition, Prof. Harrod comments, "Mr. Hicks appears to be analysing the effects of once-over-change in fundamental conditions. There is no recognition that a different technique may be required for analysing the effects of continuing changes." Thus, Harrod prefers to base his notion of economic dynamics on *continuing changes rather than once-for-all changes.* According to him, once-for-all changes simply imply the shift from one position of equilibrium to another which can be duly taken care of by economic statics.

Elaborating his point of view, Harrod emphasises that as *the economic dynamics is to be chiefly concerned with continuing change, it, therefore, necessitates the study of an economy wherein the rate of change of income (output) is itself changing.* In simple words, the continuing acceleration or deceleration is the Harrodian essence of economic dynamics.

Harrod's point can be illustrated with the help of Fig 4.2. The horizontal axis measures time, whereas the vertical axis shows the level of income. Let us assume that OF is the full employment level of income. If, to start with, the income level is at A and for the time interval O t the rate of growth is zero,

then to Harrod, the study of the economy from A to B will be static.

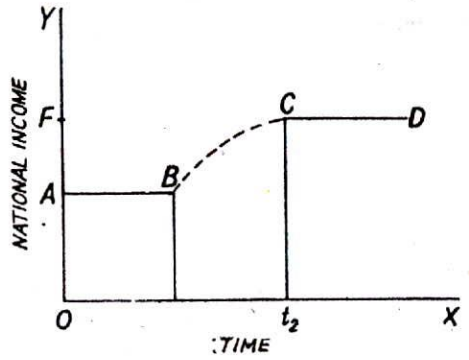


Fig. 4.2

Let us suppose that the government makes an investment (say I) in some development projects so as to raise or to push the economy up to the full employment ceiling. The investment I, through the operation of the multiplier (K) will increase the income by KI amount and take the economy to the full employment level C at the point of time t . Beyond the point of time t , the rate of growth again becomes zero and the analysis of the economy from position C to D and even beyond D will be a static one. To Harrod, the dotted path between B and C is the subject-matter of economic dynamics because, during the interval t and t , the rate of change of income is itself undergoing a change.

Frisch's View. Ragnar Frisch has broadened the vistas of economic dynamics by including in it not only continuing changes *but also the process of change.* He maintains that dynamic analysis is ". . . . *one in which we consider the magnitudes of certain variables on different points of time and we introduce certain equations which embrace at the same time several of those magnitudes at different instants".* Economic dynamics thus, according to him, should *embody functional relationships of variables with different dates appended to them.*

For instance, if we are investigating as to how many umbrellas shall be supplied by the various sellers in the market today, we should take into account the market conditions that obtained yesterday. The ramifications of the past decisions shall influence the sellers' decisions today with regard to the units of umbrella they should supply. Proceeding in this way, we may say that Frischian definition of economic dynamics takes care of the past values of the several variables, their lags, sequences, rates of change and cumulative magnitudes, *etc.*

Baumol's Concept. Taking a cue from the Frischian approach, Baumol has further sharpened the concept of economic dynamics. He states that economic dynamics is *"the study of economic phenomena in relation to the preceding and succeeding events."* Thus, to Baumol the essence of economic dynamics is predictability as against Frisch who confined it to the process of change only. What is needed is that the human mind should consider the past and the future while deciding upon the course of action to be taken. The producer should consider the past, the present state of the market and the expectations regarding the future.

The necessity for, and significance of, dynamic treatment in Baumol's sense introduces the idea of time-lags of all types. It makes incumbent, therefore, to visualize how the change in the value of a variable at one point of time affects the values of the other variables at different points of time. Hence, the dynamic analysis in the Baumolian sense has to consider the inter-temporal relationships between variables and examine the course of these variables over a particular period of time.

Samuelson's Synthesis. Samuelson has however, endeavoured to clinch this controversy by offering a sort of compromise between the definitions given by Hicks Harrod, Frisch and Baumol. He states that *"It is the essence of dynamics that economic variables at different points of time are functionally related including velocities, acceleration, or higher derivatives."* Thus, this definition includes in its field, the phenomena of cyclical growth, cyclical fluctuations, speculation, cob-web theorems of price determinations, stagnation thesis, perspective planning, *etc.*

Conclusion

The upshot of this discussion is that an economy is said to be in dynamical system when the values of the variables at any point of time are dependent on their values at some other time. Moreover, if we know their values at one moment of time, we can also discover their values at subsequent moments of time. The data produce the consequences and the consequences in turn give rise to data, *i.e.*, the causes of the change in data are the consequences in themselves.

Significance of Economic Dynamics

Realistic. Economic Dynamics is more realistic and light-giving than economic statics. It gives us a conspectus of the process of change and not just an analysis of the equilibrium position. Economic statics assumes constancy of resources, population, state of technique, investment, tastes, *etc.*, but all these in reality are not constant. They undergo a continuous and endless change and for a proper understanding of these changes there is no escape from the dynamic tools. Dynamic analysis takes closer to reality. Here is no assumption of *ceteris paribus.* It is a forbidden fruit as it were. In economic dynamics, we take into account all the changes, lags, sequences, cumulative magnitude and even expectations. In statics we deal with

stationary states which is a fiction. There is activity but the speed is uniform. There is movement but there is no change.

Boulding compares static equilibrium with a ball rolling at a constant speed or a forest where trees sprout, grow and die, but where the composition of the forest as a whole remains unchanged. But, in dynamics, we consider the real world which is ever-changing. It relates to a developing economy. The economic dynamics gives us a movie of the functioning economy and the process of its development by peering through the functional mechanism which propels the economy out into one period out of the preceding one.

Conditions of Stability. The fact, that dynamic analysis is concerned with the process of change and the path whereby this change leads to a new equilibrium position, enables us to analyse the way the economy traverses its path from a disequilibrium position to a new equilibrium state. By such an analysis the conditions for the stability of equilibrium can be studied.

Applicability. The dynamic analysis has assumed a place of paramount importance in the field of those **economic problems which involve time-lags, sequences and rates of growth.** With the help of dynamic analysis more general and fundamental results can be derived in the study of such problems than from static analysis.

Recent advances in the field of econometrics make extensive use of dynamic models based on the economic dynamics. Noteworthy works in this field are those of Klein, Samuelson, Goldberger and Koyack. In fact, Economics is fast becoming Econometric owing to the increasing use of dynamic analysis.

Dynamic analysis has also proved to be indispensable in the **theory of trade cycles.** Some of the dynamic concepts such as accelerator and super-multiplier have been evolved to study the trade cycles. Thanks to dynamic analysis for making a clear-cut distinction between the endogenous, exogenous and mixed theories of trade cycles.

Modern economists such as Hicks, Kalecki, Domar, Harrod, Samuelson, Mrs. Robinson, Lindahl, Kaldor, Frisch, Hansen, Duessenberry, Goodwin and others have constructed **macro-dynamic models.** These macro-dynamic models employ the dynamic analysis and have thrown a great deal of light on the inter-temporal adjustments of aggregate variables. This has placed the knowledge of economics on more scientific footing.

The short-term dynamic analysis is also being applied these days to elucidate the **dynamic stability of agricultural markets.** Such an exercise carries great importance for the underdeveloped countries which are mainly primary product producing countries.

The dynamic approach is also being used to study the **dynamics of wages, capital costs and employment in manufacturing.** Some studies are also underway to study the nature of **expectations of manufacturers** of industrial sales and of dealers about retail sales by the help of dynamic analysis. Such efforts are intended to enable an understanding of the existing complexities of the business behaviour.

Dynamic aggregate analysis has also found its application in the study of the **cumulative process of inflation or deflation.** This has proved useful in pinning down the sensitive factors in order to formulate effective policies for economic stabilization.

Conclusion. In the end, we may conclude with Prof. Samuelson's remark that Economic dynamics "is an enormously flexible mode of thought both for pinning down the implications of various hypotheses and for investigating new possibilities."

Limitations of Economic Dynamics

Economic dynamics, though it is a more realistic method for analysing the complicated problems, yet it suffers from some weaknesses:

The method of dynamics is essentially very **complex** and only a few economists equipped with the techniques of advanced mathematics can make use of it. This in fact has reduced its popularity.

It has been held by Northrop that it is not possible to build up the theory of economic dynamics. His contention is that the theory of economic dynamics requires certain fundamental conditions, which the economic data do not possess. Economic problems being woven round the human wants are not amenable to dynamic analysis because their future structure cannot be derived from the present wants.

Conclusion

It goes without saying that dynamics is a more general and fundamental approach than statics, but at the same time it would not be proper to discount the importance of statics. Harrod has vehemently held that statics is equally applicable to various branches of economic science. The study of the working of an aeroplane is much easier while it is standing than when it is in motion. Likewise, for really useful results to be obtained, the application of dynamic analysis should be preceded by the use of static analysis.

In fact, dynamic and static are two inseparable wings. The dynamics is composed of the statics. We are in a position to study the dynamic only because it is comprised of the static. In dynamic economics, what we really study are a large number of static positions of an economy. If the economic dynamics is a movie of a functioning economy, static is a still picture depicting the stationary position of the economy. Thus, the laws of static economics must

also apply to dynamics. The only thing that has got to be done is to introduce a variable that could link one static position with the other. Indeed such a link-variable are the expectations of the economic units that forge the present with the future and thus transform statics into dynamics. It is, therefore, reasonable to conclude that statics and dynamics are complementary to each other.

COMPARATIVE STATICS

The method of comparative statics is a sort of cross between statics and dynamics. It occupies a position in between the two.

We know that the dynamic analysis includes the time interval whereas the static analysis does not. Everything in the real world is subject to change with time. Notwithstanding this, static analysis remains useful, for this is a method whereby we can ignore time as a variable and still make a purposeful study of the economic system. This is possible when we are finding out the ultimate effect of a certain initial change and ignore the process through which it is brought about.

We can thus think of an analysis in which we start with a system in equilibrium, then introduce a change and study the ultimate effect of the change. This is the method of comparative statics. Here, we have in a way done away with the time element—we have ignored that time is changing. We just jump from one equilibrium position to another without taking care of as to what happens in between the two situations. We call such a method as comparative statics because in it we compare one equilibrium position with another and ignore the time element.

Thus, in comparative statics, we study the change from one equilibrium position to another as a result of changes in parameters. It helps us to know the direction and the magnitude of changes in the variable when certain data change, so as to cause a movement to a new equilibrium position. In comparative statics, there is a once-for-all change in demand conditions and supply is allowed to adjust to these changes. Fig. 4.3 illustrates this point:

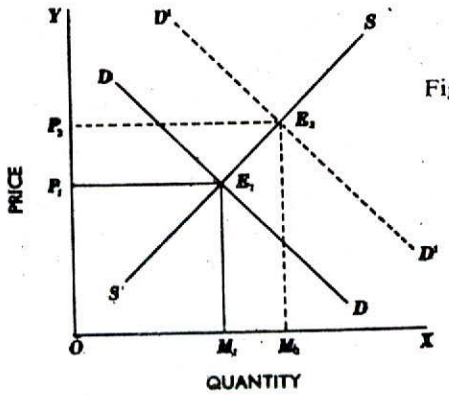


Fig. 4.3

The original equilibrium between the demand curve DD and the supply curve SS is at E_1. But when demand increases to D'D' as a result of increase in income, the new equilibrium is at E_2 at the price OP_2. In comparative static analysis, we are only concerned with explaining the new equilibrium position at E_2 and comparing it with E_1, and we are not concerned with explaining the whole path the system has travelled from E_1 to E_2. Alfred Marshall, made extensive use of comparative statics in his time—period analysis of pricing under perfect competition. Although the dynamic analysis is more comprehensive and informative of the two equilibrium positions and the different sets of data, yet comparative static treatment provides some important insights into the mechanism of the exchange economy.

Limitations of Comparative Statics

Comparative statics suffers from certain limitations. It cannot be used to tackle two types of problems: (a) It fails to predict the path which the market follows when moving from one equilibrium position to another, and (b) it cannot predict whether or not a given equilibrium position will ever be achieved. For these purposes we need dynamic analysis.

Prof. Tinbergen has pointed out that such an analysis is possible only under two circumstances: Firstly, when we are interested in the long run tendencies, when the movement produced by the changes in the data are damped and the data do not themselves undergo a change. Under such circumstances, the final position of equilibrium will be independent of time or the path traversed by the economy. Secondly, such an analysis is possible when the change in data brings about immediate adaptation of the economic magnitudes so that the new data do not take time to produce the results. Under such conditions, too, it is possible to ignore the time element.

Keynes' technique of shifting equilibrium is based upon the method of comparative statics.

The Keynesian model predicts that an upward shift in the investment function will cause a rise in the level of income, a rise in the level of saving, and a rise in the rate of interest. At the original level of income, investment exceeds saving. Equilibrium is restored by the rise in saving resulting from the rise of income, and by the fall in investment resulting from the rise in interest rates. Similarly, the Keynesian theory predicts that a fall in the transactions demand for cash will cause a rise in income, a fall in interest rates and a rise in saving and investment. Also, a downward revision in expectations about the future interest rate will lower the rate, raise income and raise saving and investment. Such are the shifts that Keynes studies with the aid of comparative statics.

Part II
Theory of Demand

5 UTILITY ANALYSIS OF DEMAND

Theory of demand seeks to establish relationship between the quantity demanded of a commodity and its price. It also offers an explanation for variations in demand. There are different approaches known to the economists to the theory of demand. The oldest among them is the marginal utility approach. The marginal utility analysis explains consumer's demand for a commodity and derives a law of demand which shows an inverse relationship between the quantity demanded and the price of the commodity. That is, it states that as price falls, demand is extended, and vice versa. Recent economists have pointed out several flaws in the utility analysis of demand and have offered new theories. For instance, we have the indifference curve technique developed by J.R. Hicks and R.G.D. Allen. This has been followed by further refinements in Samuelsons' Revealed Preference Theory and Hicks' Logical Weak Ordering Theory. In this chapter, we shall take up the marginal utility analysis.

BASIC ASSUMPTIONS OF MARGINAL UTILITY ANALYSIS

We shall first mention a few basic assumptions on which the marginal utility analysis is based. We shall see later how the marginal utility analysis has been criticised on the gound that the assumptions on which it is based are unrealistic or invalid. The following are the main assumptions:—

(i) Cardinal Measurement of Utility

Marginal utility analysis assumes in the first place that utility can be measured and the exact measurement can be given by assigning definite numbers such as 1, 2, 3, *etc.* That is, it is assumed that utility is a quantifiable entity. This means that a person can express the satisfaction derived from the consumption of a commodity in quantitative terms. He can say, for instance, that for him the first unit of the commodity has utility equal to 10, the second unit 8, and so on. In this way, it is possible for a consumer to compare the utilities of different goods. If, for example, fruit has for him utility 20 and sweets 10, then he can say, that for him the utility of fruits is double that of sweets. Utility is usually measured in imaginary units.

(ii) Utilities Are Independent

Marginal utility analysis assumes that the utilities of different commodities are independent of one another. That is, the utility of one commodity does not in any way affect that of another. In other words, the satisfaction derived from the consumption of one good is the function of that good alone and is not affected by the consumption of another. It depends on the quantity consumed of one good and not of another. On this assumption, the total utility of all goods consumed by a consumer is simply the sum total of the separate utilities of all the goods consumed by a consumer. Thus, according to this assumption, the utilities of various goods are additive, *i.e.*, separate utilities of the various goods can be added to obtain the total sum of the utilities of all goods consumed.

(iii) Constant Marginal Utility of Money

Another important assumption of the marginal utility analysis is that the marginal utility of money remains constant even though the quantity of money with the consumer is diminished by the successive purchases made by him. It is assumed that while marginal utility of a commodity varies with the quantity of the commodity purchased, the marginal utility of money remains throughout the same as the quantity of the good purchased varies. This assumption becomes necessary because the marginal utility of a commodity is measured in terms of money. It is considered desirable that the measure itself should

not keep changing. In the words of Professor Tapas Majumdar, "If money is supposed to provide the measuring rod of utility, then evidently as with all measuring rods, its unit must be invariant: it must measure the same amount of utility in all circumstances". When a person purchases more of a good, the amount of money with him must diminish and the marginal utility of money must increase. But this variation in the marginal utility of money is ignored and it is assumed to remain constant throughout.

(iv) **Introspection**

The marginal utility analysis also assumes 'that from one's own experience (judging what happens in one's own mind), it is possible to draw inference about another person. This is self-observation applied to another person. It is assumed that the mind of men work identically in similar situations. This is how a system of taxation is built on the assumption that the same incomes mean the same thing to all persons irrespective of dissimilar circumstances. That is why according to the law of diminishing marginal utility, the marginal utility decreases when consumers have more of a good. The advocates of 'behaviourism' (observing actual behaviour) do not subscribe to this view. According to them it is not possible to make a correct guess work about the working of another mind from one's own mind.

Now we shall study the two basic laws governing consumer behaviour, *viz.*, the law of diminishing marginal utility and the law of equi-marginal utility.

LAW OF DIMINISHING MARGINAL UTILITY

Statement of the Law

Satisfaction of human wants follows some very important laws and one of them is the Law of Diminishing Marginal Utility. The law refers to the common experience of every consumer. Suppose a person starts eating pieces of bread one after another. The first toast gives him great pleasure. By the time he starts taking the second, the edge of his appetite has been blunted, and the second toast, meeting with a less urgent want, yields less satisfaction; the satisfaction of the third will be less than that of the second; that of the fourth less than that of the third, and so on. The additional satisfaction will go on decreasing with every successive toast till it drops down to zero; and if the consumer is forced to take more, the satisfaction may become negative, or the utility may change into disutility.

The idea will be clear from the table in the next column.

(*N.B.* These figures are merely illustrative representations of the amount of utility. Any other figures may be taken, provided variations in the amount of utility are similar to those in the following table,

1 *Units (Toasts)*	2 *Total Utility (Units of Satisfaction)*	3 *Marginal Utility (Units of Satisfaction)*
1	20	20
2	38	18
3	53	15
4	64	11
5	70	6
6	70	0
7	62	—8
8	46	—16

i.e., the marginal utility at every step should be diminishing.)

When our hypothetical consumer goes on taking toasts, the extra satisfaction that he gets by the consumption of each successive toast goes on decreasing till it goes down to zero at the 6th, and then it becomes negative (see column 3).

The total utility, however, goes on increasing until the consumption of the 5th; but, it is worth noting that it increases at a diminishing rate. In the words of Chapman, "The more we have of a thing the less we want additional increments of it, or the more we want not to have additional increments of it."

It will be seen from the table that the **total utility of a quantity of a commodity is maximum** (*i.e.*, 70) **when the marginal utility is zero** (*i.e.*, at the 6th unit).

Marshall states the law thus: **"The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in stock that he already has."** We might add that with every diminution of his stock, the marginal utility will go on increasing. In other words, the marginal utility varies inversely with the stock. although not necessarily in the same proportion.

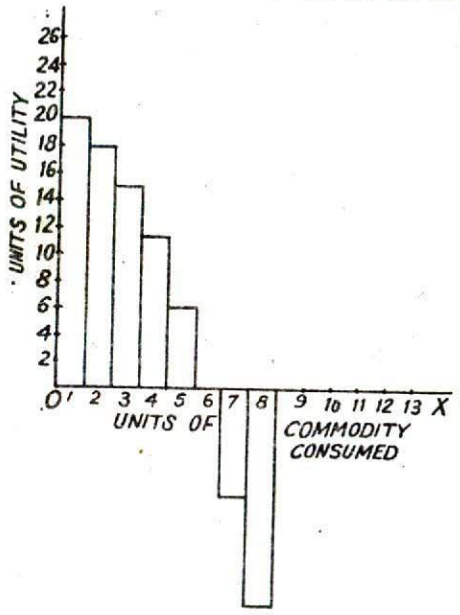
As explained below, two important reasons can be given, for diminishing marginal utility: (a) Each particular want is satiable, and (b) goods are imperfect substitutes for one another and they tend to be consumed in appropriate proportions.

Diagrammatic Representation

The following diagram illustrates the Law of Diminishing Marginal Utility as applied to the consumption of toasts, See the table above.

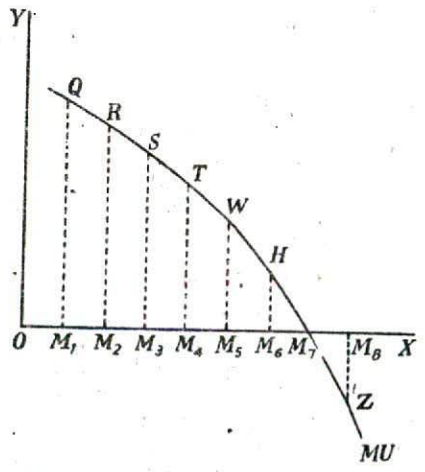
OX and OY are the two axes. Units of toasts are measured along OX and units of utility along OY. Utility of the first toast is represented by the rectangle standing on a portion of the axis of X (Fig. 5.1). Similarly, the utility of each successive unit consumed is represented by the rectangles as shown in the diagram. These rectangles become smaller and smaller, as consumption of units proceeds. The sixth toast has no utility. The seventh and the eighth have negative utilities, as shown by the rectangles below the axis of X.

The toasts are big units. If a commodity is consumed in sufficiently small units, the rectangles would become thinner and thinner. We can theore-



Diminishing Marginal Utility
Fig. 5.1

tically assume that they become so thin as to be represented by a mere line. Now, if the tops of such lines, standing shoulder to shoulder, are joined together, we get a curve sloping from left to right, as shown in Fig. 5.2.



Diminishing Marginal Utility Curve
Fig. 5.2

Diminishing Marginal Utility Curve

In this figure 5.2, a curve MU has been drawn which slopes downward from left to right. This is the diminishing marginal utility curve. It shows that as the quantity of the commodity with the consumer increases, its marginal utility decreases. When he has OM_1 quantity, the marginal utility is M_1 Q and when the quantity increases to OM_2, the marginal utility decreases to M_2 R. In the same manner, the marginal utility of the quantity OM_3 is M_3 S, of OM_4 it is M_4 T, of OM_5 it is M_5 W and of OM_6 it is M_6 H. When the quantity increases to OM_7, the marginal utility drops to zero and it becomes negative (M_8 Z below the X-axis) when the consumer comes to have OM_8 quantity.

Why does the marginal utility fall when the quantity of the commodity with the consumer increases?

As already pointed out, there are two reasons: (a) Even though human wants in the aggregate are unlimited, yet a particular want can be almost fully satisfied. Hence, when a consumer consumes more and more of a commodity, his want is satisfied and he does not desire further increments of the commodity. Thus his marginal utility decreases as his consumption of that commodity increases. A stage comes when further consumption brings the marginal utility down to zero.

(b) Another reason of the diminishing marginal utility is that goods are imperfect substitutes for one another. Different commodities satisfy different wants. When a consumer goes on consuming a commodity, the marginal utility falls as his want is satisfied. But if the commodity could be substituted for other commodities, it would have satisfied other wants. Hence, its marginal utility would not have decreased even though its quantity increases.

Limitations of the Law

The Law of Diminishing Marginal Utility, as enunciated above, is based on certain assumptions:

(i) **Suitable Units.** It is assumed that the commodity is taken in suitable units. If you begin taking water by spoonfuls when thirsty, or if you want to judge the utility of the morsels rather than the full chapatis, your thirst or hunger will be at first stimulated rather than assuaged, and the utility may, therefore, at first, rise instead of falling. But, sooner or later, a point will be reached when utility will begin to diminish. Unless, therefore, the units are of a suitable size, the law will not hold good. The initial quantity should be greater than the 'critical minimum.'

(ii) **Suitable Time.** It is further assumed that the commodity is taken within a certain time, otherwise the law will not apply. If you take your first meal at 10 a.m. and the next at 2 p.m., there is no reason why the utility of the second meal may be less. But in case you are compelled to take the second meal within an hour of your having taken the first, the law

will apply, and the utility of the second meal will be less.

(iii) **No Change in Consumer's Tastes.** Another assumption is that the character of the consumer does not change. The consumer must not, for instance, have developed a craving. The more music one hears, the more literature one reads, the more wine a drunkard takes, the more money a miser has, the greater is the utility in each case. This is so because the character of the consumer has undergone a change. More reading lifts a person to a higher plane, and he is able to appreciate and enjoy literature better than he could before. Similarly, a drunkard is said to enjoy each successive peg more than the previous one.

(iv) **Normal Persons.** The Law of Diminishing Marginal Utility applies to normal persons and not toeccentricor abnormal persons like misers. In other words, we assume rational behaviour on the part of the consumers. In case they behave in a queer and irrational manner, the law will not hold good.

(v) **Constant Income.** It is also essential that the income of the consumer remains the same. Any change in income will falsify the law. For instance, a rise in a man's income may raise in his eyes the value of the various plots in his big compound of which he could not make much use before.

(vi) **Rare Collections.** In the case of rare collections, the law does not hold good. If, for instance, a man is collecting ancient coins, the more he is able to collect the greater will be his satisfaction. Hence, in such cases, the law of diminishing marginal utility. does not hold good.

(vii) **Change in Other People's Stock.** The law says that marginal utility decreases when there is an increase in our stock. But, in some cases, the utility changes, not because of a change in what we have but because of a change in other people's stock. For example, if I have a rival in the town collecting ancient coins, and somehow he loses his collection, the utility of my collection automatically goes up. In the same manner, utility to me of my telephone increases as the number of telephone connections increases. The value of my land goes up without any change in its dimensions when a railway station has been built nearby.

(viii) **Other Possessions.** Utility also depends on our other possessions. The law ignores the relation of complementarity. For example, a carriage may be lying useless with us, but, as soon as we are able to buy a horse, its utility at once goes up. Thus, change in our other possessions can also bring about a change in marginal utility.

(ix) **Fashion.** Further, utility depends on fashion too. The utility of my dress goes up when that dress comes in fashion. If, on the other hand, it goes out of fashion, the utility goes down.

(x) **Not Applicable to Money.** The Law does not apply to money as it is said that more money he has, the more he wants. But as explained below, it does apply to money too.

Conclusion. The law of diminishing utility, like other economic laws, is merely a statement of a tendency. It depends upon so many conditions. If the conditions are not fulfilled, the law does not apply as in the many exceptional cases mentioned above.

It is worth noting that the law of diminishing utility does not operate because the successive units of the commodity are inferior. Although it is understandable that if a unit is of inferior quality *ipso facto* its utility will be less, yet the law is far more fundamental. It is independent of quality. The toasts may all be of a uniform quality still the additional utility will decrease as consumption proceeds.

It follows from this law that more urgent wants are satisfied first. As the stock increases, it will be put to less and less urgent uses, and the reduction of the stock would mean the reversing of the process.

The law holds good in all types of satisfaction whether good or bad. We do not assume rationality on the part of the consumer. Nor do we assume that there is a rigidly fixed order in which wants are arranged by all, although the order will roughly be the same in the same class of people.

Marginal Utility

Marginal utility can be defined as the change in the total utility resulting from a one-unit change in the consumption of a commodity per unit of time. When a man is purchasing a commodity, he is consciously or unconsciously weighing in his mind the price he has to pay and the utility of each unit that he buys. He will continue purchasing till the marginal utility equals the price. Here is a fundamental proposition of the theory of consumer demand: "A consumer will exchange money for units of any commodity A, up to the point where the last (marginal) unit of A which he buys has for him a marginal significance in terms of money just equal to its money price."[1]

Refer to the table given on page 35. Where will our consumer stop? It depends upon the price. If the price is 6 Paise per toast, then he will stop at the 5th, for there the marginal utility is equal to the price (marginal utility being represented in Paise units). If the price is 11 Paise per toast, he will stop at the 4th, and, if they are free, then he will go on consuming till the additional utility comes down to zero (*i.e.*, up to the 6th unit). He will not go beyond this point because disutility will be the result. The consumer stops at a point where the price and the marginal

1. Stonier and Hague—*A Text-Book of Economic Theory*, 1953, p. 40.

utility are just equal. This is called the marginal purchase and the **extra utility at this point is called the marginal utility. It is a point where we consider just worth our while to purchase,** for here the pain of parting with the money and the benefit derived from the purchase of the commodity just balance.

Marginal utility has also been defined as the **addition made to the total utility by the consumption of the last unit considered just worthwhile.** In other words, it may be defined as the change in total utility resulting from a unit change in the quantity of the commodity consumed. Thus, if we buy 5 toasts, the 5th is the marginal toast. But marginal utility is not the utility of the 5th toast, because all the toasts are supposed to be alike. It only refers to the **addition** made to the previous total by the consumption of this particular toast. Marginal utility is the increase in total utility resulting from the consumption of the marginal unit. The following formula may be used to measure it.

$$\text{Marginal utility} = \frac{\textbf{Change in total utility}}{\textbf{Change in quantity consumed}}$$

It thus measures the ratio of change in the two variables.

The margin is not something rigid or fixed. It shifts forward and backward according to changes in price. If the price falls, it will become worthwhile to purchase more of the commodity and the margin will descend, and vice versa.

Marginal Utility of Money

Does the law of diminishing marginal utility apply to money? It is said that there can be a limit to the purchase of a commodity, but there is no such limit to the acquiring of money. Money is a general purchasing power. It enables the purchaser to buy anything he likes. That is why it is said one can never reach a stage where money ceases to be desired. In other words, more money a person has more he desires to obtain it. That is, the marginal utility of money goes on increasing with its increase. This is opposed to the law of diminishing marginal utility.

We may concede the strength of this argument. But it is also true that the law of diminishing marginal utility certainly applies to money too. As the quantity of money, that a person possesses, increases, its significance to him decreases. It can be easily seen that a rich man attaches much less importance to each unit of money than the poor. He spends it more freely and is much less worried in case he happens to lose a certain portion of it. Every increment in the amount of money that a man has brings him less and less extra pleasure. Hence, the law of diminishing marginal utility does apply to money also.

Marginal Utility and Price

It is clear from the above discussion that marginal utility and price are inter-related. The two coincide, or price measures marginal utility. The consumer stops where the price and the marginal utility are equal. All units of the commodity being interchangeable, what is paid for the marginal unit is paid for every other unit. Therefore, we can say that marginal utility determines price. It is marginal utility and not total utility that determines price, otherwise the price of water should have been high, and that of gold low.

Really, marginal utility does not determine price; it simply **indicates** it. The determining factors are demand and supply. If the price changes, marginal utility will change too. Price and marginal utility thus move together up and down.

Marginal Utility and Supply

Marginal utility is a **function of supply,** *i.e.,* it varies with supply. In the case of a free good, where the supply is unlimited, the marginal utility is zero. Only in the case of scarce goods is the marginal utility positive. It increases as the supply contracts and decreases as it expands. It comes down to zero when the supply is super-abundant. Hence, **marginal utility varies inversely with supply,** *i.e.,* the greater the supply the less the marginal utility, and vice versa.

Marginal Utilities of Related Goods

There are two main types of relationship between goods: (a) They may be substitutes; or (b) they may be complementary.

The **substitutes** are capable of satisfying the same want, *e.g.,* tea and coffee, air transport, rail transport and road transport. If they are perfect substitutes, they may be treated as one commodity for all practical purposes. But most goods are only imperfect substitutes. In the case of such goods, other things being equal, the marginal utility of any such good decreases as the quantity of the substitute goods with the consumer increases.

Complementary goods are such goods which are wanted together for the satisfaction of a want, *e.g.,* paper, pen and ink for writing. In such cases, other things remaining the same, marginal utility increases as the quantities of the complementary goods with the consumer increases. If, for instance, a consumer acquires more paper, the marginal utility of the bottle of ink goes up.

Practical Importance of the Law of Diminishing Marginal Utility

Taxation. The law of diminishing marginal utility has great practical importance. We have seen that the law of diminishing marginal utility applies to money too. This law forms the basis of the theory and practice of taxation. Progressive system of

taxation, imposing a heavier burden on the rich people, is a practical application of this principle in the field of public finance. Richer a person the higher is the rate of the tax he has to pay since to him the marginal utility of money is less.

Price Determination. The law explains why, with increase in its supply, the value of a commodity must fall. It thus forms a basis of the theory of value. As such its practical importance both to the general consumer and the businessman can hardly be exaggerated.

Household Expenditure. The law of diminishing marginal utility governs our daily expenditure. Since we know that a larger purchase will mean lower marginal utility, we restrict our purchase of a particular commodity, because we cannot afford to waste our limited resources. We stop further purchases at a point where marginal utility equals price.

Downward Sloping Demand Curve. It is this law which tells us why demand curves slope downwards. It is due to this law that smaller utility lines cut larger portions of the commodity line, *i.e.*, X-axis (see utility curve on page 36).

Value-in-Use and Value-in-Exchange. It also explains the divergence between value-in-use and value-in-exchange. Air has great utility (value-in-use) but little value-in-exchange, because it has no marginal utility.

Socialism. The socialists take stand on this law when they advocate the re-distribution of wealth in favour of the poor. The marginal utility to the rich of the wealth, that they might lose, is not so great as the marginal utility of the wealth which is transferred to the poor.

Basis of Some Economic Laws. Some very important laws of Economics are based on the law of diminishing marginal utility, *e.g.*, Law of Demand, the Concept of Consumer's Surplus, the Concept of Elasticity of Demand, the Law of Substitution, *etc.* These laws and concepts have ultimately been derived from the law of diminishing marginal utility.

LAW OF EQUI-MARGINAL UTILITY

Statement of the Law

Owing to multiplicity of wants and scarcity of means wants are competitive. We have, therefore, more urgent and less urgent wants. When we are weighing in our mind whether to buy a little more or a little less of a commodity, it seems we are trying to balance the marginal utility of the commodity and that of money. **But what we are really balancing is the marginal utility of that particular commodity and** the marginal utilities of a host of other commodities which we could **purchase with that amount of money.** Money thus builds a bridge for us to pass from one commodity to another. This is how substitution takes place. It is not merely a substitution of one thing for another satisfying the same want, *e.g.*, substitution of tea for coffee, but substitution even of entirely different commodities.

Every prudent person wants to make the best of his or her resources. This is necessary because resources are scarce in relation to wants—a fundamental proposition with which we started the study of Economics. Every consumer aims at getting the maximum possible satisfaction. For this purpose, he will substitute the more useful for the less useful thing. When he has done so, it will be found that marginal utilities in each direction of his purchases have been equalised.

Our hypothetical consumer is acting consciously or unconsciously on the principle which has been called by various names (though different in approach), the Law of Substitution, or the Law of Indifference, or the Law of Economy of Expenditure, or the Law of Maximum Satisfaction. It is called the Law of Substitution, because we substitute the more useful thing for the less useful one. It is known as the Law of Maximum Satisfaction, because through its application we are able to maximize our satisfaction. It is called the Law of Equi-Marginal Utility, because it is only when marginal utilities have been equalised, through the process of substitution, that we get maximum satisfaction.

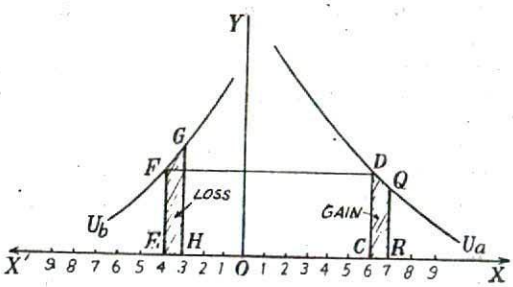
It happens like this: We assume that our consumer has a given income to spend, that his tastes are also given, that he wants to maximize his satisfaction and that the marginal utility of money to the consumer also remains constant during successive purchases. Further, we assume that commodities of his purchase are subject to the law of diminishing marginal utility so that after the consumer has spent some of his money on a particular commodity, the marginal utility to him of the commodity begins to fall. Then, he feels that he would gain greater satisfaction by spending additional units of money on something else. He goes on substituting one thing for another (after a point), until the whole of the money he wanted to spend is exhausted.

Take two goods A and B. So long as the marginal utility of money spent on good A is not equal to the marginal utility of money spent on good B, the consumer will increase his satisfaction by substituting one good for the other until the marginal utility of money is the same in both the cases. The consumer will attain maximum satisfaction, and hence will be in equilibrium position, when he has so adjusted his expenditure that marginal utility of money to him in each direction of his purchase is the same. If marginal utility of money spent on the good A is greater than the marginal utility of money spent on the good B, the consumer will withdraw some money from the purchase of B and will spend it on A till the marginal utility of money in the two

cases becomes equal. Any arrangement of expenditure, other than the one which equalised the marginal utility of money in each direction of his purchase, will yield the consumer less amount of satisfaction.

Diagrammatic Representation

The principle of equi-marginal utility can be explained with the help of the diagram (Fig. 5.3) given below. In this figure, along the axis OX, from left to right (*i.e.*, on the portion OX) is measured the



Law of Equi-Marginal Utility
Fig. 5.3

quantity of the good A and from right to left, (*i.e.*, on the portion OX') is measured the quantity of the good B. Along the axis OY is measured utility of the amounts of money spent on the goods A and B. On the right hand side of OY is drawn a curve Ua which slopes downwards from left to right. This curve shows the marginal utility of the money spent on commodity A. On the other side of OY is drawn the curve Ub which slopes downwards from right to the left. This curve shows the marginal utility of money spent on the good B.

Suppose our hypothetical consumer has Rs. 10 to spend on the two goods A and B. It will be clear from the diagram that if he spends Rs. 6 on A good and Rs. 4 on B good, the marginal utilities of both goods are equal (CD = EF).

In this way, he will derive maimum satisfaction and any other arrangement will only reduce the aggregate satisfaction. To prove this, suppose the consumer spends Re. 1 more on the good A and consequently Re. 1 less on the good B. As a result, the marginal utilities will become unequal (GH is greater than QR). In this case, the gain in utility is less than the loss thereof and his total utility will be less than before. The gain in utility and loss thereof are shown in the shaded area.

Hence, we may conclude that the consumer will get maximum satisfaction and will be in equilibrium if the marginal utilities of money spent on the various goods that he buys are equal.

Limitations of the Law

Like other economic laws, the Law of Equi-marginal Utility too is a mere statement of a tendency. The actual expenditure of individuals may not conform to this law. This may be due to the following reasons:—

(i) The Law of Equi-marginal Utility involves very careful calculations of the expected satisfaction and its comparison with the amount of money spent as well as with the satisfaction which may be derived by spending the same amount of money on some other things. But how many of us are capable of making such fine calculations? How many of us have the patience and the ability to do it? Are we all so rational and calculating? The fact is that most of our expenditure is governed by habit. There is not much of conscious calculation and careful weighing of the utilities.

(ii) Only in the case of big expenditure, a prudent person goes through a certain amount of thinking. Here we may take it that this expenditure does roughly conform to the Law of Maximum Satisfaction, but not when we make small purchases.

(iii) The utmost we can say is that all rational and prudent persons are expected to act upon this law consciously or unconsciously. As Chapman puts it, "We are not, of course, compelled to distribute our incomes according to the Law of Substitution or Equi-marginal Expenditure, as a stone thrown into the air is compelled, in a sense, to fall back to the earth; but as a matter of fact, we do in a certain rough fashion, because we are reasonable."[2] Hence, the law will not hold good of irrational purchases.

(iv) Ignorance of consumers imposes another limitation. The consumers may not be aware of other more useful alternatives. Hence, no substitution takes place and the law of substitution does not operate. Similarly, an incompetent entrepreneur will not be able to achieve the best results from his productive resources. He may not be able to divert investment to more profitable channels.

(v) People are sometimes slaves of customs or fashion and are incapable of rational consumption. Without being rational and calculating, a consumer cannot substitute one thing for another. This is another limitation on the law.

(vi) Another limitation arises from the fact that goods are not divisible into small bits to enable consumers to equalise marginal utilities. In actual practice, therefore, the marginal utilities cannot be equalised. The law remains only on a theoretical plane.

(vii) The law of substitution has no place when the resources are unlimited as in the case of free goods. In such cases, there is no need to re-arrange expenditure because no price is to be paid whatever the quantity used.

(viii) There is no definite budget period in the

2. Chapman. S.—*Outlines of Political Economy*, p. 48.

case of individuals. Even if there is fixed accounting period, the application of this principle is rendered difficult by the varying degrees of durability of the goods consumed. A durable good is available for consumption in several succeeding accounting periods. It is not, therefore, easy to bring it into account of income and expenditure of a particular accounting period to see if satisfaction has been maximised during that period.

(ix) The basic criticism of the law of equi-marginal utility is that it rests on some questionable assumptions. For example, we assume that utilities can be added and compared and that during successive purchases, the marginal utility of money to the consumer remains constant. The modern economists question both these assumptions. The indifference curve approach to the theory of consumer's equilibrium is based on this basic criticism of the Marshallian analysis.

Conclusion. In spite of these points of criticism, the law of equi-marginal utility occupies a very important place in economic theory. Whether it is a case of consumer's equilibrium, producer's equilibrium, allocation of resources or distribution of the national income among the productive agents, this law has a determining influence according to Marshallian analysis.

Practical Importance of the Law

The Law of Substitution, also known as the Law of Equi-Marginal Utility, has a very wide application. It is applicable to the utilisation of time, distribution of assets in various forms and the allocation of resources among various uses. It also applies to the use of money now and its use in the future, *i.e.*, in spending in the present and saving in the future. The law is applicable to all branches of economic theory.

It Applies to Consumption. Every consumer, if he is wise, wants to get maximum satisfaction out of his limited resources. In arranging his expenditure to that end, he must substitute the thing of greater utility for one possessing less utility till marginal utilities are equalized. In this way, the consumers' satisfaction is maximized.

Its Application to Production. To the businessman and the manufacturer the law is of special importance. He works towards the most economical combination of the factors of production employed by him. For this purpose, he will substitute one factor for another till their marginal productivities are made the same. In case he finds that marginal productivity of one factor, say, labour, is greater than that of capital, it will pay him to substitute the former for the latter. In this way, he will be able to maximize his profit.

Its Application to Exchange. In all our exchanges, this principle works, for exchange is nothing else but substitution of one thing for another. The substitutional character of our exchange is sufficient to bring home to us the very great importance of this basic economic principle.

Price Determination. This principle has an important bearing on the determination of value. When there is scarcity of a commodity, the Law of Substitution comes to our aid. We start substituting the less scarce goods for the more scarce ones. The scarcity of the latter is thus relieved, and its price comes down.

Its Application to Distribution. In Distribution, we are concerned with the determination of the rewards of the various agents of production, *i.e.*, determination of rent, wages, interest and profit. These shares are determined according to the principle of marginal productivity. The use of each agent of production is pushed by the entrepreneur to the margin of profitableness till the marginal product in each case is the same. In case it is not the same, the Law of Substitution will come into play to equalize their marginal productivities. This is how the Law of Substitution proves useful in the field of distribution of the national dividend among the various agents of production.

Public Finance. Public expenditure of a government conforms to this Law. Even a government is under the necessity of deriving maximum amount of benefit from its public expenditure. It must try to maximise welfare of the community. For this purpose it must cut down all wasteful expenditure.

Conclusion. Thus the Law of Substitution applies in all branches of economic theory. It has also got great practical importance.

CONSUMER'S EQUILIBRIUM

We have discussed above two important laws of consumption, *viz.*, the law of diminishing marginal utility and the law of equi-marginal utility. In terms of these laws, we can indicate the position of a consumer's equilibrium *i.e.*, when the consumer attains a position of maximum satisfaction and would have no further incentive to make any change in the quantity of the commodity purchased.

Equilibrium With One Commodity Purchase

The law of diminishing marginal utility tells us the position of a consumer's equilibrium in the case of a one-commodity purchase. He will go on buying successive units of the commodity till the marginal utility of the commodity becomes equal to price. If the price falls, he will buy more and the marginal utility will come down to the level of price. On the other hand, if the price goes up, naturally less will be purchased and the marginal utility goes up till it reaches the new (higher) level of price. In short, equality between marginal utility and price indicates the position of consumer's equilibrium

when only one commodity is being purchased and consumed.

Equilibrium with Two Commodity Purchase

In case the consumer is buying two commodities X and Y, the position of equilibrium will be determined according to the law of equi-marginal utilities. It has already been stated that a consumer derives maximum satisfaction when the marginal utilities of the two commodities are equal. In case they are not equal, adjustment will be made in the matter of quantities purchased, *i.e.*, buying more of the commodity with higher marginal utility and buying less of the lower marginal utility commodity) till the marginal utilities of the two commodities are equalised. This is a position of maximum satisfaction. We assume rational behaviour on the part of the consumer so that it is maximum satisfaction that he seeks and we suppose he is capable of making careful comparisons and calculations.

Let us illustrate: Suppose the consumer is buying only two commodities X and Y. For arriving at an equilibrium position, *i.e.*, a position of maximum satisfaction, the consumer will take into consideration two factors, *viz.*, the marginal utilities of the two goods and their prices, given his money income that he has to spend on the two commodities. A change in relative prices will naturally call for readjustments. Given the prices of X and Y, the consumer will be in equilibrium when the marginal utility of money expenditure on each good X and Y is the same.

Now, the marginal utility of money expenditure on a good is equal to the marginal utility of the good divided by its price. Symbolically, it can be put as:

$$MUE = \frac{MUx}{Px}$$

Hence MUE is marginal utility of expenditure, MUx is marginal utility of the commodity X and Px is the price of X. This means that a consumer so spends his money income on different commodities that marginal utility of each good is proportional to its price.

From the above, we can derive a formula for a consumer's equilibrium in respect of two goods X and Y purchased by him as under:

$\frac{MUx}{Px} = \frac{MUy}{Py}$. That is, marginal utility of good X divided by the price of X must be equal to marginal utility of Y divided by the price of Y.

Suppose, however, this equation is disturbed *i.e.* $\frac{MUx}{Px}$ is greater than $\frac{MUy}{Py}$ This would mean that the commodity X gives the consumer greater satisfaction than Y. He would, therefore, naturally substitute X for Y. The result of this substitution will be that the marginal utility of X will fall and that of Y will rise. Substitution of X for Y will continue until $\frac{MUx}{Px}$ becomes equal to $\frac{MUy}{Py}$. This would be the consumer's equilibrium position.

As we have explained already, while discussing consumers' equilibrium in the case of one-commodity purchase, a consumer goes on buying a commodity till the marginal utility of the commodity becomes equal to the price. Hence consumer's equilibrium will be indicated by the following equation:

$$\frac{MUx}{Px} = \frac{MUy}{Py} = MUm.$$

Here MUm is the marginal utility of money.

This principle can also be illustrated with the help of table I and a diagram thus:

TABLE I
Marginal Utility of Goods X and Y

Units	MUx *(Utilities)*	MUy *(Utilities)*
1	33	36
2	30	32
3	27	28
4	24	24
5	21	20
6	18	16

Suppose the prices of goods X and Y are Rs. 3 and Rs. 4 respectively. The above table can be reconstructed by dividing the marginal utilities of good X (MUx) by Rs. 3 and the marginal utilities of good Y by Rs. 4. We obtain table II:

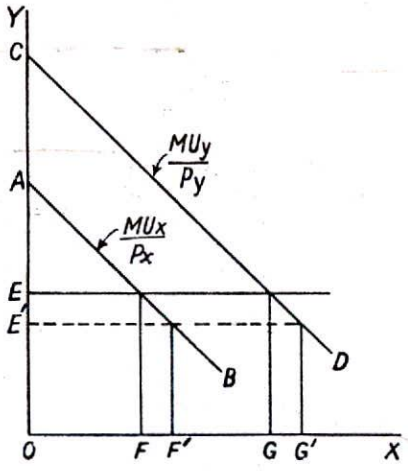
TABLE II
Marginal Utility of Expenditure

Units	$\frac{MUx}{Px}$	$\frac{MUy}{Py}$
1	11	9
2	10	8
3	9	7
4	8	6
5	7	5
6	6	4

With a given income, suppose a consumer's marginal utility of money is constant at Re. 1=8 utilities. From the above table, it will be seen that $\frac{MUx}{Px} = 8$ utils when our hypothetical consumer buys four units of good X and $\frac{MUy}{Py}$ is equal to 8, when he buys two units of good Y. This consumer will thus be in equilibrium when he is buying four units of good X and two units of good Y and he will be

spending Rs. 20 (4 × Rs. 3 + 2 × Rs. 4) on these two goods.

Consumer's equilibrium may be shown diagramatically (see Fig. 5.4 below). We have already seen that the marginal utility curves of goods slope downward. Thus the curves portraying $\frac{MUx}{Px}$ and $\frac{MUy}{Py}$ will also slope downward (curves AB and CD respectively in Fig. 5.4). Taking the income of a consumer as given, suppose his marginal utility of money is constant at OE utils in Fig. 5.4. $\frac{MUx}{Px}$ is



Consumer's Equilibrium

Fig. 5.4

equal to OE (the marginal utility of money) when OF amount of good X is purchased, $\frac{MUy}{Py}$ is equal to OE when OG quantity of good Y is bought. Thus, when our hypothetical consumer is purchasing OF of X and OG of Y, $\frac{MUx}{Px} = \frac{MUy}{Py} = MUm$. This consumer is in equilibrium when he is purchasing OF of X and OG of Y. No other distribution of money expenditure will yield the consumer greater utility than when he is purchasing OF of X and OG of Y.

Suppose the money income of the consumer increases. As a result, his marginal utility will fall, say to OE'. The consumer will then increase his purchases of goods X and Y to OF' and OG' respectively.

The equi-marginal position of a consumer's equilibrium can be stated in three ways as under:—

(i) In equilibrium, a consumer equalises weighted marginal utilities (*i.e.*, weighted by the price of the good) of all goods to one another and also to the marginal utility of money. Thus:

$$\frac{MUx}{Px} = \frac{MUy}{Py} = MUm.$$

(ii) Secondly, a consumer attains an equilibrium position when he equalises the ratios of marginal utilities of goods to the ratios of corresponding prices for each pair of goods consumed. Thus:

$$\frac{MUx}{MUy} = \frac{Px}{Py} \text{ and } \frac{MUy}{MUz} = \frac{Py}{Pz} \text{ and so on.}$$

(iii) A consumer will be in equilibrium position when the marginal utility of every rupee that he spends on each good is equal.

Meaning of Demand

It is necessary to distinguish between demand and desire or need. A sickly child needs a tonic; a peon desires to have a TV set. But such needs and desires do not constitute demand. When, however, the person desiring is **willing and able to pay** for what he desires, the desire is changed into demand.

Demand is always **at a price. "The demand for anything at a given price is the amount of it which will be bought per unit of time at that price."**[3] It simply means how much a person will be willing to buy of a commodity at a certain price in set of possible prices during some specified period of time. At another price he will, of course, buy a different quantity, more at a lower price and less at a higher price. To speak of demand without reference to price is meaningless.

Also, **the demand is always per unit of time**—per day, per week, per month or per year.

Here is a very good definition:

"By demand we mean the various quantities of a given commodity or service which consumers would buy in one market in a given period of time at various prices, or at various incomes, or at various prices of related goods." (Bober).

From the point of view of the seller, the demand price is the average revenue (revenue per unit) or income he expects to earn from the sale of a unit of a commodity. Thus, **demand price is identical with average revenue** (AR). That is why, the demand curve is also drawn as AR curve.

Types of Demand

Three kinds of demands may be distinguished:

(a) Price Demand;
(b) Income Demand; and
(c) Cross Demand.

Price Demand. Price demand refers to the various quantities of a commodity or service that a consumer would purchase at a given time in a market at various hypothetical prices. It is assumed that other things, such as consumer's income, his tastes and prices of inter-related goods, remain unchanged.

The demand of the individual consumer is called **Individual Demand** and the total demand of all the

3. Benham, F.—*Economics* (1943), p. 36.

consumers combined for the commodity or service is called **Industry Demand.** The total demand for the product of an individual firm at various prices is known as firm's demand or **Individual Seller's Demand.**

Income Demand. The income demand refers to the various quantities of goods and services which would be purchased by the consumers at various levels of incomes. Here we assume that the price of the commodity or service as well as the prices of inter-related goods and the tastes and desires of consumers do not change. Just as the price demand expresses relationship between prices and quantities, the income demand shows the relationship between income and quantities demanded. For preparing demand schedule of income demand, we write incomes in one column and quantities purchased at these incomes in the second column. Superior goods or high-priced articles command brisk sales when income increases. On the other hand, inferior goods command large sales when incomes are at a lower level.

Cross Demand. The cross demand means the quantities of a good or service which will be purchased with reference to change in price not of this good but of other inter-related goods. These goods are either substitutes or complementary goods. A change in the price of tea, for instance, will affect the demand for coffee. Similarly, if horses become cheap, demand for carriages may increase. In order to prepare demand schedule of this type, we write prices of one commodity in one column and the quantities purchased of the other commodity in the second column.

Of these types of demand, price demand is the most commonly spoken one. Now we study demand schedule, demand curve, *etc.*, relating to price demand.

DEMAND CURVE

We give here a demand curve of an imaginary consumer. The demand curve simply shows how the quantity purchased varies with the variation in price. Along OX are represented the quantities of the good purchased and along OY the prices. It will be seen that at the price OP, OM quantity is purchased, at OP′ the quantity purchased is ON and at OP″ price OL. As the price falls, more is purchased, and vice versa. The demand curve is also known as the Average Revenue (AR) curve, because the price paid by the consumer is revenue per unit (*i.e.*, average revenue) for the seller.

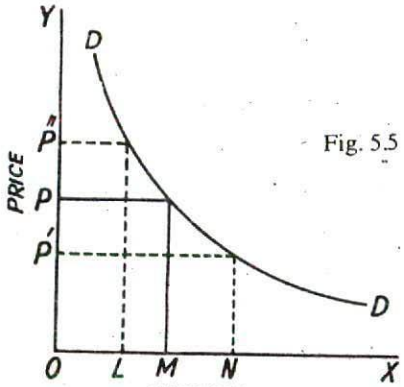


Fig. 5.5
Demand Curve

Why Demand Curve Slopes Downwards

Generally, the demand curve slopes downwards. This is in accordance with the law of diminishing marginal utility. The purchases of most of us are governed by this law. When the price falls, new purchasers enter the market and old purchasers will probably purchase more. Since this particular commodity has become cheaper, it will be purchased by some people in preference to other commodities. Only in a curve of this slope shall we find shorter price lines cutting longer pieces on the quantity-axis. If the law of diminishing marginal utility is true—and it is generally true—the curve must slope downward, for only then the phenomenon of increasing demand with falling prices can be represented.

There are three obvious reasons why people buy more when the price falls:

(i) A unit of money goes farther and a consumer can afford to buy more. He is able and willing to buy more because the thing being cheaper, his real income increases. It is called income effect.

(ii) When the commodity becomes cheaper, it tends to be substituted wholly or partly for other commodities. This is called substitution effect.

The income effect and substitution effect combine to increase the ability and willingness of the consumer to buy more of the commodity whose price has fallen.

(iii) A commodity tends to be put to more uses or less urgent uses when it becomes cheaper. For example, if water is dear, we shall use it for drinking only; but when it becomes cheaper, we shall use it for washing and other less urgent uses.

Thus, the old buyers buy more and some new buyers enter the market. The cumulative effect is an extension of demand when price falls.

But let us go a bit deeper and try to find out **why the demand increases when the price falls,** other things being equal. Benham[4] has answered this question in this manner: Having a limited amount of money at his disposal, every consumer wants to get the maximum satisfaction therefrom. Knowing his own scale of preferences he will according to the law of substitution and equi-marginal returns, so

4. Benham, F., *Economics*, 1943, pp. 42-43.

arrange his expenditure that he gets equal marginal utility from the last paisa that he spends in different ways. He will keep to this arrangement if the prices remain the same.

But if the price of a commodity, included in his assortment of goods and services, falls, then he must make a corresponding alteration in his scheme of expenditure. By the fall in price, divergence has been created between the marginal utility and price and this must be rectified. This can be done by buying more of the commodity when its price falls thus bringing its marginal utility to the level of the price. That is why, people buy more when the prices fall.

Conversely, we buy less, when the price rises because: (a) we substitute other cheaper things for it; and (b) when price rises, we feel poorer (our real income falls), hence we economise and cut down our consumption.

The law of diminishing marginal utility too is the basis of the law of demand. The consumer will buy more only if the price falls because more he buys the lower is the marginal utility.

Exceptional Demand Curves

As we have said above, generally the demand curve slopes downwards to the left. But sometimes the demand curve, instead of sloping downward, will rise upwards. In other words, sometimes people will buy more when the price rises. This can be represented only by a rising demand curve. Such cases are very rare, but we can imagine some. These were first investigated by Sir Robert Giffen. The **Giffen Paradox** holds that the demand is strengthened with a fall in price or weakened with a fall in price.

Benham has mentioned four such cases[5]:

(1) When a serious shortage is feared, people get panicky and buy more even though the price is rising. This is expectational rise in prices.

(2) In case the use of a commodity confers distinction, the wealthy people will buy more when the price rises, to be included among the few distinguished personages. Conversely, people tend to cut their purchases, if they believe the commodity to be inferior.

(3) Sometimes people buy more at a higher price in sheer ignorance.

(4) If the price of a necessity of life goes up, the consumer has to readjust his whole expenditure. He may cut down his expenses on other food articles and in order to make up, more may have to be spent on this particular good. Thus, more of this commodity will be purchased in spite of its high price.

In terms of income elasticity, the demand curves slope downward in the case of goods with positive income elasticities and upward when there is strong negative income elasticity.

Law of Demand

We are now in a position to formulate the Law of Demand. This law simply expresses the relation between quantity of a commodity demanded and its price. The law states that **demand varies inversely with price, not necessarily proportionately.** If the price falls, demand will extend, and vice versa. The law of demand indicates this inverse relationship between price and quantity demanded.

The law can also be stated thus: **"A rise in the price of a commodity or service is followed by a reduction in demand, and a fall in price is followed by an increase in demand, if conditions of demand remain constant."**

The qualifying phrase "the conditions of demand remaining constant" is very important. Demand is subject to several influences, which will be discussed presently, and the operation of any of those influences may counteract the law.

In Marshall's words, "The greater the amount to be sold, the smaller must be the price at which it is offered in order that it may find purchasers; or in other words, the amount demanded increases with a fall in price and diminishes with a rise in price."[6]

Obviously, the law of demand is based on the law of diminishing marginal utility. In other words, it is the law of diminishing marginal utility which explains the law of demand.

Demand thus is a function of price, *i.e.*, it varies with price and can be expressed as D = F (P). Here D is demand and P is price.

It may also be added that no proportionality in the change is implied. If the price falls by 10 per cent, it does not follow that the demand will increase exactly by 10 per cent. We can only say that the demand will extend when the price falls, but we cannot say how much. This will depend on the elasticity of demand which we shall discuss shortly.

Limitations of the Law. There are, however, certain exceptions to the law of demand. That is, there are cases in which demand does not contract when price rises, and vice versa. These cases are indicated by exceptional (upward rising) demand curves discussed above. The law will hold if the conditions of demand remain the same. These conditions relate to the consumer's tastes, his income, prices of other goods, possibility of substitutes, expected price changes, *etc.* If these conditions change, the law will not hold good. Thus, the following exceptions to the law of demand may be indicated:—

(i) **Change in Taste or Fashion.** According to the law of demand, when price falls, demand is expect-

5. Ibid, pp. 47.8.

6. Marshall, A.—*Principles of Economics*, 1949, p. 84.

ed to increase. But if in the meantime consumer's tastes have undergone a change or if the commodity has gone out of fashion, more may not be demanded even if the price falls..

(ii) **Change in Income.** A rise in price is likely to result in a diminution of demand according to the law of demand. But if the consumer's income has gone up, he may be willing to buy more in spite of the rise in price.

(iii) **Change in Other Prices.** The law of demand says that if the price of a commodity, say tea, falls, more tea will be demanded. But if the price of coffee falls even more heavily, more tea may not be purchased; instead more coffee may be purchased. This is in contravention of the law of demand.

(iv) **Discovery of Substitutes.** Acting on the law of demand, India may lower the price of jute by abolishing or reducing export duty to boost her sales of jute. But the discovery of cheap substitutes like paper bags may nullify our efforts and more jute may not be demanded even if the price of jute falls.

(v) Anticipatory changes in prices may also upset the law of demand. It is often seen that there is stockpiling of commodities and larger purchases even though the prices are rising. This may be due to the fact that either on account of the danger of war or widespread failure of rains, shortage is feared and the prices may in future go up still higher.

(vi) The law of demand does not hold good also when a commodity is such that its use confers distinction. In case of such a commodity, a fall in its price will keep off the eligible purchasers, because the use of a cheap commodity cannot be considered as a mark of distinction.

Conclusion. The above are a few exceptions to the law of demand. By and large, however, the law holds good. That is, a rise in price decreases demand and a fall in price increases it.

DERIVATION OF THE DEMAND CURVE AND LAW OF DEMAND

Having familiarised ourselves with the demand curve and the law of demand, we are now in a position to see how they are derived in the marginal utility analysis. Marshall derived the demand curve of a good from its utility function, *i.e.*, the variation of utility with the quantity purchased. As we have already mentioned the underlying assumptions are that the utility is measurable cardinally (*i.e.*, it is additive) and the utilities are independent of each other (thus ruling out substitution and complementary relations between the goods consumed). Also, the marginal utility of money MUm is supposed to remain constant.

Subject to the assumptions given above, we can derive the demand curve and the law of demand (a) with the help of the law of diminishing marginal utility, and (b) with the help of the law of equi-marginal utility. We have already studied these two laws.

Derivation of the Demand Curve and the Law of Demand from the Law of Diminishing Marginal Utility

The law of diminishing marginal utility states that the marginal utility of a good (expressed in terms of money) to a consumer decreases as the quantity consumed increases. This means that the marginal utility curve of a good is a downward sloping curve as shown in the figure below:

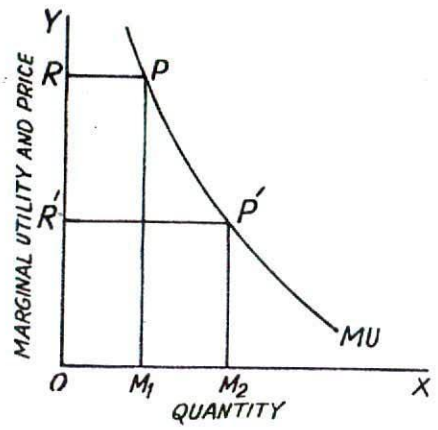


Fig. 5.6

We have already seen that a consumer is in equilibrium when the marginal utility of a good equals its price. Now when the price of the good falls for example from OR to OR', the consumer must buy more than before *i.e.*, OM_2 instead of OM_1 so that the marginal utility $P'M_2$ equals price OR'. From this it follows that the diminishing marginal utility curve leads us to a downward sloping demand curve which means that more of a good is purchased as its price falls. This can be seen in the above figure.

At the price OR, the consumer is in equilibrium at the quantity of the good OM_1 since it represents a position of equality between marginal utility PM_1 and the price OR. Now if the price comes down from OR to OR', this equality between the marginal utility and price is disturbed, because the marginal utility PM_1 is greater than the price OR'. This equality is restored only, when the consumer buys OM_2 instead of OM_1, then the marginal utility $P'M_2$ is equal to the price OR'. This means buying more when the price falls and this is precisely the law of demand and what the demand curve shows.

We have thus derived the law of demand which states that the quantity demanded of a good varies inversely with its price. In other words, other things

remaining the same, the quantity demanded increases when the price falls, and vice versa. This is the well known Marshallian law of demand and it is based on the law of diminishing marginal utility.

Derivation of the Demand Curve and the Law of Demand from the Law of Equi-Marginal Utility

We have already seen that in terms of the law of equi-marginal utility when a consumer is purchasing two commodities, he attains a position of equilibrium when the marginal utilities of the two goods he purchases are equal or they are proportional to their prices. The proportionality rule which the consumer must satisfy is

$$\frac{MUx}{Px} = \frac{MUy}{Py} = \frac{MUn}{Pn} = MUm$$

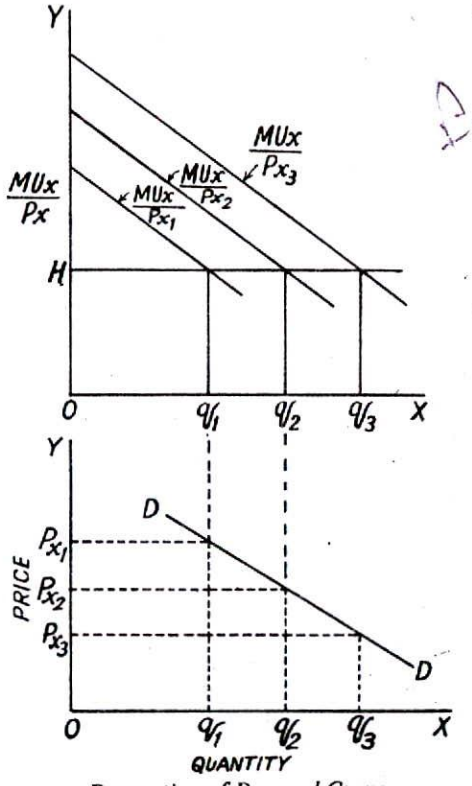
where MUm is the marginal utility of money. Px is the price of X and Py is the price of Y, and so on. That is, the consumer equalises his marginal utility of money (expenditure) with the ratio of marginal utility and price of each commodity he purchases.

Now suppose that price of one good, say X, falls, the price of the other good Y and consumer's income and tastes remaining the same (*Ceteris paribus*), the proportionality rule, *i.e.*, the equality of $\frac{Mux}{Px}$ with $\frac{MUy}{Py}$ = MUm is disturbed. Since the price of X is now lower $\frac{MUx}{Px}$ will be greater than $\frac{MUy}{Py}$ or MUm. This equality can be restored only when the consumer buys more of X, whose price has come down, than before. Only then the marginal utility of X or MUx will be reduced to the level of $\frac{MUy}{Py}$ or MUm. This means that as the price of a good falls, its demand increases. This is the law of demand and it has been derived, as explained above, from the law of equi-marginal utility.

The following figure shows how the law of demand is derived, *i.e.*, how the quantity purchased increases with a fall in price.

Take the upper portion of the figure first. On the X-axis are given the quantities of the good X demanded and on the Y-axis is shown the ratio of the marginal utility and the price *i.e.*, $\frac{MUx}{Px}$. The marginal utility of money is OH. When the price of the good is Px_1, the consumer buys Oq_1, since at this quantity of the commodity, the marginal utility of money OH is equal to the ratio of the marginal utility divided by price, *i.e.*, $\frac{MUx}{Px_1}$. Now suppose the price of the good falls from PX_1 to PX_2 the demand will increase, *i.e.*, the demand curve is shifted upwards. The quantity demanded must increase to Oq_2 because only then the marginal utility of money OH will be equal to ratio of the marginal utility of the good and the price, *i.e.*, $\frac{MUx}{Px_2}$.

Thus, we find that when the price of a good falls, the demand curve shifts upwards and more of the good will be demanded. This is precisely the law of demand and it has been derived from the law of



Deruvation of Demand Curve

Fig. 5.7

equi-marginal utility as explained above. On the same reasoning, if the price of the good falls further to Px_3, Oq_3 will be demanded, because only then the proportionality rule about consumer's equilibrium will be satisfied.

The lower portion of the figure shows the quantities demanded at different prices, *i.e.*, Oq_1 at Px_1, Oq_2 at Px_2 and Oq_3 at Px_3, *i.e.*, quantity demanded increases as the price falls. We can derive the demand curve DD by joining the various points.

CAUSES OF CHANGES IN DEMAND

We spell out below some of the causes which bring about changes in demand and also explain how demand will be affected by the following factors:

Changes in tastes, preferences and fashion. We see that increasing habit of taking tea has decreased the demand for milk. Change in the mode of dress means a change in the demand for the dress materials. The fashion among ladies to keep hair long or short brings about changes in demand for hair-pins, hair-nets, *etc.*

Climate or weather changes. It is obvious that

demand for a commodity must change with the change in season. In winter, there is a greater demand for warm clothing, for certain types of tonics and for coal or fuel. In summer, there is a great demand for electric fans, room coolers and cooling drinks, ice, *etc.*

Changes in the size and composition of population. If, for instance, the Commonwealth countries and America allow a free entry to Indians, we can expect emigration from India. If Indians stick to their own mode of living in food and dress in their new homes, demand for such things will be created there.

It is not merely a change in the size of the consuming population but change in the composition of the population, too, which affects demand for certain commodities and services. In a country of increasing population, like India, where lakhs of children are born every day, there will naturally be demand for toys, feeding bottles and nipples, perambulators, *etc.*

Changes in money supply. Where there is inflation, the additional money will add to the purchasing power of the community, and the prices will rise. But the rise of prices will not be uniform in the case of all goods. People will have to readjust their expenditure; demand for certain things will be reduced and for others stimulated. For example, shortage of sugar in India increased demand for **gur** and **shakkar,** and restrictions on the supply of electricity have created a demand for kerosene lamps, and so on.

Change in the price of the commodity. Obviously, demand is decisively affected by the change in the price of the commodity concerned. There is inverse relation between price and the quantity demanded. Lower the price, the greater is the demand, and vice versa.

Change in real income. A distinction is made between money income, *i.e.,* the amount of money which a man may earn, and real income which means the quantity of goods and services which he can buy with that amount of money. In times of technical progress, there is a large output of cheap goods. The purchasing power of money increases or, as it may be said, real income increases. Less money will be needed to purchase the same quantity of goods, and the saving so made will find outlet in the purchase of some other commodities. The demand schedules will have to be recast. Some goods may be eliminated from consumption and instead entirely new goods purchased; demand for some goods will decrease and that for others increase.

Change in the level and distribution of income. Through the instrument of public finance, *e.g.,* by taxing the rich and spending the funds so obtained on the poor, wealth is redistributed. There is a transfer of spending power. This is bound to affect demand. Demands for those goods will increase which are purchased by a class whose spending power has increased, and vice versa. The larger is the average household income, greater is the demand for the commodities they consume.

Change in savings. Demand for goods is affected by a change in consumer's propensity to save. Large saving means less money available for the purchase of goods. The demand will therefore decrease.

Change in asset preferences. It is quite obvious that if a consumer develops marked liquidity preference, his demand for goods will decrease, because he prefers to keep with him ready cash instead of buying things.

Conditions of trade. Demand for everything is greater in a boom even though the prices are rising. On the other hand, in times of depression, there is a general slackening of the demand.

Expectations or Anticipations. Expectations also bring about a change in demand. If prices are expected to rise in future, the demand for goods will increase now in the present. Similarly, expectations of rising incomes will restrain current purchases and postpone purchases to a future favourable situation.

Prices of Related goods. In case of substitutes, *e.g.,* tea and coffee, an increase in the consumption of one will lead to a decrease in the demand for the other. When a decline in the price of one good results in a decline in the demand for another, they are substitutes. Or, two goods are substitutes if the demand for one is directly related to the price of the other.

In the case of **complements,** *e.g.,* horse and carriage, increased demand for one will augment that for the other. Two goods are complements if the price of one and the demand for the other are inversely related. For instance, if the price of the carriages falls, the demand for horses rises. Other examples of complementary goods are pipes and tobacco, tennis rackets and tennis balls, *etc.*

In the case of **joint supply,** *e.g.,* wheat and straw, the increased demand for one will lead to the cheapening of the other, and may, therefore, stimulate its demand too, after some time.

When there is a case of **joint demand,** the increase in the demand for the ultimate object, *e.g.,* the house, will increase the demand for everything needed in building a house.

In the case of **composite supply,** *e.g.,* light obtained from electricity, gas or kerosene, cheapening of any one of them will reduce the demand for the others.

In the case of **composite demand,** *e.g.,* water required for drinking, washing, bathing, *etc.,* any extension or contraction of its uses will correspondingly change the demand.

Thus, the demand for a commodity does not depend only on its own price but the prices of other goods too.

The limited supply of money that a consumer has is to be allocated among numerous goods that he has to purchase. Hence, the demands and prices of

all goods are inter-related. A big price hike in certain commodities is bound to affect the demand for other goods that a consumer has to purchase.

These are some of the factors which bring about changes in demand.

SHORTCOMINGS OF THE UTILITY ANALYSIS

Above we have made the study of utility analysis of demand at some length. Modern economists, however, do not place much faith in the utility analysis on grounds of both theory and operational efficiency. The following are the main defects pointed out in the utility analysis or the Marshallian approach to the demand theory:

(i) **Unsound Psychology.** It is urged that market demand is an objective phenomenon. But the utility theorists try to explain it in terms of desire, motivation, *etc.* As such, the utility theory is individualistic and hedonistic (or utilitarian). To attribute motive to the consumer is unrealistic. When the theory says that with successive increases in the quantity consumed, the marginal utility diminishes, it is too naive a description of human nature. It must, however, be said that the utility analysis given by Marshall is free from hedonistic or utilitarian interpretation. The modern economists regard the diminishing marginal utility as a familiar and fundamental tendency of human nature. It is true that the principle is based on introspection, but it has been supported by observed human behaviour.

(ii) **Cardinal Measurement Not Possible.** The utility analysis assumes that utility is measurable cardinally, *i.e.,* it can be assigned definite numbers. But the fact is that cardinal measurement of utility is not possible. Instead, we can only have an ordinal measure, *i.e.,* we can only compare the two situations and say whether the satisfaction is more or less. As Hicks observes, it is possible to establish elementary parts of the demand theory with the help of cardinal numbers, but in advanced theory, it becomes a nuisance. He says: "It might be, more convenient as a sort of scaffolding useful in erecting the building, but to be taken down when the building has been completed."[7] Thus, the utility analysis breaks down on the ground of measurability of utility and economists like J.R. Hicks want the cardinal measurability of utility to be given up as being unrealistic.

(iii) **Wrong Assumption of Independent Utilities.** The utility analysis further assumes that utilities are independent. On this assumption, the utility of a commodity to a consumer varies with the quantity of that commodity, and of that commodity alone. This means that the satisfaction that a consumer obtains from the consumption of a particular good is not affected in any manner by the consumption of another good. This is not correct. The utility of a pen is certainly enhanced if a good quality paper is made available. It, therefore, follows from this assumption that the total utility of all the goods consumed is merely a sum of their separate utilities. That is, the utility function is additive. Actually this is not so. All the goods consumed by a person form one system and as such the satisfaction derived from the consumption of one commodity is influenced by that from the other. The commodities are interlinked. This makes the marginal utilities interdependent and not independent.

Hence, the marginal utility of a commodity depends not merely on its own consumption but also on the consumption of some other commodity or commodities. This is so because the commodities may be complements or substitutes of one another. Thus the assumption that utilities are independent is not a valid assumption to base the utility analysis on as, for example, Marshall did it. This is a weakness of Marshallian utility analysis.

(iv) **Income Effect and substitution Effect Not Brought Out.** Besides, the utility analysis does not bring out fully the income effect and substitution effect of a change in price. We know, for instance, that when the price of a commodity falls, the consumer feels as if his income has increased and he is able to purchase more. This is the income effect. Also, the consumer substitutes the cheaper commodity for some other rival commodities. This is the substitution effect. The utility analysis does not clearly distinguish between the income effect and the substitution effect in a price change. It is unable to explain how much of the increased demand is due to the income effect and how much to the substitution effect. As Hicks says, "The distinction between direct and indirect effects of a price change is accordingly left by the cardinal theory as an empty box which is crying out to be filled."[8]

(v) **Does Not Explain Giffen Paradox.** It is owing to the assumption of constant marginal utility of money and ignoring the income effect that Marshallian utility analysis failed to explain the 'Giffen Paradox'.

(vi) **Assumption of Constant Marginal Utility of Money Wrong.** Further, the utility analysis is based on the assumption that the marginal utility of money remains constant even when a consumer is proceeding with his purchases and is parting with money at every step. Constancy of marginal utility of money is necessary in the marginal utility analysis because, according to Marshall, utility is measured in terms of money and the measure, therefore, must not change. Obviously, the reduction in the quantity of money with the purchaser must raise its marginal

7. Hicks, J. R.—*A Revision of Demand Theory,* 1959, p. 9.

8. Ibid. p. 14.

utility. But this fact is conveniently brushed aside in the utility analysis.

(vii) **Applies to One-Commodity World.** The Marshallian law of demand cannot be genuinely derived from the utility analysis on the assumption of constant marginal utility of money except in one-commodity world. The assumption of constant marginal utility is not compatible with the law of demand in a situation where a consumer has more than one commodity to spend his income on. In a multi-commodity model, the marginal utility of money does not remain the same. When a consumer has to spend his income on a number of goods, there must occur a change in the marginal utility of money with every change in the price of a good. When the marginal utility of money does not remain the same, utility ceases to be measurable and the marginal utility analysis breaks down.

(viii) **Assumes Too Much and Explains Too Little.** The marginal utility analysis is based on too many assumptions like measurability of marginal utility and constancy of marginal utility of money. But it is restrictive in scope. For example, it does not split the price effect into its two components, the income effect and substitution. It does not explain the 'Giffen' paradox. On the other hand, Hicks-Allen indifference curve technique steers clear of these assumptions and is still able to deduce a more general theorem of demand which covers the Giffen Paradox too. We shall explain these fully in the next chapter.

Conclusion

We have examined above at some length the various short-comings of the utility analysis. In conclusion, we may draw attention of the student once again to some basic weakness of this analysis also known as the cardinalist approach.

(i) The satisfaction derived from the various commodities cannot be measured objectively. Hence the assumption of cardinal utility is extremely doubtful. No doubt Walras has attempted to use subjective units (utils) for measuring utility but it is not a satisfactory solution.

(ii) The assumption of constant utility of money is also unrealistic. The marginal utility of money changes with changes in income. Hence money fails as a measuring rod because its own utility changes.

(iii) The law of diminishing marginal utility has been derived from introspection. It is only a psychological law which must be taken for granted. In view of its various shortcomings, the utility analysis has now been replaced, by and large, by the modern indifference curve analysis or the ordinal approach.

Modifications by Modern Economists

The modern economists have improved upon the Marshallian utility analysis in a number of ways to rid it of its restrictive assumptions:

(i) The modern economists have shown how demand curve can be derived with utility analysis, without assuming constant marginal utility of money.

(ii) The modern economists are able to explain the utility of substitutes and complementary goods with utility analysis without assuming that the marginal utilities are independent.

(iii) The modern economists are able to offer a satisfactory explanation of the Giffen Paradox.

The modern economists have by and large, given up the Marshallian utility analysis and have instead, adopted the indifference curve technique which we shall discuss at some length in the next two chapters. They have adopted ordinal measure of utility instead of the cardinal utility. According to them utility is a psychological phenomenon and is not therefore quantifiable. On the other hand, ordinal measure helps comparison of utilities which is enough for practical purposes. For a proper analysis of consumer behaviour, it is sufficient if a consumer can rank his preferences. A consumer can formulate his scale of preferences independently of the market prices of goods on the basis of satisfaction he expects to derive.

All the same, the indifference curve analysis retains some of the assumptions of the marginal utility analysis: For instance it is assumed that a consumer has complete information regarding the goods he wants to purchase, i.e., the prices, satisfaction, etc. Rational behaviour on the part of a consumer is also assumed, i.e., he will seek maximum satisfaction from his purchases. Continuity is also assumed which means that the consumers are capable of ranking all conceivable combinations of goods on the basis of satisfaction that the goods are expected to yield.

In a later chapter, we shall compare in detail the Marshallian utility analysis and the indifference curve technique.

6 INDIFFERENCE CURVE TECHNIQUE

In view of the shortcomings of the utility analysis, modern economists have adopted a new technique—called the indifference curve technique—for the analysis of demand. In the following three chapters, we shall first consider this new tool of indifference curves, then analyse consumer's behaviour with its help, and finally study the various applications of the modern technique.

Scale of Preferences

All desires of a consumer are not of equal urgency or importance. Since his resources are limited and he cannot fulfil all his desires, he must pick and choose more important and more urgent desires for satisfaction. Thus, some desires take precedence of others. This is how a consumer ranks his desires and builds up a scale of preferences. Scarcity forces him to choose. Ability to arrange preferences in order of importance or urgency is inherent in human nature.

A prudent consumer exercises a lot of discrimination in his purchases. We find him substituting one commodity, partly or wholly, for another. He purchases a certain quantity of a commodity and no more. All the time, he is striving to reach an equilibrium position, *i.e.*, a position in which he derives maximum satisfaction from the use of money at his disposal.

But what is the criterion on which a consumer bases his choice? It is the relative evaluation of the utilities of the commodities included in his purchase plan. Since utility is subjective, the evaluation is obviously by himself. This means that a consumer has in his mind a definite scale of preferences which guides him in his purchases. For example, some students would like to spend their monthly allowance on the purchase of useful books, while others will squander it in the canteen. It is the consumer's scale of preferences which would determine his purchase plan. This scale of preferences is shaped by consumer's temperament and tastes. Thus, the priorities in a consumer's purchase plan are determined by his scale of preferences.

As we have mentioned already, a prudent consumer seeks to maximise his satisfaction from the purchases he makes, *i.e.*, reach an equilibrium position. But in order to be able to do so, a consumer must build up a scale of preferences on which all objects of desire or pursuit find their place, and which registers the terms on which they would be accepted as equivalent, or preferred one to the other.

The consumer's scale of preferences is independent of the prices ruling in the market. He builds up his scale of preferences from the commodities he consumes. On the basis of this scale of preferences, he knows that one combination of the goods yields him the same satisfaction as another.

In the discussion of consumer preference, we have to make certain assumptions to enable us to reach valid conclusions. The main assumptions are:

(i) **Completeness.** We assume that the consumer's scale of preferences is so complete that he is able to choose any one of the two combinations of commodities presented to him or is indifferent between them.

(ii) **Non-satiation.** A consumer prefers more to less.

(iii) **Consistency or Transitivity.** If a consumer regards Q better than R and R better than S, obviously he will prefer Q to S, if this choice is open. Consumers' choices have to be consistent.

(iv) **Continuity or Substitutability.** Unless one combination can be substituted for another, the consumers' preferences will not be possible.

(v) **Convexity.** The indifference curve is convex to the origin and shows the diminishing rate of marginal rate of substitution to be explained presently.

It is not to be supposed, however, that actually a

consumer has a complete or consistent scale of preferences in his mind or that he is fully conscious of it all the time. Certain commodities usually figure in the weekly or monthly purchases and are thus purchased by habit. A conscious choice is made in the case of new purchases. But consumers are rational beings. We can construct a theory of demand because scales of preferences are in some degree rational and stable through time, and purchases are usually made according to them. Actually, there is sufficient degree of stability in the spending pattern of consumers so that a realistic theory of demand can be propounded.

Actual purchases made by a consumer may not, however, be in conformity with his scale of preferences. They rather depend on the amount of money in his pocket and the commodities available at the time as well as on their relative prices. Consumer's purchasing power does not depend merely on the amount of money he has. The real purchasing power depends also on the current price level. If he finds that the market has gone down, he will be able to purchase more, and vice versa. Given the scale of preferences, a consumer will arrange his purchases in the light of realised purchasing power of his resources.

INDIFFERENCE CURVES

On the basis of a consumer's scale of preferences, we can draw indifference curves. An indifference curve represents satisfaction of a consumer from two commodities. It is drawn on the assumption that for all possible points (or combinations of the two commodities) on an indifference curve, the total satisfaction (or utility) remains the same. Hence, the consumer is indifferent as to the combinations lying on an indifference curve. It is an iso-utility curve.

Let us now start by considering a consumer who wants to buy apples and mangoes. He does not make purchases of the amounts of these two commodities arbitrarily. He knows it well that one combination of apples and mangoes gives him as much satisfaction (total utility) as another combination of less apples and more mangoes or another combination of more apples and less mangoes.

The consumer cannot tell how much satisfaction he secures from an apple or from a mango but he has got a scale of preferences between these two commodities so as to be able to compare the satisfaction derived from one basketful of apples and mangoes and another basketful of these two commodities. In other words, he knows what substitution of apples for mangoes or mangoes for apples will leave him with the same or equal satisfaction. Thus, our consumer has in his mind an indifference schedule. This schedule has several combinations of apples and mangoes from which he derives the same or equal total satisfaction. Or we can say that various combinations are equally preferred or desired by him.

We further clarify this point by giving an indifference schedule of the various combinations of apples and mangoes.

Indifference Schedule

Combination	*Apples*	*Mangoes*
1	15	1
2	11	2
3	8	3
4	6	4
5	5	5

In the above schedule, the consumer obtains as much total satisfaction (total utility) from 11 apples and 2 mangoes as from 8 apples and 3 mangoes and as well as from other combinations. In other words, our consumer feels indifferent whether he gets the 1st combination (15A + 1M), the 2nd combination (11A + 2M), the 3rd combination (8A + 3M), the 4th combination (6A + 4M) or the 5th combination (5A + 5M). (Here A stands for apples and M stands for mangoes). The total satisfaction is the same in all these combinations. We shall now translate this schedule into a diagram and thus get an indifference curve IC in Fig. 6.1.

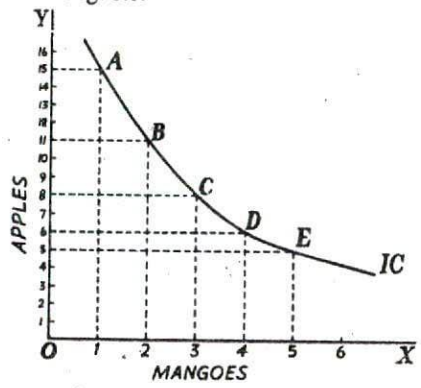


Fig. 6.1

In Fig. 6.1, mangoes are measured along the X-axis; their number increases from left to right. Apples are measured along Y-axis; and their number increases upwards.

If the consumer were at point A on the curve IC with 15 apples and 1 mango, he would be just as satisfied as at point B with 11 apples and 2 mangoes or at point C with 8 apples and 3 mangoes or at point D with 6 apples and 4 mangoes, and so on. These combinations give him the same satisfaction. If we join the points A, B, C, D and E, we get a continuous curve IC, each point on it showing equal satisfaction or the indifference of the consumer towards the various combinations. This is an **indifference curve.** Each point on it shows a combina-

tion of apples and mangoes which yields the same total satisfaction to our consumer.

Indifference Map

We can draw similar indifference curves showing combinations of apples and mangoes which represent greater and lesser satisfaction than that shown on indifference curve IC (see Fig. 6.2). In this figure, all points on IC_3 and IC_4 are preferred to all the points on IC_1 or IC_2 or IC_3. All combinations of apples and mangoes on IC_2 are equally preferred and are more preferred to all the combinations at various points on the IC_1. In other words, indifference curve IC_1 represents a lower level of satisfaction as compared with indifference curves IC_2, IC_3, IC_4, IC_5. It will thus be seen that indifference curves remind us of the weather maps showing the lines of equal pressure of the contour lines on a topographical map. A set of indifference curves is called **an indifference map.**

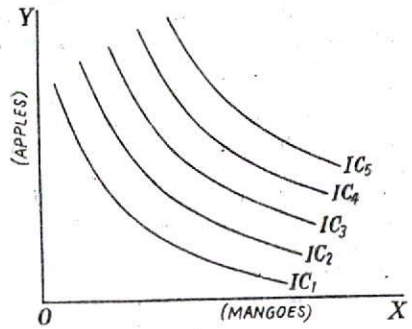


Fig. 6.2

It should be borne in mind that we cannot say how much more utility the higher indifference curve represents. That is, the aggregate utilities are rankable but not measurable; the jumps or increases in utility cannot be ranked. We cannot say how much greater utility does IC_2 represent than IC_1 and IC_3, than IC_2, and so on. If we could, we shall be making cardinal measurement of utility, a Marshallian assumption that we have rejected already.

MARGINAL RATE OF SUBSTITUTION

From the schedule given above, we can see that when we move from one combination of the two commodities to another, we are in fact substituting some units of one commodity for some units of another. We can also work out the rate at which this substitution takes place.

The Marginal Rate of Substitution shows how much of one commodity is substituted for how much of another or at what rate a consumer is willing to substitute one commodity for another in his consumption pattern. The concept of marginal rate of substitution is a tool of indifference curve technique and is parallel to the concept of marginal utility in the Marshallian analysis of demand.

Taking our previous example of substitution between apples and mangoes, we notice that when our consumer has 15 apples and one mango, he will be prepared to forgo 4 apples for 1 mango and yet remain at the same level of satisfaction. Or, in other words, we can say, in case he has the second combination, then he will be prepared to accept 4 apples for the loss of one mango. Here the marginal rate of substitution of mangoes for apples is 4:1.

Combination	*Apples*	*Mangoes*	*MRS of Mangoes for Apples*
1	15	1	—
2	11	2	4:1
3	8	3	3:1
4	6	4	2:1
5	5	5	1:1

The marginal rate of substitution may thus be defined as the amount of apples that is sacrificed for obtaining one mango or it may also be defined as the amount of apples that may be given to the consumer for the loss of one mango so that he may remain at the same level of satisfaction.

In Hicks' words, "we may **define marginal rate of substitution of X for Y as the quantity of Y which would just compensate the consumer for the loss of the marginal unit of X."**

Let us suppose that the consumer decides upon the fourth combination, which, in terms of our diagram (No. 6.1), means that he chooses the combination represented by a point on IC. Now the marginal unit of mangoes is the third mango, to acquire which he has had to forego two apples; or in other words, he will agree to get the fourth mango if he is compensated by two apples. At this point, the marginal rate of substitution of mango for apples is 2:1.

It is a common observation that, as we come to have more and more of one good, we shall be prepared to forego less and less of the other since our desire for the former becomes less and less intense with more and more of it. In technical language, it will be said that the marginal rate of substitution of good X for good Y will fall as we have more of X and less of Y. This is clearly brought out in the preceding table, where in combination 2 the marginal rate of substitution of mango for apples is 4:1, and it falls to 3:1 in combination 3 and further 2:1 in combination 4.

Thus the principle is that as X is substituted for Y so as to keep the consumer at the same level of satisfaction, the marginal rate of substitution of X for Y diminishes.

This principle in indifference curve technique is

termed the diminishing marginal rate of substitution, and is parallel to the law of diminishing marginal utility in Marshallian utility analysis.

The marginal rate of substitution is indicated by the slope of an indifference curve at a point. That is, it represents a movement along an indifference curve, but not a movement among the curves.

PRINCIPLE OF DIMINISHING MARGINAL RATE OF SUBSTITUTION

We have explained above the term marginal rate of substitution. An important principle of consumer behaviour emerges, *viz.*, as more and more of a good, say X, is substituted for another good, say Y, the marginal rate of substitution diminishes. This is due to the fact that as the consumer has more and more of good X, he goes on losing interest therein and he is prepared to give less and less of the other good Y for it.

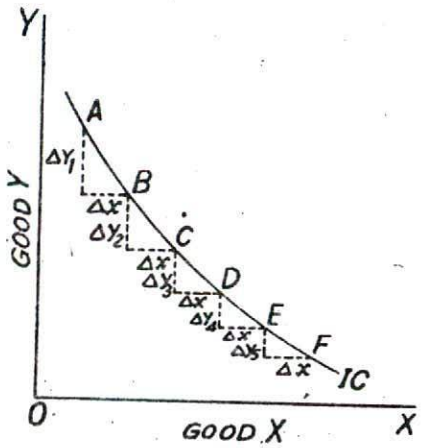


Fig. 6.3

Look at the figure 6.3. When the consumer slides down the curve IC from A to B, he foregoes ΔY_1 of good Y to obtain X of good X. Hence in this case the marginal rate of substitution of X for Y (MRS xy) is equal to $\frac{\Delta y_1}{\Delta x}$ We notice that as the consumer slides down further and further on the indifference curve, ΔY becomes shorter and shorter, while ΔX remains the same. This means that as the consumer has more and more of X *i.e.*, when he moves from A to B, from B to C, from C to D and so on, he is prepared to forego less and less of Y for a unit of X. From the above figure, it can be seen that ΔY_2 is less than ΔY_1 and ΔY_3 is less than ΔY_2 and ΔY_4 is less than ΔY_3, and so on. It follows, therefore, that as the stock of X with the consumer increases and his stock of Y decreases, he is willing to give less and less of Y for a given increment of X. In other words, the marginal rate of substitution of X for Y falls as the consumer has more of X and less of Y.

That the marginal rate of substitution falls is also clearly brought out in the preceding table. As already mentioned, the marginal rate of substitution of mangoes for apples is 4.1 to start with and it falls to 3:1 in combination 3, 2:1 in combination 4 and 1:1 in combination 5.

Let us try to understand the reasons for the diminishing, marginal rate of substitution. Why is the consumer prepared to forego less and less of the other commodity Y for a given increment of a commodity X? The reasons are:

(i) Since a particular want is satiable, the edge of a want for a good is blunted as the consumer has more and more of it. It is the diminishing intensity for a want that is responsible for the diminishing marginal rate of substitution (*i.e.*, offering less for a good whose stock is increasing). That is why, as the stock of X with the consumer increases, he will offer less and less of the other good Y for a unit increase in X.

(ii) Another reason for a declining marginal rate of substitution lies in the fact that goods are imperfect substitutes for one another. If X and Y, for instance, were perfect substitutes for each other, they would be regarded as one commodity. In that case increase in the stock of one commodity and decrease in that of the other would make no difference. Hence the marginal rate of substitution will not diminish, it will remain the same, for one commodity is good as another.

(iii) Also, the marginal rate of substitution of one good for another will not diminish if the want-satisfying power of the other good has increased at the same time. For instance, if with increase in the stock of the good X, the want-satisfying power of the good Y has increased, then more and more of Y will have to be offered for a unit increase in X to keep the consumer's satisfaction at the same level.

PROPERTIES OF INDIFFERENCE CURVES

The diagram of an indifference curve given already is a typical one. From the following paragraphs, it would become clear why indifference curves normally have this shape. Besides, we shall notice the properties of typical indifference curves. There are three characteristics of indifference curves:

(i) Downward sloping to the right,
(ii) Non-intersecting, and
(iii) Convex to the origin.

Downward Sloping or Negatively Sloped. To begin with, **an indifference curve slopes downwards from left to the right.** It is because when the consumer decides to have more units of one of the two goods, he will have to reduce the number of the units of the other good, if he is to remain on the same indifference curve, *i.e.*, if level of his satisfac-

tion is to remain the same. Looking at the diagram in Fig. 6.1, we find that when the consumer moves from point A to point B, he has more mangoes than before, but the number of apples with him falls; similarly from B to C and from C to D. This is the meaning or implication of an **indifference curve** sloping downward from left to right.

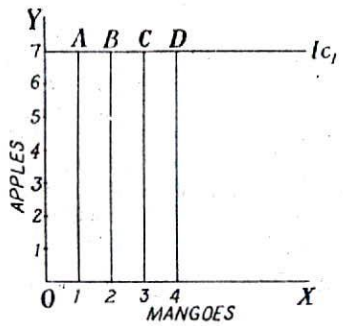


Fig. 6.4

To be surer of this property, let us for a moment suppose that instead of sloping downward to the right, an indifference curve is a horizontal straight line, as is indicated in the figure given above (Fig. 6.4). This shows that when the consumer is at point A, he has 7 apples and 1 mango and he is at a certain level of satisfaction, and that when he moves from the position A to the position B on the same indifference curve, he remains at the same level of satisfaction despite the fact that he has more of mangoes (*i.e.*, 2) and the same number of apples. This is obviously absurd. After all, the addition of a mango without losing any of the apples he had in the previous position, must take him on to a higher indifference curve rather than keeping him on the old indifference curve.

Similarly, if the indifference curve was a vertical straight line (see Figure 6.5 below), it would mean that the consumer remains at the same level of satisfaction even though the quantity of one good increases without the decrease in the quantity of the other. Combinations A and B, for example, lie on the same indifference curve and are, therefore, assumed to yield the same level of satisfaction. But this is quite absurd. How can the combination B, which contains the same number of mangoes but a greater number of apples as compared with A, give the same satisfaction as A? Hence, an indifference curve cannot be a vertical straight line.

Still another possibility, but still more absurd, is that an indifference curve may slope upwards to the right, as has been shown in diagram No. 6.6. At points A, B, and C . . . . , our hypothetical consumer is at the same level of satisfaction, because he is on the same indifference curve, but what is indeed startling is that he derives the same level of satisfaction when he is at A with 1 mango and 6 apples, and also at B when he has 2 mangoes and 10 apples and also at C with 3 mangoes and 13 apples, *i.e.*, when the units of both goods are increasing. This is absurd. Clearly an indifference curve cannot slope upwards to the right.

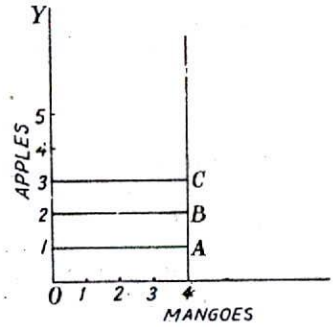


Fig. 6.5

Thus, we see that an indifference curve cannot be a horizontal straight line as in Fig. 6.4, nor can it be vertical straight line as in Fig. 6.5, nor sloping upwards as in Fig 6.6. Hence, by process of

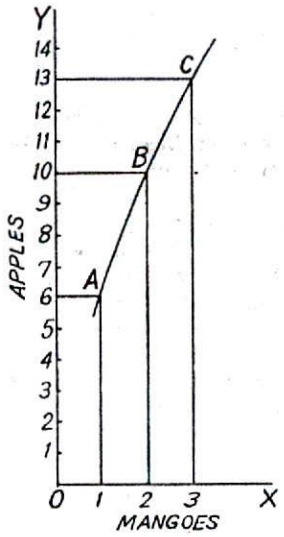


Fig. 6.6

elimination, we come to the conclusion that an indifference curve must slope downwards to the right. This is its first property.

Non-intersecting

The second property or characteristic of indifference curves is that **no two such curves will ever cut each other.** What absurdity follows when two indifference curves are shown as intersecting each

other may be explained with the help of diagram No. 6.7. At point B, our hypothetical consumer is on

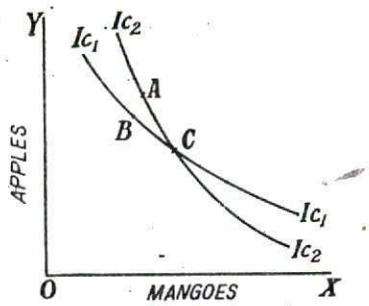


Fig. 6.7

the indifference curve IC_1, while at point A, he is on the higher indifference curve IC_2, *i.e.*, the combination represented by point A gives him a level of satisfaction higher than that he enjoys when he is at point B. But since the two indifference curves have been shown to be intersecting at point C, it means that point C lies on both indifference curves, which in turn means that C is at once equal to A and B which, as seen already, represent different levels of satisfaction. How can one level be equal to two different levels? It follows, therefore, that the indifference curves cannot cut each other.

Convexity

The third property of indifference curves is that **they are normally convex to the origin.** The implication of this convexity rule is that as we have more and more of good X and less and less of Y, the marginal rate of substitution of X for Y goes on falling. This is exactly what was brought out in the table given to explain the concept of the marginal rate of substitution. (See page 53). There we said that in combination 2 our hypothetical consumer had 11 apples and 2 mangoes. Now when he acquired one mango more, he had to forego 3 apples, *i.e.*, the marginal rate of substitution of mango for apples at that stage was 3:1. For a further addition of one mango, the consumer was now prepared to forego a smaller number of apples—two this time.

Let us prove convexity by exposing the absurdity if the curve is either concave or a straight line. Three figures of an indifference curve are given below. In Fig. 6.8(a) the indifference curve is convex to the origin: in Fig. (b), it is a straight line, and in Fig. (c) it is concave to the origin. From Fig. (a) it is evident that the marginal rate of substitution (MRS) of mangoes for apples falls (**cd** is smaller than **ab**). In Fig. (b), the MRS of mangoes for apples remains constant ($cd = ab$), which is against the normal behaviour of MRS (*i.e.*, diminishing). In Fig. (c) it actually increases (cd is larger than ab) which is quite the opposite of the normal behaviour of MRS. We have already seen that normally the marginal rate of substitution of a commodity diminishes as we have more of it. In other words, the normal shape of an indifference curve would be convex to the origin, as is given in Fig. (a) below. The other two shapes given in Fig. (b) and Fig. (c) are unrealistic.

Having studied the concept of indifference curve and its properties, we are now in a position to study the indifference curve analysis of demand.

Substitute Relationship and Convexity

The curvature of the indifference curves reflects the degree of substitutability between the commodities. That is, flatness or straightness of the curves shows to what extent commodities are substitutes for each other. In case of perfect substitutes, the indifference curves are downward sloping straight lines [Fig. 6.8. (b)], whereas if they are either horizontal (Fig. 6.4), or vertical (Fig. 6.5), the consumer will not be willing to substitute one commodity for another. Goods which can be substituted somewhat (not perfect substitutes) are represented by indifference curves which are somewhat convex to the origin. But greater the degree of convexity, the poorer are the substitutes. The flatter or less convex curves represent better substitutes.

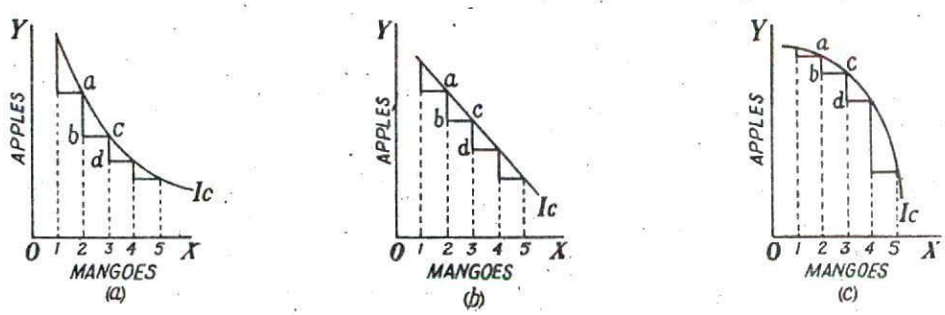


Fig. 6.8

7 INDIFFERENCE CURVE ANALYSIS OF DEMAND

We now undertake the study of the demand theory with the help of the indifference curve technique. We begin with what is known as the price line.

PRICE LINE OR BUDGET LINE

It has already been explained that a higher indifference curve shows a higher level of satisfaction than a lower one. A rational consumer will, therefore, try to reach the highest possible indifference curve in order to obtain the highest possible level of satisfaction. In this pursuit, our consumer will be governed by the amount of the money or income he has to spend on goods, and the prices of the goods in the market. Suppose our consumer has Rs. 15 to spend on apples and mangoes. Further suppose that the price of mangoes in the market is Rs. 1.50 per unit and the price of apples is Re. 1 per unit. With Rs. 15, he can buy 10 (=OM) mangoes and no apples or 15 apples (=OA) and no mangoes. (See Fig 7.1).

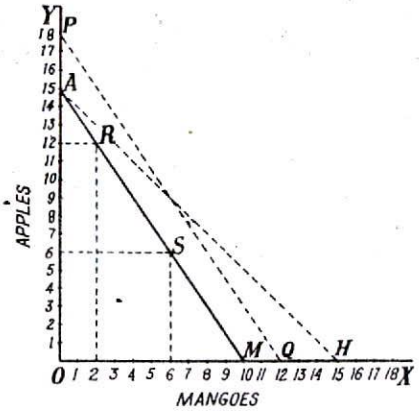


Fig. 7.1

By joining points A and M, we get what is called **Price Line** or **Price Opportunity Line.** It is also called **Price-income Line** or **Budget Line** or **Budget Constraint Line.** This line shows all possible combinations of two goods (in our case apples and mangoes) that the consumer can buy if he spends the whole of his given sum of money on his purchases at the given prices. Thus, at point R, our consumer will be having 2 mangoes and 12 apples and will be spending all his money (Rs. 15) on the two goods—Rs. 3 on mangoes and Rs. 12 on apples. And at point S, he will be buying 6 mangoes and 6 apples with Rs. 15.

Shifting the Price Line

If money with our consumer increases to Rs. 18, the price line will shift to PQ. For with Rs. 18, he can buy either 12 mangoes (=OQ) or 18 apples (=OP), prices of mangoes and apples remaining the same. It may be carefully noted that, since prices of mangoes and apples remain unchanged, PQ will be parallel to AM.

If the total amount of money (Rs. 15) and price of apples (Re. 1 per unit) remain the same but the price of mangoes falls from Rs. 1.50 to Re. 1 per unit, the price line will shift from AM to AH. AH will not be parallel to AM because the price ratio has changed.

From the above, it follows that the shape and the position of the price line will depend on two factors: (1) the total amount of money a consumer has for purchasing goods; and (2) price ratio of the goods in the market.

The slope of the price line may be distinguished from the slope of the indifference curve. The slope of the price line is (the negative of) the price ratio, *i.e.*, the ratio of the price of X to the price of Y. But the slope of the indifference curve at any point is called the marginal rate of substitution of X for Y. The marginal rate of substitution gives the rate at which the consumer is **willing to substitute** X for Y,

whereas the price ratio shows the rate at which he can substitute X for Y.

CONSUMER'S EQUILIBRIUM OR MAXIMISING SATISFACTION

Let us explain, with the help of indifference curves, how a consumer reaches an equilibrium position. The consumer is said to be in equilibrium when he obtains the maximum possible satisfaction from his purchases, given the prices in the market and the amount of money he has for making purchases.

In terms of Marshallian or utility analysis, a consumer is said to be in equilibrium, in case of one commodity, when its price and marginal utility have been equated. When we are considering more than one commodity, a consumer's expenditure is completely adjusted (or he is in equilibrium) when marginal utilities of money in each direction of his purchase have been equalised (or marginal utilities are in proportion to the prices, see chapter 5) and thus maximum satisfaction obtained according to the law of maximum satisfaction.

Equilibrium with Indifference Curves. Let us now consider how a consumer reaches an equilibrium position with the help of indifference curves.

In order to explain how a consumer reaches equilibrium position, we shall make the following assumptions:

(i) our consumer has an indifference map showing his scale of preferences for various combinations of the two goods—apples and mangoes. This scale of preferences remains the same throughout the analysis;

(ii) he has a given and constant amount of money to spend on the goods and if he does not spend it on one good, he must spend it on the other;

(iii) prices of the goods in the market are given and constant;

(iv) each of the goods is homogeneous and divisible; and

(v) the consumer acts rationally, that is, he tries to maximise his satisfaction.

Suppose our consumer has an indifference map, shown in the following diagram (Fig. 7.2). Further suppose that the price line facing the consumer is AM, given a certain amount of money he has to spend on apples and mangoes and the prices of apples and mangoes in the market. Since his income and the relative prices of the two goods to be purchased are shown by the price-income line AM, his equilibrium must be on some point on this line. That is why this line is called the price-opportunity line. It is this line that contains all the possible opportunities of combining the two goods that are open to our hypothetical consumer. Any point not lying on this price line cannot be a possible equilibrium point, because his present price-income situation will not allow him to move on to that point (or purchase that combination).

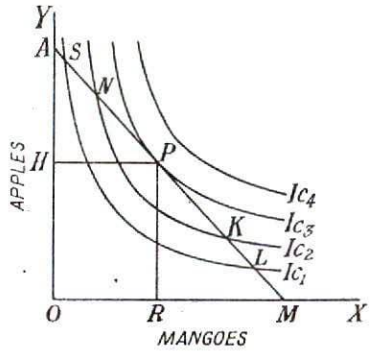


Fig. 7.2

Actually, the consumer will be in equilibrium at the point P, *i.e.*, he will be buying OR mangoes and OH apples. **The consumer will maximise his satisfaction and be in equilibrium at a point where the price line touches (or is tangent to) an indifference curve.** Such a point in our diagram is P which lies on indifference curve IC_3. This is the highest indifference curve to which he can go, given the money he has and the prices of the goods in the market. Given a price line, there can only be one point such as P, since no two indifference curves can cut one another and all are convex to the origin. Any combination other than P on the given price line can be shown to give less satisfaction to the consumer, for all other points on the price line must lie on indifference curves of a lower order than that on which P lies.

Thus, if our consumer chooses a combination of mangoes and apples represented by S, he will be on a lower indifference curve IC_1 and will thus be getting less satisfaction than when he chooses the point P and is on a higher indifference curve IC_3. The combination represented by point N will also give him less satisfaction, because it lies on indifference curve IC_2, which is also lower than IC_3 at which P lies. Similarly, all other points on the price line to the left of P will be less attractive in the estimation of our consumer than P. Likewise, on all points to the right of P on the price line AM, such as K and L, the consumer will not be in equilibrium, because all of them lie on indifference curves lower than IC_3.

In equilibrium at point P, the marginal rate of substitution (MRS) of mangoes for apples is equal to the price ratio between these two goods, since both the indifference curve IC_3 and the price line AM have the same slope at point P (MRS of mangoes for apples is given by the slope of the indifference curve and the price ratio is given by the slope of the price line AM). Thus, at point P,

$$\text{MRS. of mangoes for apples} = \frac{\text{Price of mangoes}}{\text{Prices of apples}}$$

Conditions of Equilibrium

Thus, two conditions must be satisfied for a consumer to attain an equilibrium:

(1) The price line should be tangent to an indifference curve or MRS of one commodity for another should be equal to their relative prices. This is no doubt a necessary condition, but not a sufficient condition of equilibrium. For attaining equilibrium another condition must also be satisfied as under:

(2) At the point of equilibrium an indifference curve must be convex to the origin. We have already explained the implication of convexity to the origin, which is that MRS is falling. Thus, if the indifference curve is convex to the origin at the equilibrium point, it means that, at or near the point of equilibrium, the MRS of mangoes for apples is falling. In the preceding diagram (Fig. 7.2) showing consumer's equilibrium, this second condition is also being fulfilled at the point P.

If by some chance, the indifference curve is not convex to the origin at the point where the price line is tangent to the indifference curve, as shown in the following diagram (Fig. 7.3), equilibrium at such a

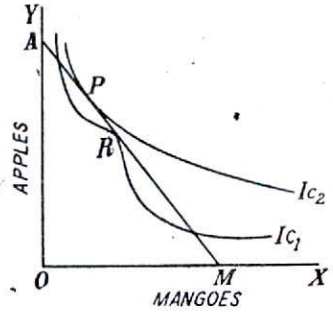


Fig. 7.3

point is not possible. At point R, for instance, the price line is no doubt tangential to indifference curve IC_1, but in a region of the curve where it is concave to the origin rather than being convex. Here the MRS of mangoes for apples is increasing rather than decreasing. Why should he stop at point R when the MRS of mangoes for apples is still rising above the relative money prices of mangoes and apples? On the price line AM, there can be other points at which higher indifference curves may be tangential to it. For example, IC_2 which is higher than IC_1 is tangential to the price line AM at P. Points like P will naturally be preferred to point R

Conclusion. Thus, the point of consumer's equilibrium or of maximum satisfaction may be defined by the condition that the marginal rate of substitution between any pair of two commodities will be equal to the ratio of their prices, or (what can be deduced from it), the marginal rate of substitution of money for any commodity is equal to the price of the commodity. That is, the slope of the price line and that of the indifference curve must coincide (the former is a tangent to the latter). In other words, there must be a coincidence between the rate at which the consumer is **willing to substitute** X for Y (as depicted in the indifference curve) and the rate at which **he can substitute** (as indicated by the price line). If these two ratios are not equal, it will be possible, by changing the combination of X and Y, to reach a still higher level of satisfaction.

How far is this theory of consumer behaviour valid?

The question is: 'How far does this theory explain the actual behaviour of real consumers in the real markets?' Now, every rational consumer will tend to act on this principle, but the actual behaviour may not conform to it for several reasons:

(i) Few consumers actually equate consciously the marginal rates of substitution of the things they buy to their price ratio. Not all consumers are capable of doing so.

(ii) Custom plays a very important role in the consumers' purchases. They keep buying the same assortment of goods and ignore minor price changes. They also do not take such notice of the changes in prices of other goods. But if the price changes persist, consumers will, by and large, make adjustments in their purchases so that the prices do not get far out of line from their marginal rates of substitution.

(iii) Many commodities are indivisible preventing precise price adjustments.

(iv) Another fact which prevents exact balancing between prices and the marginal rates of substitution is that no consumer purchases all commodities. If a commodity cannot figure in a consumer's purchase, the marginal rate of substitution of money for such a commodity is zero, and is not equal to the price.

(v) Not many consumers have the time or the energy to be devoted to the working out the precise balancing of their expenditure in the light of price changes. Only a rough balance between prices and marginal rates of substitution can be expected.

Conclusion. Considering all these limitations, the theory of consumer's equilibrium must be regarded only a rough approximation to the actual consumer behaviour.

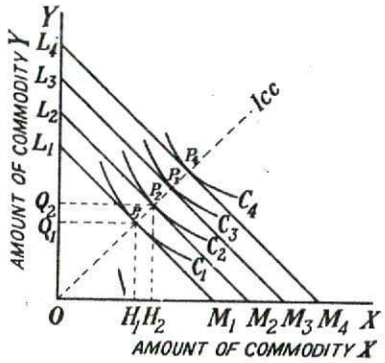
INCOME EFFECT

Let us consider the effect on consumer's equilibrium of a change in consumer's income, relative

prices of commodities remaining the same. This is called 'income effect.'

Income effect is the effect on the quantity demanded exclusively as a result of change in money income, all prices remaining constant. It has been shown above how a consumer reaches his equilibrium position with a fixed income and given and constant market prices of the two commodities. But the question arises what will happen to the consumer's equilibrium and the amounts of the two commodities bought if his income were to change while prices of the commodities remain the same. Obviously, as a result of a change in income, his satisfaction will either increase or diminish, for he has now a larger or smaller income to spend. The result of this type of change is described in technical language as **income effect.**

The income effect has been explained with the help of diagram No. 7.4. With price-income line L_1M_1, the consumer is in equilibrium at point P_1. Now suppose the income of the consumer increases so that his new price-income line is L_2M_2. As a result of this increase in income, the consumer will move to a new equilibrium position, at the point P_2, on a higher indifference curve C_2 and will be buying OH_2 of commodity X and OQ_2 of commodity Y. Thus, the consumer will get on to a higher level of satisfaction as a result of an increase in his income.



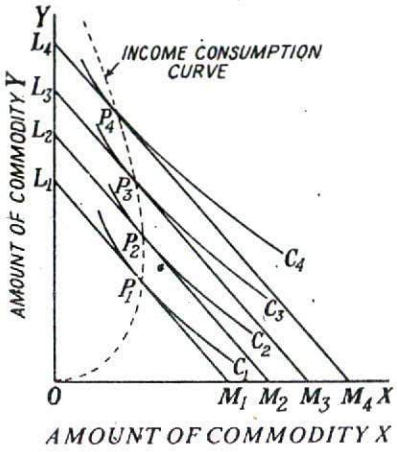
Income Effect
Fig. 7.4

If his income increases still further, so that the new price income line becomes L_3M_3, he will be in equilibrium at the Point P_3 on an indifference curve C_3, and so on for further increases in income.

Thus, we get various points of equilibrium such as P_1, P_2, P_3 for different levels of income, prices of the commodities remaining the same. If the points P_1, P_2, P_3, P_4, *etc.*, are joined together by a line passing from the origin, we get what is called **Income Consumption Curve. (ICC)**

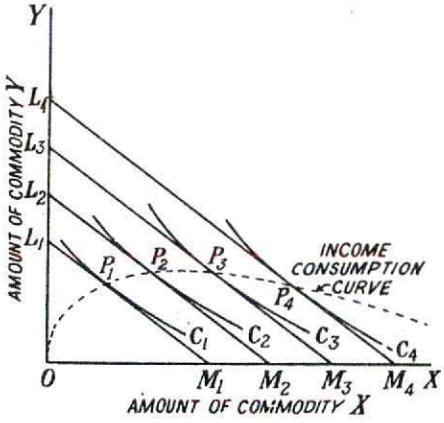
The Income Consumption Curve shows how the consumption of two goods is affected by change in income when prices of both goods are given and constant. **An income consumption curve thus traces out the income effect as the consumer's income changes, with given relative prices of the two goods.**

Our general observation of how consumers react to an increase in their incomes suggests that most income consumption curves are of the shape presented in Fig. 7.4, *i.e.*, sloping upwards to the right. This means that, as a rule, a rise in consumer's income will make him buy more of each of any two goods he is consuming. This is the usual shape of the income consumption curve.



Income Effect: Inferior Good X
Fig. 7.5 (a)

In diagram 7.5 (a), however, the income consumption curve begins to move towards the OY axis



Income Effect: Inferior Good Y
Fig. 7.5 (b)

on which we measure Y, showing that after a certain point, as income rises, less of X is bought. In diagram 7.5 (b), the curve bends towards the OX

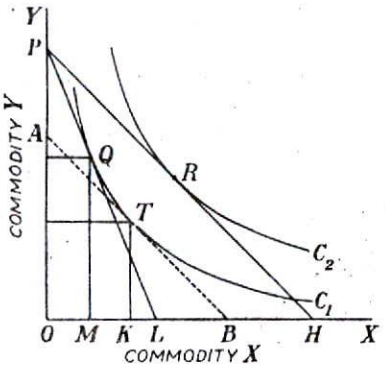
axis on which we measure X, showing that as income increases, after a point, less of Y is bought. Income consumption curves of these shapes, while rare, are not unknown. For example, it has been observed in India that when the income of a poor villager increases, he may buy less of coarser grains like millets and substitute for them superior kinds of grain like wheat or rice.

Inferior Goods. Those goods of which the quantity that the consumer would buy less, as his income rises, are called **inferior goods.** Thus, in diagram 7.5 (a), good X and in diagram 7.5 (b), good Y are inferior goods. **Inferior goods may, therefore, be defined as goods for which income effect is negative.**

SUBSTITUTION EFFECT

We have discussed above the effect on consumer's equilibrium of a change in consumer's income, relative prices of commodities remaining the same. Now let us see the effect of a change in relative prices, consumer's income remaining the same. This leads us to the study of what is known as the **Substitution Effect.** Substitution effect means the change in the quantity of a good purchased which is due only to the change in relative prices, money income remaining constant.

When price of a good, say, X, falls, real income of the consumer would increase. In order to find out the change in the quantity of X purchased, which is



Substitution Effect
Fig. 7.6

attributable only to the change in the relative price of X, the consumer's money income must be reduced by an amount so as to cancel out the gain in real income that results from price decrease. This is necessary for us to know the effect of only a change in relative prices, consumer's income remaining the same. The amount by which the money income is reduced, so that the consumer should be neither better off nor worse off than before (*i.e.*, his income remains the same), is called **Compensating Variation in income.**

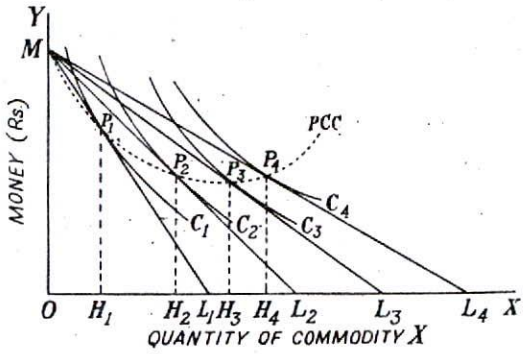
Even after compensating for the gain in real income, the consumer would still buy more of X, because X has become relatively cheaper. **This increase in the amount purchased of X, because of the fall in its relative price, is the substitution effect.**

Thus, the substitution effect can be defined as a change in the quantity demanded as a result of a change in relative price after the consumer has been compensated for a change in his real income. That is, there is a movement along the original indifference curve, real income remaining the same.

The substitution effect can be explained easily with the help of Fig. 7.6 given on this page. In this Fig., the consumer is in equilibrium at point Q where the given price line PL is tangent to indifference curve C_1. When the price of X falls, while the price of Y remains the same, the price line will shift to PH (because now more of X is purchased) and the consumer will be in equilibrium at R, where the new price line PH touches the indifference curve C_2. To find out the substitution effect, we draw a hypothetical price line AB parallel to the price line PH so that it (*i.e.*, AB) should touch the indifference curve C_1. Slope of AB or PH shows the changed relative prices of X and Y. In terms of this diagram, BH or AP is the amount of money income that should be taken away from the consumer so that the gain in real income which results from the fall in the price of X is cancelled out. With price line AB, the consumer is in equilibrium at T on indifference curve C_1. At the point T, he gets the same satisfaction as at Q, because both Q and T are situated on the same indifference curve C_1. Movement from Q to T on the same indifference curve C_1 is due only to the relative fall in the price of X. At the point T, the consumer buys MK more (at Q he bought OM but at T he buys OK) of X than at Q as X is now relatively cheaper. This MK is the substitution effect which involves movement from Q to T.

PRICE EFFECT

We have so far analysed as to what happens to



Price Effect
Fig. 7.7

consumer's equilibrium (a) when his income

changes, relative prices of goods remaining constant (*i.e.*, the income effect) and (b) when the relative prices of goods change, his income remaining the same (*i.e.*, the substitution effect). Now we shall describe how a consumer's equilibrium shifts as a result of a change in the price of one of the goods, while his income and the price of the other good remain the same (*i.e.*, the price effect).

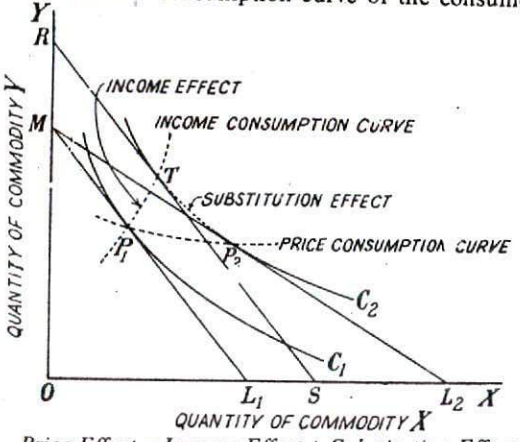
Suppose, with a certain fixed income and given market prices of the two goods X and Y represented by the price-income line ML_1, the consumer is in equilibrium at point P_1 in diagram (see Fig. 7.7) Suppose the price of X falls, income and price of Y remaining unchanged, so that new price-income line becomes ML_2, the consumer will be in equilibrium at point P_2 on the higher indifference curve C_2. In this position, he will be buying OH_2 of commodity X. If the price of X falls further, so that the relevant price line is ML_3 the consumer will be in equilibrium at point P_3 and will be buying OH_3 of commodity X. In the same way, we can discover other points of equilibrium for every other price at which X might be sold. When all the points such as P_1, P_2, P_3, P_4, are joined together we have the **price consumption curve** of the consumer for good X. This shows the **price effect. It shows how the consumption of commodity X changes, as its price changes, the consumer's income and price of Y remaining the same.**

Two Components of Price Effect

The movement of the consumer along the price-consumption curve, such as from equilibrium point P_1 to P as a result of a fall in the price of X, is in reality a resultant of two forces. The first of these components is the feeling of better-offness that a consumer experiences when the price of X falls. There is an increase in the potential purchasing power of the consumer's income following a relative fall in the price of X. It is **Income Effect.** It is as if his income has increased and the price of both goods has remained the same. This income effect is the first component of the price effect. The consumer is operating along the income consumption curve.

There is also the second component of the price effect viz., the **Substitution Effect.** Now that X is cheaper than before while the price of Y has remained unchanged, there will naturally be a tendency on the part of the consumer to buy more of the cheaper good and less of the relatively dearer one. In other words, he will substitute cheaper good for the dearer one. This second component is called the **Substitution Effect** and can be viewed as operating along the price consumption curve. (Fig. 7.8)

These two components of the movement from P_1 to P_2 are shown in Fig. 7.8. Initially, with the price-income line ML_1, the consumer is in equilibrium at point P_1. With a fall in price of X, so that the new relevant price-income line is ML_2 he moves to a new equilibrium position P_2 on a higher indifference curve C_2. RS is a hypothetical price-income line drawn parallel to ML_1 and touching the higher indifference curve C_2 at point T. RS shows as if the price of X had remained the same (as represnted by ML_1), but instead consumer's income had increased by an amount just sufficient to make the consumer as well-off as he is at point P_2, when his money income remains the same but price of X is lower than at P_1. As RS touches the higher indifference curve at T, the line passing through PT is the income consumption curve of the consumer.



Price Effect = Income Effect + Substitution Effect

Fig. 7.8

The line PT shows both the magnitude and the direction of the income effect. The portion TP_2 of the higher indifference curve C_2 shows the direction and magnitude of the substitution effect. The substitution effect means that the cheaper good X is substituted for the dearer good Y.

The splitting up of the price effect into substitution effect and income effect is very useful in bringing out clearly the response of a consumer to a change in price of a commodity. This response will reveal itself through substitution effect and the income effect. The difference between the two may be clearly understood. The substitution effect is always positive. That is, if the price of a good falls, more of it will be purchased and substituted for other goods whose prices have not fallen. Thus, the direction of the substitution effect is very clear and certain. But we cannot be so sure of the income effect. The income effect may be positive (*i.e.*, more of the good may be purchased if the income goes up) or it may be negative (*i.e.*, increase in income may lead to less being purchased of a good). This will happen if the consumer regards it as an inferior good. Thus, the substitution effect and the income effect may move in the same direction *i.e.*, they may both be positive. In that case, the positive income effect will reinforce the positive substitution effect in

increasing the demand for a good the price of which has fallen.

But in some cases, the substitution effect and the income effect pull in opposite directions. That is, the substitution effect is positive, as it generally is but the income effect may be negative. In that case, the negative income effect may dilute or negative altogether the positive substitution effect. That is, the demand for the commodity, whose price has fallen, may not much increase or it may diminish instead of increasing as in the Giffen case given below. Hence, the direction in which the quantity demanded of a good will change as a result of a fall in its price will depend upon the direction and strength of the income effect on the one hand and the strength of the substitution effect on the other.

Ordinary Inferior Goods

If the positive substitution effect over weighs the negative income effect, the net result would be an increase in the quantity of the good bought when its price falls. This will be so in case of ordinary inferior goods.

Giffen Goods

If, on the other hand, the negative income effect for a good is so powerful that it more than offsets the positive substitution effect, the net result would be a fall in the quantity of the good bought as its relative price falls. The latter case holds good in case of what are known as the **"Giffen Goods."** [1]

Giffen Goods are inferior goods, because in their case, income effect is negative; but they are a special type of inferior goods inasmuch as in their case negative income effect is stronger than positive substitution effect. In the case of ordinary inferior goods, the negative income effect is weaker than the positive substitution effect.

The following three conditions are essential to put a good in the category of Giffen goods:

(i) It should be an inferior good having a large negative income effect.

(ii) The substitution effect of a price change must be small.

(iii) It must be an inferior good which absorbs a large proportion of the consumers' income.

PRICE CONSUMPTION CURVE AND ELASTICITY OF DEMAND

The shape of the price consumption curve shows the degree of elasticity of demand, *i.e.*, the elasticity is unitary, greater than one or less than one. When the price consumption is horizontal, *i.e.*, parallel to X-axis (*i.e.*, has zero slope), the elasticity of demand for good X is unitary, *i.e.*, the total outlay on X remains the same even though price of X rises. If the price consumption curve is upward sloping, the demand for the good X is inelastic; and if it is downward sloping, the demand will be elastic.

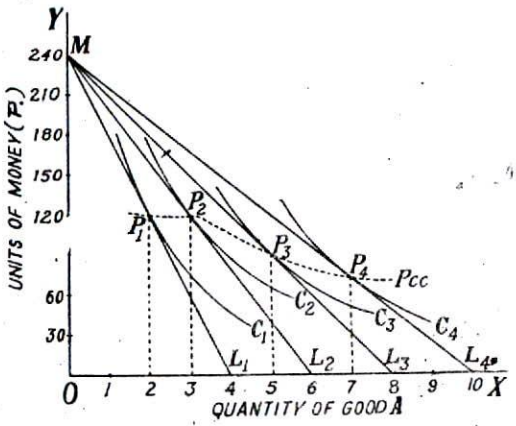
Derivation of Individual Demand Curve

In an earlier chapter (Ch. 6), we drew a demand curve showing the various quantities of the commodity purchased at different prices. In this section, we shall describe how an ordinary demand curve of an individual consumer can be derived from his given indifference map and the size of his income.

In the earlier chapter, the demand curve was drawn on the Marshallian assumptions of utility being measurable and the marginal utility of money being constant. In the indifference curve technique, demand curve is arrived at without making these dubious assumptions.

A demand curve has been defined as the curve showing how much of a good would be bought at various prices—assuming that tastes and preferences and income of the consumer are given and constant and so are the prices of all other goods.

A little thinking will show that an individual's demand curve for a good must be related in some way to his price consumption curve for that good. In fact, both give the same information except that the former gives it directly and in a more useful form. The way in which ordinary demand curve can be drawn from price consumption curve is explained with the help of Fig. 7.9. When a demand curve is to be drawn, units of money are measured on one axis, while amounts of a good for which demand curve is to be drawn are shown on the other axis. In the above diagram, the units of money are shown on the



Derivation of individual Demand Curve
Fig. 7.9

1. So named after Sir Robert Giffen of Britain, who, in the mid-19th century, is said to have observed that when the price of bread rose the poor bought more bread and less meat and less of some other more expensive food. stuffs

Y-axis and the commodity A, for which the demand curve is to be drawn, is shown on the X-axis.

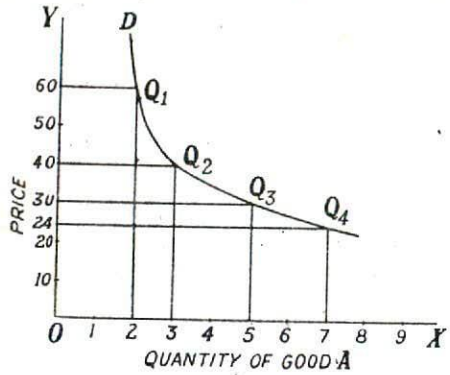
Suppose a consumer has a daily income of 240 P.[2] If the price of commodity A is 60 P. per unit, the relevant price-income line will be ML_1 because, at this price, 4 units can be purchased with 240 Paise. The consumer will be in equilibrium at the point P_1 of the price consumption curve PCC, because at this point the price line ML_1 is tangent to the indifference curve C_1, and will buy or demand 2 units of the commodity A. Suppose the price falls to 40 P. The relevant price line becomes ML_2 (because now 6 units can be purchased with 240 Paise). Now the consumer will be in equilibrium at point P_2 of the price consumption curve on a higher indifference curve C_2 and will buy 3 units. Similarly, the consumer will buy 5 units of the good when price is 30 P., and 7 units when price is 24 P.

With the above information, we can draw up the **demand schedule** of a consumer as follows:

Individual's Demand Schedule

Price Line	*Price*	*Quantity Demanded*
ML_1	$\frac{240}{4}$ = 60 P.	2 units
ML_2	$\frac{240}{6}$ = 40 P.	3
ML_3	$\frac{240}{8}$ = 30 P.	5
ML_4	$\frac{240}{10}$ = 24 P.	7

Now we can easily convert this demand schedule into an ordinary demand curve. By plotting the above data, we get points like Q_1, Q_2, Q_3, Q_4 (Fig. 7.10). By joining these points with a continuous



Demand Curve

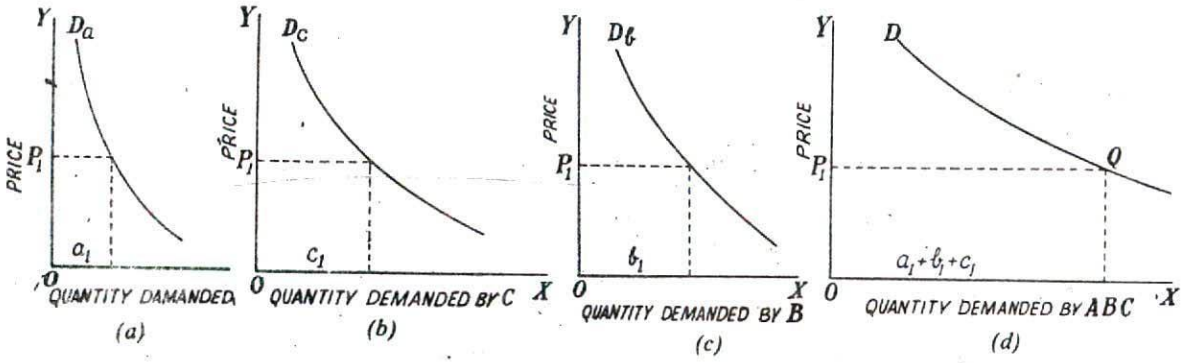
Fig. 7.10

curve, we get the usual demand curve of the consumer for the commodity A. We see that the demand curve drawn slopes downward from left to right as usual. This is the typical shape of the demand curve.

If we had derived a demand curve for a 'Giffen Good', it would have sloped upwards from left to right because of the fact, which we have discussed earlier, that in case of Giffen Goods there is a positive relationship between price and the quantity demanded.

DERIVATION OF MARKET DEMAND CURVE

We have derived above the demand curve of a single consumer. But for price determination it is the market demand curve which is relevant. The market



Market Demand Curve from Individual Demand Curves

Fig. 7.11

demand curve for a commodity is obtained by adding together the demands of all consumers who plan to buy it. The way in which this summation is effected is illustrated in Fig. 7.11. Figure (a), (b) and (c) show the demand curve of three separate and

2. We have taken daily income, and the demand curve which we shall draw will show the demand of the consumer for the good per day. Demand is always with reference to a certain period of time.

independent consumers. We get the market demand curve by adding together the quantities that each consumer wishes to buy at each price. Thus, at the price, OP_1, the consumer A's demand is a_1, B's b_1 and C's C_1. The total quantity of the commodity that all consumers demand at the price OP_1 is, therefore, a plus b plus c and this quantity is plotted against P_1 in Fig. (d) above. In the same fashion, we can discover the quantity demanded by all the three consumers at any other price. When all the points like Q are joined together, we get a market demand curve for the commodity. In our analysis, we have supposed that there are three consumers in the market. But the method will apply to any number of consumers.

The market demand curve will slope downwards to the right as individual demand curves slope downwards to the right. It is very rarely that market demand curve will slope upwards from left to right. A good may be a Giffen good for a single consumer, but it is seldom that any good will be a Giffen good for all consumers. And even if it is, it is unlikely that it will be so for each consumer in the same range of prices. In these cases, there will generally be enough consumers who increase their quantity demanded of the good as price falls to compensate for those consumers who buy less because for them the good is a 'Giffen good' in that range of prices.

CASE OF COMPETITIVE (OR SUBSTITUTE) GOODS AND COMPLEMENTARY GOODS

The indifference curve technique has been found very useful in explaining the demand for substitutes and complementary goods. This has been facilitated by the splitting up of price effect into its two components, *viz.*, the income effect and the substitution effect. Before Hicks used the indifference curve technique for this purpose, the demand for substitutes and complementary goods was explained in terms of total price effect, or the cross elasticity of demand. According to this approach, if the price of a good, say, X, falls and consequently the demand for it increases, the demand for the other good Y decreases, then Y is said to be substitute for X. If, on the other hand, with the fall in price of X and the resultant increase in demand for it, the quantity demanded of Y also increases, Y is said to be a complement of X.

But according to Hicks, taking the income effect into account, then even with the fall in price of X, the demand for Y may also increase even though Y may be a competitive or substitute good. This is due to the fact that when the price of X falls, there may be a large income effect which may more than offset the substitution effect. Owing to income effect of the fall in price of X the demand for Y also tends to increase. This income effect may be much stronger than the substitution effect of the fall in price of X. That is why the demand for Y may increase side by side with increase in demand for X.

But we must eliminate the income effect of the price change, by making a compensating variation in income in order to arrive at a correct or accurate effect on the demand for substitute goods as a result of fall in price in one of them. Using the indifference curve technique, we can now define substitute goods and complementary goods in this way. If with a fall in price of X, price of Y remaining the same, the demand for X increases due to the substitution effect and the demand for Y decreases then Y is a substitute for X, income of the consumer having been reduced by compensating variation in income so that he is no better off than before. On the other hand, if with a fall in price of X and after making compensating variation in income, the demand for X increases due to the substitution effect, and along with it if the demand for Y also increases then Y is said to be a complement of X.

Thus, in the case of complementary goods, the quantity demanded of both goods increases and both of them are substituted for some other good or goods. Professor Hicks defines the substitutes and complements thus: "I shall say Y is a substitute of X if a fall in the price of X leads to a fall in the consumption of Y: Y is a complement of X if a fall in price of X leads to a rise in the consumption of Y: a compensating variation in income being made of course in each case."[3]

There is, however, one point to be borne in mind. While the relationship of substitutes can occur only in the case of two goods, complementary relationship must involve more than two goods. In the case of two goods, the substitution effect always works in favour of the good whose price has fallen and against the other goods, *i.e.*, it tends to increase the demand for one good and reduce the demand for the other. But the case of complementarity can arise only if there are atleast three goods. As Professor Hicks observes: "If consumer is dividing his income between purchases of two goods only and cannot buy any other goods than these two, then there cannot be anything else but a substitution relation between the two goods. For if he is to get more of one of them and still be no better off than before, he must have less of the other. But when he is dividing his income between more than two goods other kinds of relation becomes possible."

It is also worth remembering regarding the relation of substitution that all goods in a consumer's budget can be substituted for one another, but all cannot be complements. For instance, if the price of a good falls demand for it increases and the demand for other goods will decline.

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3. Hicks, J. R.—*A Revision of Demand Theory*, 1956. p. 128.

Thus, we see that complementarity between a group of commodities is possible only when there is atleast one commodity outside the group of complements, at whose expense the substitution in favour of the group of complement can occur. In other words out of a given number of commodities in a consumer's budget, atleast one of them must be substitute for them while all other may be complements of each other. This is one extreme limit of complementarity. The other extreme limit is one where there may be no complementarity present at all. *i.e.*, all goods are substitutes for each other. In the words of Stonier and Hague. "Where there is any number of goods (n) at least one of those goods must be competitive with that in which we are interested. It could conceivably happen that all the remaining $n-2$ goods were complementary with it, but this is unlikely. It will of course be quite possible for $n-1$ of any collection of goods to be competitive with the remaining good."[4]

INDIFFERENCE CURVE TECHNIQUE VERSUS MARSHALLIAN UTILITY ANALYSIS

Whereas the indifference curve approach and the utility analysis, are similar in some respects, the former is superior to the latter in several respects:

Similarities

The two approaches are similar in the following respects:—

(i) Both approaches assume a rational behaviour on the part of the consumer in that he seeks to attain a position of equilibrium by maximising satisfaction.

(ii) Both techniques embody the same proportionality rule for the consumer to maximise satisfaction or reach an equilibrium position (see p. 67).

(iii) Both approaches assume diminishing utility—diminishing marginal utility in one case and diminishing marginal rate of substitution in another case.

(iv) Both approaches apply the psychological or introspective method. The law of diminishing utility, which is psychological in nature, lies at the bottom of law of demand. It is based on introspection. The indifference curve technique, too, is based on introspection. Thus, both approaches are introspective.

Superiority of the Indifference Curve Technique

The indifference curve technique is superior to the Marshallian utility analysis in several respects:

(i) **More Realistic Measurement of Utility.** Marshall explained consumer's behaviour assuming that utility is **measurable** and **additive** just as the weight or length of objects is measurable and additive. The consumer was, thus, assumed by Marshall to possess, what modern economists call, **'cardinal measurement of utility'.** In other words, the consumer was assumed to be capable of assigning to every commodity or combination of commodities a number representing the amount of utility associated with it The numbers representing amounts of utility could be manipulated in the same fashion as weights.

Suppose, for example, that utility of good A is 15 units and the utility of good B 45 units. The consumer would, therefore, like the good B three times as strongly as the good A. The differences between utility numbers could be compared and the comparison could lead to a statement such as 'A' is preferred to 'B' twice as much as 'C' is preferred to 'D'.

Thus, we see that the Marshallian assumption of cardinal measurement of utility is very restrictive. It demands too much from the human mind. Utility is a mental phenomenon and the precision in the measurement of utility assumed by Marshall is unrealistic.

On the other hand, indifference curve technique assumes what is called **'ordinal measurement of utility'.** Ordinal measurement of utility means that the consumer need not assign exact numbers that represent the amount of utility attributable to the various units of the commodity, but that he is capable of judging whether one level of satisfaction is equal to, lower than, or higher than, the other. That is, he can compare the different levels of satisfaction. In an indifference map, one indifference curve represents a higher or lower level of satisfaction than another, but one cannot say exactly **by how much** a satisfaction is higher or lower. For this reason, indifference curves are generally given ordinal numbers to put them in the right order, I, II, III, IV *etc.*, and no attempt is made to label them in terms of units of satisfaction—since there are no such units. For an explanation of consumer's behaviour, it is sufficient to assume that he is able to **rank his preferences consistently.** The assumption of ordinal measurement of utility made by indifference curve is less restrictive and more realistic.

(ii) **No Assumption of Constancy of Marginal Utility of Money.** Marshall in his analysis of a consumer's behaviour assumed marginal utility of money to remain constant while the consumer proceeded to make purchases. Marshall defended his assumption on the ground that since the consumer spends a small fraction of his income on a particular good, his marginal utility of money does not increase to any significant extent as he purchases more and more units of the commodity.

But this exposes Marshall to a serious criticism. With the assumption of constant marginal utility.

4. Stonier and Hague, *A Textbook of Economic Theory*, 1973, p. 100.

of money, the Marshallian law of demand cannot genuinely be derived from utility hypothesis except in a one-commodity world. The assumption of constant marginal utility of money is not compatible with the validity of the law of demand in a situation where the consumer has more than a single good to spend his income on. If, in Marshallian analysis, this difficulty is avoided by giving up the assumption of constant marginal utility of money, then units of money can no longer express the marginal utility of a commodity. Units of measurement must be invariant.[5]

By assuming constant marginal utility of money, Marshall ignored "the income effect" of a price change and thus failed to distinguish between the two components of the "price-effect" Indifference curve technique is superior to the Marshallian analysis in that it does not assume constancy of marginal utility of money and is therefore able to draw a **distinction between the "income effect" and "substitution effect" of a price change, as seen before.**

(iii) **Analyses Multi-goods Model.** Marshall assumes that utility or demand for one commodity is independent of that for the other good(s) and that the marginal utility of money remains constant.

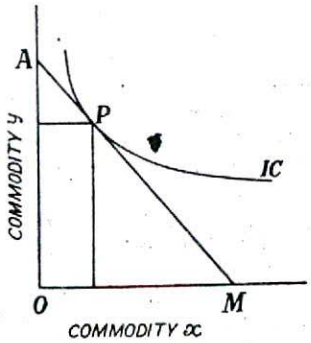


Fig. 7.12

Thus, Marshall confines himself precisely to a single-good model and is unable to analyse precisely and correctly multi-good models and therefore the relationship of substitution and complementarity, The indifference curve technique, on the other hand, can successfully analyse all such cases.

By giving an extra dimension, the indifference curve technique facilitates inter-commodity analyses which are of vital importance in the **price analyses.**

(iv) **Less Restrictive.** The remarkable thing about the indifference curve technique is that it arrives at the same equilibrium condition for a consumer as the Marshallian analysis, but with less restrictive, and fewer assumptions than in Marshall's analysis. It has already been explained that a consumer is in equilibrium where a price line is tangent to an indifference curve and, therefore, the marginal rate of substitution (MRS) is equal to the ratio of prices between the goods. Thus, at P in our diagram 7.12:

$$\text{MRS of X for Y} = \frac{\text{Price of X}}{\text{Price of Y}} \qquad ...(i)$$

But MRS of X for Y is nothing else but a ratio between the marginal utility (MU) of X and the marginal utility (MU) of Y. Thus,

$$^{6}\text{MRS of X for Y} = \frac{\text{M.U. of X}}{\text{M.U. of Y}} \qquad ...(ii)$$

From (*i*) and (*ii*) is follows that:

$$\frac{\text{M.U. of X}}{\text{M.U. of Y}} = \frac{\text{Price of X}}{\text{Price of Y}}$$

which can be written as

$$\frac{\text{M.U. of X}}{\text{Price of X}} = \frac{\text{M.U. of Y}}{\text{Price of Y}} \qquad ...(iii)$$

Thus, (iii) is the same "proportionality rule" of equilibrium as enunciated by Marshall, and the indifference curve technique arrives at this rule with less restrictive and fewer assumptions. This is no small achievement.

(v) **More General Theory of Demand.** The superiority of the indifference curve technique lies in the fact that even with less restrictive and fewer assumptions, it gives us a more general theory of demand. The ordinal utility theory enables us to enunciate the general theorem of demand in the following composite form of which the Marshallian law of demand constitutes a special case: [7]

(a) the demand for a commodity varies inversely with price when the income elasticity of demand for that commodity is nil or positive;

(b) the demand for a commodity varies inversely with price when the income-effect or a change in price is smaller than the substitution-effect; and

(c) the demand for a commodity varies directly with price when the income-elasticity of demand for that commodity is negative, and the income-effect of a change in price is larger than the substitution effect.

5. Cf. Majumdar, T.—*Measurement of Utility*, p. 56.

6. This does not mean that MRS is found by measuring marginal utilities of the goods and then taking out their ratio. MRS measures the ratio between the marginal utilities of two goods directly, without actually measuring marginal utilities.

7. Majumdar. T—*Measurement of Utility*, pp. 74–75.

When either the first or the second condition is fulfilled, the Marshallian law of demand holds; and when the third condition applies, we get the Giffen case of a positively sloping demand curve. The Giffen case was an exception to the Marshallian law of demand. Marshall could not provide any satisfactory explanation of the peculiar phenomenon presented by Giffen goods; it remained a paradox to him, as to Sir Robert Giffen, after whom the problem has been named. Hicks' explanation of a Giffen case is that the negative income effect is so powerful that it outweighs the positive substitution effect and hence, when the price of a Giffen good falls, its demand also falls, instead of rising.

(iv) **Change in Welfare.** By means of indifference curve technique, welfare consequences of changes in prices can be translated into changes in income. A fall in the price of a good enables the consumer to shift from a lower to a higher level of welfare or satisfaction. That is, a change in price causes a change in welfare exactly as a change in consumer's income would have done. Thus, a change in price (rise or fall) brings about a change (fall or rise) in consumer's welfare exactly as if his income has changed (decreased or increased). "The equivalence of a given change in price to a suitable change in income is a major discovery of ordinal utility analysis" (T. Majumdar).

(vii) **Closer Analysis of Price Effect.** The indifference curve technique is also superior to the Marshallian utility analysis in that it furnishes a closer analysis of the effect of a change in price on consumer demand for a good by bringing out clearly the distinction between the income effect and substitution effect as already mentioned. It brings out clearly the two components of the price effect, *viz.*, the income effect and the substitution effect. It thus enables us to understand more clearly the effect of a change in price on the demand for a commodity. When price falls, demand increases for two reasons: (a) Real income increases as price falls. This is income effect. (b) Owing to the fall in price, the commodity becomes cheaper and this cheaper commodity is then substituted for other commodities whose prices are higher. This is substitution effect. The indifference curve technique separates the income effect from the substitution effect by the method of 'Compensating variation in income'

(viii) **Recognition of Relationship of Substitution and Complementarity.** Marshall assumed independent marginal utilities. That is, he assumed that the utility of a commodity is a function of the quantity of that commodity **alone**. In other words, a change in the quantity consumed of a commodity changed its utility to the consumer and it does not affect (nor is it affected by) the utility of another commodity which can be substituted for it or which is a complementary good. Actually, this is not so. That is, the utilities are interdependent and not independent. On the other hand, the indifference curve analysis duly recognises the effect of substitutes and complementary goods on the utility of a commodity. It is able to explain the complementary and substitute goods in terms of substitution effect by splitting the price effect into substitution effect and income effects by using the technique of compensating variation in income.

Criticism of Indifference Curve Approach

(i) **Old Wine in New Bottle.** There are, however, some economists, who in spite of its merits given above, do not readily concede the superiority of the indifference curve technique. Professor D.H. Robertson is of the view that the indifference curve technique is merely "the old wine in a new bottle". The indifference curve analysis, according to him, has simply substituted new concepts and equations in place of the old ones. In place of the concept of "utility", the indifference curve technique has introduced the term "preferences"; instead of the cardinal number system of one, two, three, *etc.*, which is said to measure the strength of a consumer's desire, the indifference curves have substituted ordinal number system of first, second, third, *etc.*, to indicate the consumer's scale of preferences. The concept of marginal utility has been replaced by the marginal rate of substitution. And against the Marshallian "proportionality rule" to describe the consumer's equilibrium, indifference curve technique has advanced the equality between the marginal rate of substitution and the price ratio.

(ii) **Marshallian Base Essential.** Professor Armstrong, too, is of the opinion that it is not possible to arrive at the Hicksian principle of diminishing MRS without making use of the "Marshallian scaffolding" of marginal utility. Why does MRS of X for Y fall as X is substituted for Y? The marginal rate of substitution diminishes and the indifference curve becomes convex to the origin, because as the consumer's stock of X increases, the marginal utility of X in term of Y falls and that of Y increases. Thus, according to Professor Armstrong, Hicks has not been able to derive the fundamental concept of diminishing marginal rate of substitution independently of the concept of utility. By a stroke of terminological manipulation, the concept of utility has been relegated to the background; but it is there all the same. Thus, it is obvious that "the principle of diminishing marginal rate of substitution is as much determinate or indeterminate as the poor law of diminishing marginal utility."

Hicks, however, claims that "the replacement of the principle of diminishing marginal utility by the principle of diminishing marginal rate of substitution is not a mere translation. It is a positive change in the theory of consumer's demand." How far his claim is justified is a matter of opinion.

(iii) **Unrealistic.** It is argued that the new theory

only jumps from **the frying pan of the difficulty of measuring utility into the fire of the unreality of assuming consumer's complete knowledge of all his scales of preferences** or indifference map. The indifference curve technique envisages a consumer who thinks of innumerable possible combinations of goods and his relative preferences for them.

(iv) **Absurd.** Even if this feat could be performed, there is yet **another unrealistic element** in the indifference curve technique. Such curves include even the most **ridiculous combinations** which may be far removed from a consumer's habitual combinations. For example, while it may be perfectly sensible to compare whether three pairs of shoes and six shirts would give him as much satisfaction as two pairs of shoes and seven shirts. the consumer will be at a loss to compare the desirability of eight pairs of shoes and one shirt.

(v) **Only Two-goods Model.** A further drawback of the indifference curve technique is that it can analyse consumer behaviour in respect of **two goods only**; for three goods three dimensional diagrams are needed which are difficult to understand and handle. When more than three goods may be involved, geometry altogether fails and recourse has to be taken to complicated mathematics which often tends to conceal the real point.

(vi) **Cannot Explain Uncertainty.** This technique cannot formalise consumer's behaviour when there exists risk or uncertainty of expectation, as regards the consequences of choice.

(vii) **Introspective.** Samuelson has criticised this technique as being predominantly introspective and he has adopted a behaviourist method for devising the demand theory.

(viii) **Constancy of Tastes.** This analysis assumes that consumers' tastes remain unaltered over period of time. This is not correct.

(ix) **Continuity.** The indifference curve is supposedly smooth & continuous. This is unrealistic.

(x) **Ignores Demonstration Effect.** An individual's consumption is often affected by level of consumption of others. Of this no notice is taken in this analysis.

(xi) **Market Behaviour Ignored.** It considers only the prices of two goods and takes no notice of market changes in prices of other goods

(xii) **Relation of Transitivity Objected.** Prof. Armstrong has criticised the relation of transitivity involved in indifference curve technique. According to him, the consumer's indifference arises from his inability to perceive the difference between alternative combinations of goods. This is due to the fact that the difference is too slight to be noticed. If that is true the relation of indifference becomes non-transitive. This knocks the bottom out of the whole system of indifference curve analysis.

(xiii) **Limited Empirical Nature.** In Hicks-Allen theory, indifference curves are based on **hypothetical experimentation.** They are based on imaginary indifference curves, although attempts have been made recently to derive them experimentally

Conclusion. However, in spite of these weaknesses, the indifference curve technique is nowadays largely considered superior to the marginal utility analysis of Marshall and has of late gained considerable popularity among economists.

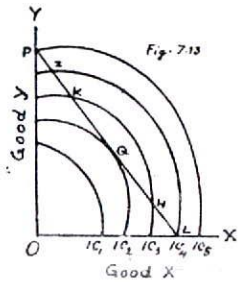
EXCEPTIONAL CASES OF CONSUMER'S EQUILIBRIUM

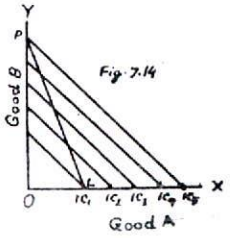
We have said that the indifference curves are usually convex to the origin. The consumers' equilibrium is at the point of tangency of the price line with an indifference curve. There are some exceptions.

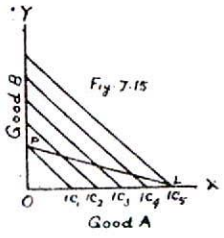
Fig. 7.13 gives concave indifference curves and the consumer will be in equilibrium not at Q where PL price line is a tangent to the curve but at P where consumer buys only good Y or at L where he will buy only good X. P and L being on higher indifference curves than at Q.

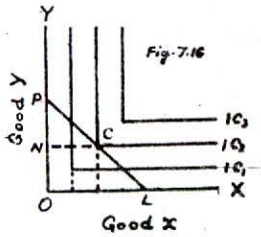
Fig. 7.14 and 7.15 give straight line indifference curves. It is a case of substitutes. Since these are straight lines, tangency is not possible. The equilibrium position will depend on the slope of the price line relative to the slope of indifference curves. If the slope of the price line PL is greater as in Fig. 7.14, he will be at equilibrium at P and buy only Y good. But if it is less as in Fig. 7.15, he will be in equilibrium at L and buy only good X.

Fig. 7.16 represents the case of complementary goods. Here the indifference curves are right-angled. In such a case the consumer's equilibrium will be at the corner of the curve where the price line is a tangent i.e. at C.









8 SOME APPLICATIONS OF INDIFFERENCE CURVE TECHNIQUE

The indifference curve technique is not merely a tool of theoretical analysis. It can also be put to practical use in several economic spheres. As such, it occupies an important place in applied economics. It can be applied in consumption, production, index numbers, taxation and other economic matters. We shall now say a word about each.

Application in Consumption

The indifference curve technique can be used by the householder in settling his purchase plan. A consumer endeavours to reach an equilibrium position, *i.e.*, a position in which he derives maximum satisfaction from his scheme of purchases. We have already explained in the previous chapter how a consumer attains equilibrium with the help of the indifference curve technique. With any given sum of money and at any given set of prices, a consumer must decide the quantity of each commodity that he should purchase to maximise his satisfaction. He must select one of the many possible combinations of the two goods that he can purchase. These various possibilities lie on an indifference curve. Out of these, the combination that he chooses gives him the maximum satisfaction. For this purpose, he will try to reach the highest possible indifference curve touching the price line; all other points on the price line will lie on a lower indifference curve.

In the world of reality, a consumer has not to purchase only two goods but a number of them. But the indifference curve technique can be adapted even to represent this reality by making axis of Y represent money which is a general purchasing power, *i.e.*, all goods. With a change in the planned expenditure or in the price of a commodity, the purchase plan of the consumer will have to be revised. Such changes can also be shown on the indifference curve.

Measurement of National Income

The indifference curve technique also lends itself for measuring national income. National income is the aggregate value of the net output of an economy. Each individual attaches the same relative importance to the commodities as their price ratio. National income is produced by the members of the community and so also it is consumed by them. An estimate of the relative valuation of the commodities composing the national income is essential for computing it. In their system of purchases, the consumers combine the commodities in such a manner as to maximise their satisfaction. The relative importance of the commodities in these combinations and the relative prices indicate the relative importance of these commodities to various members of the community. In fact, relative prices furnish the basis for combining the commodities in the purchase plans of the consumers. The indifference curves, showing the different combinations open to a consumer, can thus be used for measuring national income.

Rationing

Rationing is another field in which the indifference curve technique can be applied. Suppose in

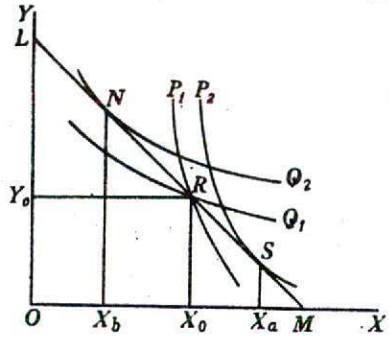


Fig. 8.1

non-price rationing an equal quantity of the

rationed commodity is allotted to each individual. Take two individuals P and Q (Fig. 8.1). X0 is allotted to P and Y0 the same quantity is allotted to Q. P will be on indifference curve P_1 and Q on indifference curve Q_1. But in the absence of rationing P will move from R to S and Q from R to N, which are both on higher indifference curves. This shows that the absence of rationing (leaving people to buy according to their tastes and means) is more advantageous than rationing. The gain arises from a better distribution of commodities according to taste and not from an increase in the aggregate quantities of goods (Xa + Xb = 2X0).

Cost of Living Index

The cost of living depends on the collection of goods and services consumed by the household. The standard of living consists of the various combinations of goods yielding equal satisfaction. Such combinations can be represented by points on the same indifference curve. If the combinations of goods purchased in two successive years are plotted on the indifference curve, it can be shown whether the standard of living has risen or fallen according as the most preferable combination is on a higher or lower indifference curve touching the respective price lines.

Price Discrimination

It can be shown with the help of indifference curves that two individuals (representing separate group of consumers) will derive greater satisfaction from the purchase of two commodities on a single price system instead of under price discrimination, (*i.e.*, when different prices are charged from each). Price discrimination prevents them from reaching the point of equilibrium at a higher indifference curve. [1]

Taxation: Direct *vs.* Indirect Taxes

In the field of taxation, too, the indifference curve technique can be usefully employed. For instance, it can help us to find out whether a direct tax like income-tax will be better or not than indirect taxes like sales tax or excise duty. From the point of view of an individual (who may be considered a representative of a group of tax-payers), will it be better to pay Rs. 100 as income-tax or Rs. 100 in the form of an excise duty? Excise duty is bound to raise the price of the commodity.

In the following Fig. 8.2, we get the answer to the question whether the individual will prefer income-tax or excise duty.

$X_1 Y_1$ is the initial price line. The individual is in equilibrium at P on indifference curve C_1. When an excise duty is imposed, the price of X commodity shown along OX rises and the new price line is $Y_1 X_2$ and now the individual is in equilibrium is in equilibrium at Q on indifference curve C_2. It is clear that he is now buying a smaller quantity of X. To

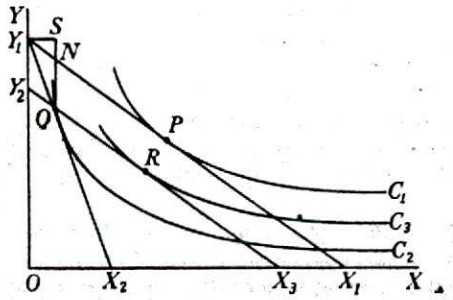


Fig. 8.2

buy this quantity he has to pay SQ amount of money. If he bought no X at all, he would be at S ($=Y_1$). If he had bought the same quantity of X at the former lower price, he would have spent SN amount. Thus, NQ is the amount of tax.

In case he paid income-tax equal to NQ ($=Y_1 Y_2$), he is left with $Y_2 O$ income after paying income-tax. Draw a new price line $Y_2 X_3$ parallel to $Y_1 X_1$. Indifference curve C_3 touches this new price line at R. Indifference curve C_3 is at a higher level than C_2, which shows that the tax-payer is hurt more by excise duty than by income-tax. Excise duty puts the tax-payer on a lower indifference curve. It is understandable from common sense that an excise duty upsets the budget of a consumer.

Effect of a Subsidy

Suppose the low-income groups are supplied by the Government some necessaries (say, housing accommodation) at subsidised rates, (*i.e.*, lower prices). Most welfare States like to help poor citizens in this manner. Let us suppose that the government supplies wheat at half price, the other half being a subsidy. The question is whether the benefit to the consumers is as great as the cost of the subsidy to the Government. Figure 8.3 on the next page gives the answer.

Wheat is measured along OX and income along OY. Suppose the individual's income is CO. If he spent the whole of it on unsubsidized wheat, he would buy OG quantity. Thus, CG is the price line without subsidy. The subsidy being half, the price line with subsidy is CK (OK is double of OG). The consumer is in equilibrium at P and he will, therefore, buy OF quantity of wheat and the amount of subsidy is AB. He spends AC on wheat, but in the absence of the subsidy, he would have spent BC. AB would be the cost to the Government

1. For a diagrammatic representation, see Stigler, G. J.—*The Theory of Price*, 1953, p. 92.

(the vertical distance between the two price lines). The benefit to the consumer is CD. The price line without subsidy, *i.e.*, CG has moved to the right and becomes DH so as to be tangent to the indifference

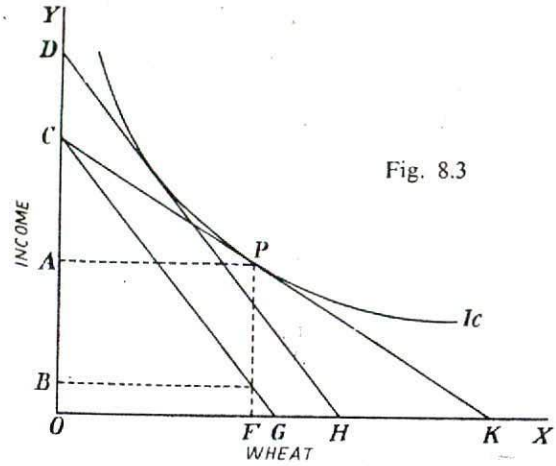


Fig. 8.3

curve. This amounts to an increase in the money income of the consumer. It will be seen that CD is less than AB, *i.e.*, the amount of the subsidy. Hence, we may conclude that the cost of the subsidy to the government is greater than the money equivalent of the gain to the consumer.

Effect of Taxation on Willingness to Work

When a tax is imposed on a person, reduction in money income at his disposal will spur him on to put in more work to increase his income. But if extra work is irksome, it will have the opposite effect. Hence, a tax may induce a man to work more or work less. **A proportional tax tends to restrict output.**

In the diagram (Fig. 8.4) given below, LM′ and LM are the two price lines before and after tax

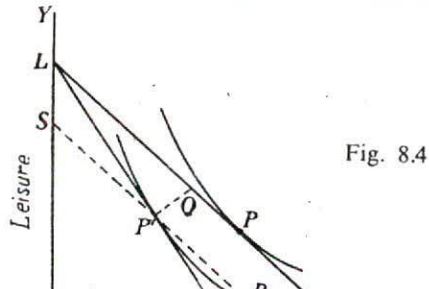


Fig. 8.4

respectively. P is the point of equilibrium before tax and P′ after tax. P′Q is the amount of the tax paid. As a result of the tax, output has been reduced from OM′ to OM. Hence, this particular individual works less than before.

Suppose instead of a proportionate tax, a poll tax (*i.e.*, fixed amount irrespective of the size of the income) is levied. This is represented by the dotted price line SS′ which is parallel to LM′ but on its left. The point of tangency on this new price line will lie somewhere between P and R, which means that the tax payer will work more than when he paid income-tax. The reaction of the individual tax payers may vary. But it can be laid down as a general rule that if a fixed sum is taken away from a worker, it will restrict his output more (or increase it less) than in the case of a progressive income tax.

Effect of Increase in Wages on Supply of Labour

In the case of poorly-paid workers, any rise in the wage rate will not lead to a reduction in working time; it will only result in larger income which will be utilised in purchasing more goods. But beyond a certain stage, the worker will work less and still enjoy more goods. Study the following diagram.

The worker in this figure (Fig. 8.5) is in equilibrium at P on the price line LM. When the wage rate goes up, the new price line is LM′ The worker

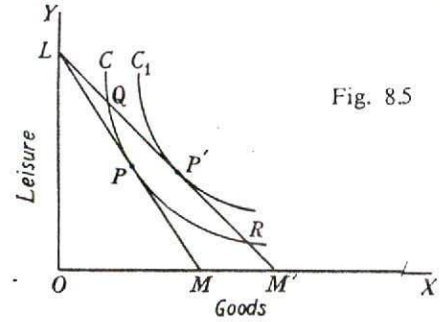


Fig. 8.5

must, therefore, now move up to some point on LM′ between Q and R, which are the points on the indifference curve C. Any point between Q and R must be on a higher indifference curve like C_1 indicating that the worker will be better off. This point may be P′, a new equilibrium. Here leisure remains constant, but goods increase. The worker has moved horizontally from P outwards. If P′ is on a higher slope of C_1, it will mean more leisure and also more goods.

Other Uses of Indifference Curves

The use of indifference curve technique is not merely confined to the cases mentioned above. This technique is now being very widely used in almost the entire economic theory. We may just mention, among other uses, a few uses here, *viz.*, measurement of consumer's surplus, in the welfare economics, in theory of production (*e.g.*, Isoquants), in international trade in the determination of gain from international exchange of goods, etc.

9 REVEALED PREFERENCE THEORY

The Theory

This theory is associated with the name of Prof. Samuelson. This theory is called the behaviourist ordinal-utility theory. Instead of the unrealistic assumption that the consumers operate with a complete and consistent scales of preferences set out in the form of indifference curves, most economists now prefer to analyse situations in which their hypothesis can be tested. Both Marshallian utility analysis and Allen-Hicksian indifference curve technique apply the introspective method or the subjective method. But Samuelson's revealed preference theory makes use of hypotheses which are observable and testable. There is thus a shift from the psychological to behaviouristic explanation of consumer behaviour.

According to the revealed preference theory, the consumer is supposed to reveal the nature of his preferences. He shows the goods he would prefer to purchase in a given situation even though he may not be able to show his scale of preferences on an indifference map. Thus, in the theory of revealed preference, it is unnecessary to assume that the consumers can describe their preferences on indifference maps. This is one merit of the revealed preference theory. Also, as Sir John Hicks observes, revealed preference theory lends itself to use by econometricians.

Assumptions

Rational Consumer. When we use the revealed preference theory in order to find out the effects of a change in price of a commodity on the demand for it, we make certain assumptions. We assume that we are considering an ideal consumer or a rational consumer. That is, we assume that the consumer seeks to maximise his satisfaction from the resources he has. As such he will choose a combination of goods which he deems most satisfying, *i.e.*, which he prefers the most. It, therefore, follows that in one set of market conditions, he selects one combination and his choices will be different under different market situations.

Consistency. We also assume that the consumer's choices are consistent. The choices of actual consumers may not be consistent but those of the ideal or rational consumer may be supposed to be consistent. This consistency implies (a) two-term consistency and (b) transitivity. The two-term consistency means, for instance, that if a particular combination of goods P is better than Q combination and Q is better than R, then P must also be assumed to be better than R, and R cannot be better than P Transitivity ensures that there should be no such circular relationship.

Positive Income-Elasticity of Demand. Another very important assumption underlying revealed preference theory is that the income-elasticity of demand of the consumer must always be positive. That is, if his income increases, his demand for the commodity must also increase; it should not remain the same (*i.e.*, zero elasticity) and it should not also decrease (*i.e.*, negative elasticity) as it happens in the case of inferior goods.

Strong Ordering. A distinguishing feature of Samuelson's theory is that of **'strong ordering'.** There are two kinds of ordering, *viz.*, strong and weak. In a strong ordering, each item in a consumer's scheme of purchases is assigned a definite place or number and at each number there is only one item so that the consumer definitely reveals his preferences. For instance, a consumer reveals his preference when he is observed to choose, say, Q combination of goods in preference to all others or he rejects the rest. In other words, choice reveals preference, by choosing one combination and rejecting others, the consumer has shown his definite preference. It is a case of strong ordering. In a weak ordering there may be some items which cannot be,

arranged in order or preference, so that the consumer is unable to indicate which items he prefers to which.

It may be noted that there is strong ordering so far indifference curves themselves are concerned, because each indifference represents a different level of satisfaction. As between indifference curves, you can at once say which you would prefer the most. But there is a weak ordering so far as the combinations of goods on the same indifference curve are concerned because they represent the same level of satisfaction. Since they are equally satisfactory, the consumer hesitates and cannot at once reveal his preference.

A weak ordering divides the items of purchase into groups; the groups may be strongly ordered showing a definite sequence of preference but there is no such preference within the group itself, *i.e.*, there is weak ordering within the group. There may be two or more positions at the top and the choice between these cannot be easily explained. In case the ordering is strong, the consumer chooses the most preferred position and the preference explains the choice.

The conventional indifference curve is an illustration of weak ordering because all points on the same indifference curve are equally preferred to represent a non-ordered group. Samuelson's theory assumes strong ordering. The assumption underlying the indifference curve technique, *viz.*, that a consumer is capable of ordering all conceivable alternatives indicated by several points on the indifference curve, appeared obviously to be unrealistic.

Samuelson, therefore, rules out the possibility of weak ordering. He does not regard indifference as an operationally significant concept. Samuelson thinks that in the choice that a consumer makes he reveals his preference. Thus, the behaviour of the individual reflects his preference. That is how the revealed preference theory derives a demand theorem from the actually observed behaviour of the consumer. The axiom of revealed preference "provides the necessary operational link between observed choice-behaviour and the behaviourist's welfare conclusions". Thus, the relation of indifference is rejected on operational grounds.

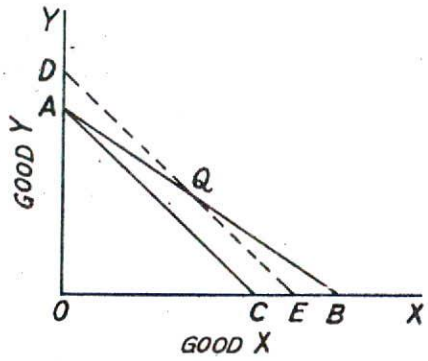
But, as already explained, the consumer behaviour should not be self-contradictory. If, for instance, he prefers coffee to tea at one time, he cannot consistently choose tea rather than coffee at another time. Hicks has called this 'two-term consistency', which is an important assumption underlying Samuelson's theory. This consistency relates to an individual's each single act of choice.

Demand Theorem with Revealed Preference Hypothesis

It can be easily explained that the Marshallian law of demand can be derived with the aid of revealed preference hypothesis. According to the Marshallian law of demand, demand extends with a fall in price and contracts with a rise in price, other things remaining the same, *i.e.*, consumer's income and other relevant prices do not change. Samuelson has tried to demonstrate this inverse relationship between price and the amount demanded by **assuming income elasticity of demand to be positive.**

Samuelson states the demand theorem under the title "Fundamental Theorem of Consumption Theory" thus: **"Any good (simple or composite) that is known always to increase in demand when income alone rises must definitely shrink in demand when its price alone rises."** In this proposition, income elasticity of demand has been assumed to be positive.

This theorem can be illustrated by the following diagram (Fig. 9.1).



Effect of Rise on Demand
Fig. 9.1

In this diagram (Fig. 9.1), consumer's income in terms of good X is shown by OB and in terms of good Y by OA. He is supposed to spend his entire income on these two goods X and Y. AB is the price line and as such shows all the combinations of the two goods X and Y that the consumer can buy in this price-income situation. Let us suppose the consumer is observed to choose the combination represented by Q on the price line AB as giving him the maximum satisfaction.

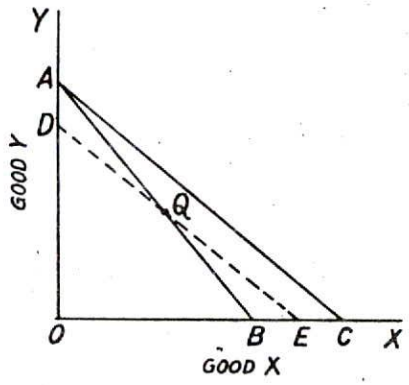
Price Effect. Now suppose that the price of good X rises, while the price of Y remains the same. The demand for X contracts from OB to OC. This gives the new price line AC. In this new price-income situation, Q which put the consumer in equilibrium before, becomes now beyond his reach. In order to enable him to buy the same combination Q, which had given him maximum satisfaction earlier, we give the consumer some extra money to overcome the higher price resistance. For this purpose, we draw a line DE parallel to AC but passing through Q. We give the consumer CE more money to put

him on this new price line DE to enable him to buy Q combination, because Q is on this price line too. Prof. Samuelson calls the extra money as **Over-Compensation Effect** and Hicks calls it Cost-difference.

Now, since Q combination becomes available to the consumer again in the price-income situation indicated by DE price line, he will not choose any combination lower than Q (*i.e.,* lying on QE part of DE). They were available to him before since they lie within the triangle AOB made by the price line AB but were rejected by him in favour of Q. Hence, he will now choose Q or any higher combination lying on QD part of the price line DE. If he selects Q, it will mean that he is buying the same amount of goods X and Y as before. But if he chooses any combination above Q on QD portion of DE, it will mean he is buying less of X and more of Y. This shows the **substitution** effect of a price rise since some units of Y have been substituted for some units of X which has become dearer.

Thus, even when we have given some extra money to the consumer to compensate for the rise in the price of X, he either buys the original quantity of X or less quantity at a higher price. If extra money were not given to him, he would definitely buy smaller quantity of X when its price has risen. This establishes the inverse relationship between price and the quantity demanded when price of good has risen.

Now suppose the price of good X falls. The effect of fall in price is illustrated by the Fig. 9.2 as that of rise was illustrated by the Fig. 9.1 (The figure is given below).



Effect of Fall in Price on Demand
Fig. 9.2

In this diagram, take AB as the original price line and suppose our hypothetical consumer reveals his preference for Q combination of goods X and Y to all other combinations in or on the triangle OAB.

Now suppose the price of X falls and as a result the demand for X extends from OB to OC. Thus, the price line shifts from AB to AC. The consumer now feels he is better off than before. If he is to purchase the original combination of X and Y as represented by Q, we have to take away from him some money so that he is neither better off nor worse off than before. For this purpose, we draw DE price line parallel to AC. In this way, the amount of money withdrawn from the consumer is CE. Now Q being on the new price line DE also, the combination represented by Q becomes available to the consumer. But owing to reduction in his money income he cannot purchase any combination above Q, *i.e.,* lying on QD portion of DE. These combinations were available to him but had been rejected in favour of Q. Hence, he will either choose Q or any other lying below Q, *i.e.,* on the QE portion of DE. If he chooses Q, it will mean that he buys the same quantity of goods X and Y as in the original price-income situation represented by AB. But if he chooses any other combination below Q, it will mean that he buys more of X and less of Y than what he did originally in the price-income situation of AB.

We thus see that even when the consumer's income is reduced, he buys either the same quantity of X or more of it at a lower price. If no money is taken away, he is on the AC price line, he will definitely buy more of X at the lower price provided that his demand for X increases, as his income rises, *i.e.,* his income elasticity of demand for good X is positive.

Thus, we have proved the "Fundamental Theorem of Consumption Theory" in both cases of rise and a fall in the price of commodity. The inverse relationship between price and quantity demanded is established.

Consumer's Equilibrium. Incidentally, we have indicated how a consumer reaches an equilibrium with revealed preference hypothesis and the income effect, the substitution effect and price effect of which the former two are components.

Critical Evaluation

Merits. We have already pointed out some merits of the revealed preference theory. There is no doubt that, in several respects, it is an improvement on the Marshallian utility analysis and Hicks-Allen indifference curve technique:

(a) In the first place, it is behaviouristic and draws the demand theorem from the actually observed behaviour of a consumer. On the other hand, both Marshallian utility analysis and the Hicks-Allen indifference curve techniques are introspective and give psychological explanation of consumer demand. The revealed preference theory studies the actual behaviour of a consumer and not an ideal or imaginary consumer. It is, therefore, more realistic and more scientific. As Prof. Tapas Majumdar says, "Behaviourism has certainly great advantages of

treading only on observed ground; it cannot go wrong."

(b) Samuelson's revealed preference theory has another advantage over the earlier theories. It steers clear of the dubious assumptions upon which the earlier theories were based. The Marshallian and the Hicksian theories were based on the utility maximisation principle. This principle is more restrictive and difficult of realisation in actual practice. On the other hand, Samuelson's theory steers clear of the utility maximisation principle and uses instead the consistency principle to derive the demand theorem which is much less restrictive but more realistic.

(c) The indifference curve is based on the assumption of continuity, whereas revealed preference theory does not assume continuity. Indifference curve is continuous in the sense that it depicts all conceivable combinations some of which may be so unrealistic as to be ridiculous. That is why Prof. Samuelson has given up the assumption of continuity in his revealed preference theory. Although, price line is drawn continuous, yet no continuity is actually involved because the theory is based on the actually observed choice of the consumer from among such combinations as are actually available in the given price-income situation.

Demerits. Whereas the revealed perference theory has several merits as compared with the earlier theories, it is not free from defects:

(i) It is based on strong ordering and as such does not admit of indifference. But since observed choice implies a number of possible alternatives, indifference cannot be ruled out altogether. It may be that no definite preference emerges from a large number of observations. The consumer is sometimes confronted with alternatives which are equally desirable and he is hesitant to choose between them.

(ii) It is very reasonable to assume that an individual is able to compare the different alternatives open to him. Hence, there is a possibility of indifference and of remaining at the same level of satisfaction by sacrificing some units of a good in order to obtain additional units of some other good. As Mr. Tapas Majumdar points out, capacity to compare is the very basis of welfare economics.

(iii) Further, Mr. Armstrong asserts that round about every chosen point there are points of indifference. A consumer goes through these points to reach the most desirable end. The combination actually chosen is thus a point of the series of points of indifference.

(iv) Moreover, it is pointed out that since Samuelson's revealed preference theory is based on actually observed behaviour, there is no room for making a distinction between income effect and substitution effect. And since response of demand to a change in price (*i.e.*, price effect) has two components, income effect and substitution effect, it is supposed that Samuelson's revealed preference theory gives only a partial explanation of change in demand as a result of a change in price. But Samuelson makes a clear distinction between income effect and what he calls over-compensation effect which is similar to substitution effect.

(v) Another flaw in the theory of revealed preference arises from the assumption of positive income-elasticity of demand. In view of this assumption, this theory fails to enunciate the demand theorem when income-elasticity of demand is negative. It only enunciates the demand theorem in a case in which substitution effect of a price change has been reinforced by positive income effect. It cannot, therefore, explain Giffen's paradox in which the income effect is negative and this negative effect is so powerful that it outweighs the substitution effect. Samuelson's theorem explains the inverse relationship between price and the quantity demanded, but in Giffen paradox this relationship is direct.

Samuelson thus denies the phenomenon of Giffen paradox. But we know that this paradox is theoretically conceivable. We know that in the case of inferior goods demand changes in the same direction as price. In this respect, Hicks-Allen indifference theorem is more general than Samuelson's revealed preference theory.

(vi) Finally, objection is raised against his axiom 'choice reveals preference'. But "this axiom is invalid for situations where the individual choosers are to be capable of employing strategies of a game theory type."

Conclusion. With all these flaws in the revealed preference theory, we must admit that this theory is superior to other demand theories in that it applies a scientific and behaviouristic method to consumer's demand. Samuelson's enunciation of the preference hypothesis makes a valuable contribution. But it is circumscribed by the fact that it must reject a hypothesis which is not directly testable. The revealed preference theory is not more general than the Marshallian Law of demand and, unlike Hicks' indifference curve, it does not cover the Giffen case. It is unable to explain a case in which income-elasticity of demand is zero or is negative and the income effect larger than the substitution effect. Hence, Hicksian theory of indifference has greater operational significance than Samuelson's revealed preference theory.

A theory of consumer demand based entirely on strong ordering cannot be very satisfactory, because the consumer is actually confronted sometimes with alternatives which are equally desirable. Hence, indifference analysis cannot be altogether ruled out.

We may, therefore, conclude that neither for the purpose of formulating a general theory of demand nor on any operationally relevant consideration is it necessary to subscribe to the revealed preference theory.

10 RECENT DEVELOPMENTS IN DEMAND THEORY

The demand theory is primarily concerned with the elucidation of the law of demand. The law of demand states that the demand curve slopes downwards, which implies two things: (a) a fall in the price of a commodity tends to increase the quantity demanded, and (b) an increase in supply tends to lower its price. This 'price into quantity' and 'quantity into price' are the two aspects of the law of demand. The law holds good 'other things being equal.'

We can notice the following different stages of development in the theory of demand:

(i) The Marshallian Marginal Utility Theory.
(ii) Hicksian-Allen Indifference Curve Technique.
(iii) Samuelson's Revealed Preference Theory.
(iv) Hicksian Revised Theory of Demand.
(v) Neumann-Morgenstern Statistical Utility Theory.
(vi) Armstrong's Marginal Preference Theory.

We have already studied in some detail the first three, *viz.*, the Marshallian utility analysis, Hicks' indifference curve technique and Samuelson's Revealed Preference Theory. The Marshallian utility analysis, we have seen, is based on the two untenable assumptions, *viz.*, that utility is cardinally measurable and that the marginal utility of money remains constant. The indifference curve technique steers clear of these doubtful assumptions and arrives at the same conclusions as the Marshallian utility analysis but with fewer and less restrictive assumptions. These two theories apply the introspective method in Economics. The introspective method lays down general propositions which are not observable by themselves but which have observable consequences. Samuelson's theory of revealed preference is based on actually observed consumer's behaviour.

We shall now briefly notice the other development in the demand theory particularly Hicks' revised theory of ordinal utility, the cardinal utility theory of Morgenstern and Von Neumann, both called behaviourists who insist on observable or refutable data and the Marginal Preference Theory of W. E. Armstrong—representing a revival of the introspective cardinalism.

Hicks' Revised Theory of Demand

Hicks' first theory of demand was presented in his book **'Value and Capital.'** He revised his theory and published his book, **'A Revision of Demand Theory'** in 1956. Samuelson's revealed preference theory, the growing importance of econometrics and other allied developments led to this revision. In his revision of the demand theory. Hicks emphasised the econometric approach to the theory of demand.

Salient points in Hicks' theory may be noted: Even in his new theory. Hicks confirmed his belief in the ordinal approach to the utility theory and rejected the concept of utility hypothesis of independent utilities.

But it is curious that Hicks, who was largely responsible for popularising indifference curves in economic analysis, almost gave them up in his revision of demand theory. Among the disadvantages of indifference curves he mentions that: (a) this technique cannot include more than two commodities; and (b) it is based on the assumption of continuity which is generally not to be found in economic field. The new method that he adopted was, in his view, more effective in clarifying the nature of preference hypothesis itself.

Hicks starts by taking up an ideal consumer who is supposed to be influenced by current prices and incomes alone in his behaviour. Hicks adopts preference hypothesis for explaining the behaviour of an ideal consumer. Preference hypothesis assumes behaviour according to scale of preferences.

In his own words: "The ideal consumer (who is

not affected by anything else than current market conditions) chooses that alternative, out of the various alternatives open to him, which he most prefers or ranks most highly. In one set of market conditions he makes one choice, in others other choices, but the choices he makes always express the same ordering and must, therefore, be consistent with one another."[1]

According to Hicks, "the demand theory which is based upon preference hypothesis turns out to be nothing else but an economic application of the logical theory of ordering". After drawing a distinction between strong ordering and weak ordering, he proceeds to base his demand theory on weak ordering (as distinguished from strong ordering adopted by Samuelson in his revealed preference theory). To use his own words, "A weak ordering consists of division into groups, in which sequence of groups is strongly ordered, but in which there is no ordering within the groups." Since all combinations on an indifference curve are equally desirable or represent the same level of satisfaction, it illustrates weak ordering. It is obvious that in weak ordering, the actual choice fails to reveal definite preference. (See Figures 9.1 and 9.2 in the previous chapter). The various price-income lines drawn there represent weak ordering.

Hicks objects to strong ordering. He says that a 'two dimensional continuum point cannot be strongly ordered.' According to him, where the choice is between any good which is available in discrete units and money which is finally divisible, the possibility of equally desired combinations cannot be ruled out. The concept of strong ordering must, therefore, be given up. According to Hicks, the choice of a particular combination does not indicate preference for that particular combination over all other possible alternative combinations that have been rejected. All that is shown is that there is no rejected combination which is preferred to the one chosen. The point chosen is preferred to all points within the triangle (See figures 9.1 and 9.2 in the previous chapter) but it shows preference or indifference to all points on the price line.

Hicks is able to deduce all the major propositions of theory of consumer demand from the logic of weak ordering and the theory of direct consistency test based on it. He derives the law of demand or the downward sloping demand curve and for this purpose he adopts the same technique as was adopted in the case of indifference curve, *viz.*, splitting the price effect into its two components; income effect and substitution effect. He deduces the substitution effect from the consistency theory and the income effect is based upon empirical evidence. The substitution effect is separated by means of (a) the method of compensating variation and by the method of cost difference.[2] (This has been explained in the previous chapter on revealed preference).

The law of demand enunciated by Hicks covers the inferior goods too, *i.e.*, where income effect is negative. This is not provided in the theory of revealed preference.

Neumann-Morgenstern Statistical Theory

There has been a neo-cardinalist revival in recent years as represented by the works of Oskar Morgenstern and John Von Neumann. The demand theory formulated by them is considered applicable to situations involving measurable risk. It is a statistical theory because it is based on a number of observations and not on a single act of choice as in Samuelson's or Hicksian theory.

In statistical terms, we can have both strong and weak ordering. For example, if a person always chooses P situation rather than Q situation, P is preferred in a strong sense. Also, if he always chooses Q rather than R, then Q is strongly ordered. But between the situations like P (in which Q is never chosen) and situations like R (in which Q is never rejected), there may exist a number of intermediate situations in which Q may be accepted or rejected. We shall not, therefore, be able to predict the consumer's choice in such situations and we may say that he is in a state of indifference, which is a case of weak ordering. Samuelson's behaviour theory, therefore, cannot rationally predict individual behaviour.

When, however, an individual's choice is repeatedly observed over a set of samples of minimum size, some sort of consistency is established and the way is prepared for the statistical preference hypothesis. The Neumann-Morgenstern theory admits the concept of indifference but only by ruling out the requirement of single-events consistency. Thus, it is a hypothesis of 'weak' but consistent preference (indifference).

It is based on two possible assumptions: (a) the consumer is unable to distinguish clearly between two objects so that he chooses (rejects) only hesitatingly with the result that the choice sometimes turns out to be undesirable. (b) The consumer does not regard the two objects of his choice as 'sure prospects' and that there is an element of risk of not having one or the other. The existence of risk explains the phenomenon of weak preference, *i.e.*, the choice frequency is less than 100 per cent. The frequency of choice would vary inversely with the degree of risk. Given the degree of risk, the

1. Hicks, J. R.—*A Revision of Demand Theory*, 1956, p. 18.

2. For diagrammatic illustration See H. L. Ahuja—*Advanced Economic Theory*, 1975, pp. 222-223.

frequency of choice would vary with intensity of preference. This frequency serves as a measure of relative preference under conditions of risk. That is, "under conditions of measurable risk, the individual expresses his relative preference in terms of frequency of his choices."

The neo-cardinalist demand theory is simply this: A "consumer is expected to evaluate his 'prospects' in terms of statistical probability, and judged over a large number of cases, to appear to maximise the statistically expected value of his 'utility'." [3]

Armstrong's Marginal Preference Theory

W. E. Armstrong is essentially an orthodox cardinalist and stands in Marshall's tradition. He has forged his own tools to re-establish cardinalism. His theory is based on two interdependent concepts, *viz.*, uncertainty and indifference.

We have seen above that the two assumptions on which Neumann-Morgenstern's theory is based are: first, the consumer does not regard the object of his choice as 'sure prospects'. Though the nature of the end is certain, one is not certain as to how the end is to be achieved. The second assumption is that the consumer is not able to discriminate clearly between two otherwise certainly distinct ends. It is uncertainty in discernment as distinguished from uncertainty in the prospect of achieving a given economic end which provides a basis of Armstrong's utility theory.

Like Hicks, Armstrong makes use of the concept of indifference which arises from the fact that the consumer is unable to distinguish clearly between the two situations. But, unlike Hicks, his indifference (preference) is not transitive, *i.e.*, it cannot be passed from one to the other. For instance, the consumer may not be able to distinguish between X and Y or between Y and Z, yet the difference between X and Z may be quite perceptible.

Thus, Amstrong puts forward his own concept of uncertainty and definition of indifference. Indifference may arise (a) from the principle of compensation, *i.e.*, loss in one direction may be compensated by gain in any other direction, or (b) from the idea of approximation, *i.e.*, the two situations being approximately the same, the consumer is unable to distinguish between them and is, therefore, indifferent between them. Armstrong's concept of indifference is based on approximation, whereas Hicks's idea is based on the principle of compensation. It will be seen that (a) is the result of weighing pros and cons and (b) arises from the consumer's inability to see clearly the difference between the two. Hicks's preference implies process of substitution, whereas Armstrong's indifference is the result of low state of preference.

Armstrong has introduced a concept of 'preference intensity'; the intensity may be high, low or imperceptible. According to Amstrong, preference is marginal when the consumer is just able to perceive. This will happen when the two situations are so near each other that the consumer is barely able to see that he prefers one to the other. The consumer may not be able to distinguish between these two situations. He will then be in a state of indifference. Thus, indifference in Armstrong's definition arises from the approximate identity of the two situations. His indifference is due to the triviality of difference between two situations. This relation of indifference will be intransitive, *i.e.*, there will not exist a relation of indifference between two other points.

MARGINAL UTILITY OF MONEY INCOME

Marshall assumed that the law of diminishing marginal utility applied to money too. But the recent view is that it does not. It is said that the marginal utility of money rises and falls depending on the level of income as is shown by the people taking to gambling and insurance. In this connection, the following hypotheses may be noted:

Bernoulli Hypothesis

Bernoulli offered a rational explanation of gambling and insurance. He said that the people would insist on a larger gain to compensate for the risk of a given loss. He therefore hypothesised that total utility curve of money income slopes from left upwards to right and is concave from below (or the marginal utility of money income curve falls from left to right).

Friedman-Savage Hypothesis

Friedman and Savage have suggested that the utility curve of income is first concave, then convex and finally again concave. The total utility curve is S-shaped. It shows that the poor people are willing to buy fair insurance against any kind of risk, the middle classes are induced to go in for a fair gamble and rich people are prepared to insure against small loss but not against very large losses.

The Markowitz Hypothesis

According to Markowitz, the Friedman-Savage hypothesis contradicts common behaviour. It looks strange, he says, that a poor man should go in for a fair gamble, that a rich man should insure against small losses and that both poor and rich purchase lotteries and gamble on horse races. In order to avoid these contradictions, he suggests a different form of total utility curve

3. Majumdar, T.—*The Measurement of Utility*, 1958, p. 102.