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Syllabus

Introduction: Meaning, nature, scope, significance and limitations of Micro economics, Ceteris Paribus Use and significance. Concept and equilibrium – Partial and general, Positive and normative economics, managerial economics, Basic concepts wealth, welfare and scarcity, Basic Tools of economic analysis (equations and functions, graphs and diagrams, slopes and intercepts)

Consumers Behaviour and Demand: Marshallian Approach: Equi-marginal utility, law of demand- determinants of demand, Elasticity of demand and its measurement: Price-income and cross and promotional elasticity of demand, consumer's surplus Hicksian Approach: Indifference curves- properties of IC, consumer's equilibrium, Price effect, income effect and substitution effect. Derivation of demand from price consumption curve(PCC) Giffen Paradox Samuelson Approach Revealed Preference Theory

Production and Cost Analysis Concept of production function: short and long run- Cobb-Douglass production function. Iso-quants- Iso-cost line- Producer's equilibrium. Law of variable proportion and laws of returns to scale- Economies of scale- Economics of scope Concepts of costs: Money and real costs, opportunity cost, social cost, private cost, Derivation of short and long run cost curves- learning curve.

Theory of firm Concepts of revenue, Total, Average, Marginal- Relationship between AR, TR, MR under perfect and imperfect competition – AR, MR, and elasticity. Objectives of a firm- Analysis of equilibrium of a firm. TR-TC Approach, MR-MC Approach , Break even Analysis

Market Structure Perfect competition : Features, Short run equilibrium of the firm and industry and long run equilibrium of the firm and industry Monopoly: Features- Short run equilibrium of the monopolist under different cost conditions and long run equilibrium of the monopolist- Discriminating monopoly-Equilibrium under discriminating monopoly- Dumping Monopolistic competition; Features, Equilibrium in the short and long run- wastages under Monopolistic Competition – oligopoly Features.

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Introduction to Economics and Microeconomic Theory

University of Mumbai

MICROECONOMICS

Introduction to Economics and Microeconomics

Learning Objectives

After reading this chapter, you are expected to be able to:

- Understand the meaning and scope of the subject Economics
- Understand the meaning of and the disctinction between the terms Microeconomics and Macroeconomics
- Understand the subject matter of Microeconomics
- Understand the importance and significance of Microeconomics
- Understand the limitations of Microeconomics

Understanding Economic Theory

What is Economics?

In your daily life you must have experienced that as a human being you hold many desires and requirements but the means to satisy them are limited. For example, let us assume that you are a student of an undergraduate programme and as you are still studying, you don't have any regular source of income except for the monthly pocket money of Rs. 750 which your parents are giving to you every month. This pocket money is the only monetary source for you to take care of your monthly expenses. Thus, we can say that you have limited monetary resource of Rs. 750 per month to satisfy your various desires and requirements. Let us further assume that your various desires and requirements are follows:

- You want to see the latest movie which has been declared a box office hit
- You want to buy a new car similar to the one which your friend owns and uses
- You want to purchase mobile phone cum tablet which has been recently launched by XYZ company in the market
- You want to eat out with your friends in good restaurant located near your college
- You need to buy certain course books as you semester end examinations are near
- You have to spend on taking print out of the six class assignments which are due for submission to the college by end of this month.

In nutshell, your desires and requirements are many and your means are limited (Rs. 750 that you get every month as pocket money). In such a case, you will have to prioritize your desires and requirements on the basis of their importance and the gains associated with them. In other words, you will be able to satisfy only some of your desires and requirements and not all as you have limited means or resources. Thus in above example you might be position to satisfy only following few desires and requirements:

- Buying course books for the examination preparation
- Paying for taking print out of the six class assignments due for submission
- And either seeing the movie released recently or eating out with your friends.

This action of yours through which you allocated your limited resource (pocket money of Rs. 750

per month) in order to satisfy your various desires and requirements while ensuring maximization of your gain or return is the crux of the subject **Economics**.

Economics is thus a social science which studies human behaviour when an individual is encountered with unlimited desires but holds limited means to satisfy them. Economics studies that how individuals (i.e; an Individual human being or an individual firm or an Industry etc) optimise their resources to maximize their gains.

To quote words of famous economists, following are few well accepted definitions of 'Economics':

- In words of ***Alfred Marshall***:

"Economics is the study of people in the ordinary business of life"

- In words of ***Lionel Robbins***:

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

- In words of ***Paul A. Samuelson***:

"Economics is the study of how socities use scarce resources to produce valuable commodities and distribute them among different people"

Economics is thus a social science which studies following:

1. How an individual uses his limited resources to maximise his well being
2. How companies use their limited resources to maximise their business gains and profit
3. How an Industry uses the limited resources in order to maximize gains of the firms which are part of the Industry as well as the Industry as a whole
4. How society at large uses the limited resources at its disposal in order to produce required goods or commodities and distribute them among various individuals in society.

Various aspects of economic theory study and analyze thefollowing: Production and factors of production (Land , Labor, Capital and Organization), Cost, Factors impacting Demand and Supply, Demand and Supply analysis, Pricing under various market situations, Factor Pricing, Welfare analysis, Consumption, Money, National Income, Investment, Distribution, Problem of economic growth and development etc. }}

Micro and Macro Economics

Microeconomics and Macroeconomics

As the terms imply, **Microeconomics** focuses on micro or small segment of economy and it studies the decision making process and econtomic problems of individuals (household, firm, industry etc) in an economy with respect to that how they use scarce means or resources at their disposal for satisfying their unlimted ends. On the other hand **Macroeconomics** looks at a larger picture and is study of economy as a whole.

In order to understand the concepts (Microeconomics and Macroeconomics) better, we can say that Microeconomics is the study of an individual human being, an individual household, an individual firm or an individual industry etc with respect to how they use/divide their given scarce means among the possible alternative uses/ends in order to maximize their gain or well being. Microeconomic theory does not study the economy as a whole and instead studies the individuals and their gain maximizing behaviour in any economy. Microeconomics studies and analyzes individual (human being, household, firm, industry etc) behaviour with respect to issues like production, consumption, distribution, price determination etc.

Macroeconomics on the other hand, studies the aggregate or overall economic behaviour of households, firms, industries etc in any economy.It focuses on broader economic issues like business cycles, inlation, deflation, stagflation, issues related to economic growth and development,national income, employment, money and monetary policy, fiscal policy etc.

Understanding the difference between Micro and Macro Economics

- Microeconomics studies the economic behavior of an individual firm, industry, household, consumers etc in an economy. On the other hand, Macroeconomics studies the economic behavior of firms, industries, household consumers etc at an aggregate level. In other words, we can say that Macroeconomics is the study of economy or economic systems as a whole.
- Microeconomics studies issues like demand, supply, production, production efficiency, cost, cost minimization, market structures, pricing, distribution, profit maximization etc at the individual firm, industry, household or at consumer level. On the other hand, Macroeconomics studies the economic issues and problems affecting economy at a broader level. These issues can be problem of inflation, deflation, stagflation, business cycles, problem of economic growth, national income, employment etc.
- Macroeconomic theory explains and deals with the economic environment which an individuals firms, industry, household etc face or encounter. Such issues (inflation, deflation, business cycles etc) in the economic environment impact the decision making of the individual firms, industry, households etc. However, these individual entities (focus of Microeconomic theory is on economic behaviour of individual entities) do not hold any power to control or to manage the macroeconomic issues at an individual level.

Case Study

Understanding differance between Micro and Macroeconomics

Case 1

Let us assume that your mother is managing various household expenses and requirements with the limited monetary resource she holds. Let us further assume that this limited resource is the income of your father earned on monthly basis. Your mother, thus every month, undertakes budgeting or allocation of resource exercise in order meet various household requirement with the limited means that she holds in such a way, that such allocation of resources leads to maximisation of benefits or gains for the individual household. This is crux of the subject Microeconomics.

Let us further assume that in the country where you are residing, the problem of Inflation (Inflation is an economic problem in which an economy experiences continous and persistent rise in prices of goods and services being sold in the economy) emerges and this disturbs the monthly household budget of your mother. Your mother cannot control or manage the problem of inflation as inflation is a macroeconomic issue. Thus, in order to deal the impact of inflation on her household budget, your mother will have to reallocate her limited monetary resource among various goods and services which she is currently buying. This reallocation of resource exercise will most likely result in substitution of expensive goods and services with the cheaper alternative options available in the market. Your mother will be forced to do so because any increase in prices of goods and services in any economy shrinks the real income of the individuals in the economy. This is on account of the fall in the value of money and thus real income due to continous and persistent rise in prices

In this case the resource allcation exercise which your mother undertakes is subject matter microeconomic theory while the problem of Inflation is part of study of Macroeconomic theory.

Case 2

Most of the clients or customers of Infosys Technologies(a very successful Indian Information Technology firm) are located in the overseas markets like USA, Europe, Latin America etc. Infosys provides its clients with on-sight as well as off-sight IT service and support. Infosys Technologies, over the last few years, has been successful in managing its resources (primarily talented human resource) in such a way so as to maximize the return/profit of the company. The management of resources at the Infosys Technologies among various requirements/enf for the profit maximization is focus of microeconomic theory.

As already discussed, most of the clients of Infosys Technologies are located overseas and thus the earnings of the company are in terms of foreign currencies like US Dollars (USD), Euros etc. The excahnge rate movement of US Dollar (USD), Euro etc and the factors impacting the exchange rate of USD, Euro etc in the Indian market is a macroeconomic issue and is dependent on the macroeconomic factors like Inflation, GDP growth rate, Balance of Payments etc. It is thus beyond the capability of Infosys to control or manage such macroeconomic variables. However, any change in the value of USD or Euro vis-a vis Indian rupee impacts the earnings of Infosys. In order to manage the risk and uncertainity associted with the earnings flow, the Infosys Technologies can use hedging techniques.

In this case the issue of allocation and management of resources at the disposal of Infosys for maxisimising the gains or profit for the company is a Microeconomic issue while the issue of fluctation in the value of USD, Euro etc is an outcome of changes in the macroeconomic variables like inflation, balance of payment, GDP growth rate etc and is thus a macroeconomic issue which is beyond the control of the company.

Scope of Microeconomics

Microeconomic theory deals with four important issues at an individual level. ==These issues are:==

- What should be produced?
- How much it should be produced?
- How can one make best use of given resources while producing goods and services in order to maximize the efficiency of production and consumption or to maximize the returns for an individual (firm, industry, household etc)?
- How the goods and services can be distributed for maximum well being?

The scope and subject matter of Microeconomics covers following three aspects:

- *Theory of Firm and Product Pricing*
- *Theory of Factor Pricing (As per economic theory there are four factors of Production – Land, Labour, Capital and Organization)*
- *Welfare Economics*

The theory of 'Firm and Product Pricing' analyses and discusses following topics:

- Theory of Demand and Supply
- Theory of Production
- Theory of Cost

- Theory of Markets - Perfect market and Imperfect Markets like Monopoly, Duopoly, Oligopoly, Monopolistic competition
- Theory of Product Pricing in various market situations

In brief, the theory of Firm and Product pricing discusses demand and supply environment encountered by individual firms, industries etc. It discusses how given resources can be allocated for production in order to ensure maximization of profit or minimization of cost for a firm. It also discusses various market situations possible and determination of product pricing under various market situations.

The theory of 'Factor Pricing' analyses and discusses following:

- Labor theory and theory of Wage
- Theory of Rent
- Theory of Interest and
- Theory of Profit

In brief, the Factor pricing theory discusses how the reward or return for the various factors of production (Land, Labor, Capital and Organization) can be decided when they are contributing to the production activities.

The 'Welfare theory' discusses the following:

- Criteria of Social Welfare
- Maximization of Social Welfare
- Determination of welfare optimizing output mix, commodity distribution and resource allocation

In brief, the Welfare theory discusses and understand the criteria of 'Social Welfare' for any economy and how the same can be achieved in the economy. It also discusses the determination of welfare maximizing output-mix, commodity distribution and resource allocation.

Ceteris Paribus

Ceteris Paribus

It is a latin phrase which means 'Other things remain constant'. The assumption of 'Ceteris Paribus' is integral part of microeconomics theory. By using the assumption of 'Ceteris Paribus', it becomes easy to understand the relationship between two variables or in other words the impact of change in one variable on the other variable while other variables remain constant.

For example while explaining the **Law of Demand**, which states that ***There is an inverse relationship between the price and the demand of a good or service. Thus, whenever the price increases the demand for the good decreases and whenever the price decreases the demand for the good increases - provided other things remain constant or Ceteris Paribus***. Here, the assumption of 'Ceteris Paribus' helps us in understanding the relationship existing between only price and the demand of good under consideration. By assuming that 'other things remain constant', it becomes easy to eliminate the impact of other factors on demand of a good or service. Here, it becomes important for us to understand that various determinants of demand are - Price of the good, price of related goods, income of an individual, advertisement, fashion, fad etc. In case,we assume that all other determinants of demand except the price of the good in question remain constant then it is possible for us to undersatnd the impact of change in only the price of a product on the demand of the product.

As already stated above, the assumption of 'Ceteris Paribus' is an integral part of economic theory and helps in exploring relation ship between following: Demand and Price, Demand and Income, Demand and price of related goods, Supply and Price, relationship between variable factors of production and the output in the short run, Impact of change in variable factors of the cost of production of a firm in the short run etc.

Importance and Significance of Microeconomics

The study of Microeconomic theory helps in following:

- **Understanding operation of economy at a micro level** - The study of Microeconomics helps us in understanding various market situations which are possible in any economy. It helps in understanding the economic reasons behind the decisions like – What to Produce? For whom to produce? How much to Produce? etc.
- **Optimization of resource allocation** - The study of Microeconomics helps in understanding that how a firm or an industry etc can maximize its production efficiency and the profit by appropriate allocation and utilization of resources at its disposal.
- **Minimization of Cost** - The study of Microeconomics helps in the determination of optimum production point for a firm/industry.The theory also helps in determining the point of cost minimization for a firm
- **Understanding Consumer Behaviour** - The study of Marginal Utility theory, Revealed Preference Hypothesis, Consumer Indifferance curves etc give useful insight into consumer behaviour and thus help in understanding and predicting the consumer behaviour in varied market situations.
- **Demand Forecasting** - The theory of Demand and Demand analysis, elasticity of demand etc help in understanding and predicting demand of a product.

- **Impact of change in Price/Income/Prices of related goods etc on the demand of a Product** - The study of Microeconomic theory can help an individual firm to understand the impact of change in price, income, prices of related goods etc on the demand the good or service which the firm is offering to the market.
- **Government Policy Making** - The study of demand theory, supply theory, market theory etc can help the government in policy making at macro level. For example the study of microeconomic theory can help in deciding appropriate tax policy, pricing policy of the public goods and services, impact of tax policy in reducing inequality of income and wealth etc
- **Foreign trade and exchange rate determination** - Microeconomic theory of demand, supply, elasticity of demand etc help in understanding the impact of change in tariff on the terms of trade. Similarly, microeconomic theory of demand,supply etc helps in understanding the exchange rate determination process in the foreign exchange market.
- **Maximisation of Social Welfare** - The study of Microeconomic theory can help in deciding the appropriate allocation of resources, commodities and output mix for the maximization of the social welfare.

Case Study

Understanding Government Tax Policy

Have you ever wondered why the tax imposed by government on Goods like Cigrattes, Liqour etc is very high? This is so because the Government understands that consumer demand for such products is inelastic and high tax rate on such goods will result in higher tax collection for the Government and thus Government comes out with the policy of high taxes on such commodities.

Similarly, if the Government of a country wishes to discourage consumption of certain Goods then it can impose very high taxes on such category of Goods. For example Government tax is very high on Imported Cars and Other Luxary Products in India.

In the same manner, if Government of a country wishes to encourage consumption of certain category of goods or may be investment in production of certain category of Goods then it reduces the related taxes for encouraging Production/Consumption of such Goods.

Limitations of Microeconomics

The study of Microeconomics gives us useful insight into operational aspects of an economy at the micro or individual level. As discussed above, the study of Microeconomic theory can help us in deciding upon the best resource allocation process for the maximisation of social welfare. The study of Microeconomic theory also helps in demand forecasting, deciding the economic policies of the government, price determination under various market situations etc. However there are certain shortcomings of the Microeconomic theory as well. We need to understand these limitation in order to complete our understanding of the Microeconomic theory.

The limitations of Microeconomics are as follows:

- Microeconomic theory assumes full employment in an economy. This assumption is unrealistic in the real markets. No economy or economic system in the world has witnessed or experienced the full employment scenario till date.
- Microeconomic theory assumes of a 'Lassiez Faire' economic system. This means an economic system having 'No government intervention'. However, when we look around us, we realize that all economic systems across the world including the capitalist economies experience government intervention into the economic systems on a very regular basis.
- Most Microeconomic theories are based on the static assumption of 'Ceteris Paribus' which means 'Other things being equal'. Again, this assumption of ceteris paribus, is unrealistic in the real markets.
- Microeconomic theory sometimes leads to generalization of individual behaviour and this may not always be true or correct.
- Microeconomics is only a part study of a economy and thus it does not help us much in understanding any economic system as a whole.

Let's Sum Up

- Economics is thus a social science which studies human behaviour when an individual is encountered with unlimited desires but holds limited means to satisfy them. Economics studies that how individuals (i.e; an Individual human being or an individual firm or an Industry etc) optimise their resources to maximize their gains.
- Economics is thus a social science which studies following:
  1. How an individual uses his limited resources to maximise his well being
  2. How companies use their limited resources to maximise their business gains and profit
  3. How an Industry uses the limited resources in order to maximize gains of the firms which are part of the Industry as well as the Industry as a whole
  4. How society at large uses the limited resources at its disposal in order to produce required goods or commodities and distribute them among various individuals in society.
- **Microeconomics** focuses on micro or small segment of economy and it studies the decision making process and econtomic problems of individuals (household, firm, industry etc) in an

economy with respect to that how they use scarce means or resources at their disposal for satisfying their unlimted ends. On the other hand **Macroeconomics** looks at a larger picture and is study of economy as a whole.

- Microeconomics studies the economic behavior of an individual firm, industry, household, consumers etc in an economy. On the other hand, Macroeconomics studies the economic behavior of firms, industries, household consumers etc at an aggregate level. In other words, we can say that Macroeconomics is the study of economy or economic systems as a whole.
- Microeconomics studies issues like demand, supply, production, production efficiency, cost, cost minimization, market structures, pricing, distribution, profit maximization etc at the individual firm, industry, household or at consumer level. On the other hand, Macroeconomics studies the economic issues and problems affecting economy at a broader level. These issues can be problem of inflation, deflation, stagflation, business cycles, problem of economic growth, national income, employment etc.
- Macroeconomic theory explains and deals with the economic environment which an individuals firms, industry, household etc face or encounter. Such issues (inflation, deflation, business cycles etc) in the economic environment impact the decision making of the individual firms, industry, households etc. However, these individual entities (focus of Microeconomic theory is on economic behaviour of individual entities) do not hold any power to control or to manage the macroeconomic issues at an individual level.
- The scope and subject matter of Microeconomics covers following three aspects:
  1. Theory of Firm and Product Pricing
  2. Theory of Factor Pricing (As per economic theory there are four factors of Production – Land, Labour, Capital and Organization)
  3. Welfare Economics
- Ceteris Peribus is a latin phrase which means 'Other things remain constant'. The assumption of 'Ceteris Paribus' is integral part of microeconomics theory. By using the assumption of 'Ceteris Paribus', it becomes easy to understand the relationship between two variables or in other words the impact of change in one variable on the other variable while other variables remain constant.

Self-Assessment Questions (SAQs) {{{n}}}

Self Assessment Questions on Introduction to Microeconomics

Points added for a correct answer: 1

Points for a wrong answer: 0

Ignore the questions' coefficients: ☐

Shuffle questions

1. Economics is

- the study of how socities use scarce resources to produce valuable commodities and distribute them among different people
- How ordinary human beings earn their living
- How factors of production earn their returns

2. Macroeconomics

- analyses and discusses issues impacting economy as a whole
- is study of how individual firms, industries, households etc maximize their well being
- is study of components like production, consumption, product pricing, demand and supply at an individual level

3. Microeconomics is

- Study economic variables impacting economy as a whole
- Study of economic behavior of an individual firm, industry, household, consumers etc in an economy
- fall in the valuation of a firm in the market

4. The Study of Microeconomics assists in

- Demand Forecasting
- Price Determination
- Framing the government Policies
- Understanding Consumer Behaviour
- All of the above

Submit

True or False Quiz

1. Microeconomics and Macroeconomics
   - are two differnt aspects of economic theory.

- are two different terms used in the economic theory which however are same in terms of their meaning and reference.

2. The subject matter of Microeconomics includes following:
   - The heory of Firm and Product Pricing, Theory of Factor Pricing and Welfare Economics
   - The theory of Inflation, Business cycles, National Income and Employment etc
3. The subject matter of Theory and Firm and Product Pricing is
   - Study of how reward for the factors of production - Land, Labor, Capital and Organization is determined
   - Study of theory of Demand, Supply, Production, Cost,Markets etc
4. The subject matter of Welfare theory covers following issues:
   - how can we ensure welfare of aged and children in any society and how welfare of companies operating in any economy can be achieved
   - how can we determie the welfare maximizing output-mix, commodity distribution and resource allocation for maximising welfare of any society.
5. Following are the limitations of Microeconomics
   - Wrong assumption of full employment in any economic system, unrealistic assumption of Lassiez Faire economy, assumption of Static equilibrium etc
   - Wrong assumption of two factor production model, assumption that demand creates its own supply etc

Activity

Try to observe how your mother or father are utilizing their monthly income in order to meet the daily reqirements of the family. Discuss with them that how changes in economic variables like inflation, slowdown of economic activity, appreciation or depreciation of domestic currency (for example Rupee) is impacting their household budgeting decision. Try to analyze and record what in your view is aspect of Microeconomic theory and what is the aspect of macroeconomic theory

Key Terms

- Macroeconomics
- Microeconomics
- Welfare theory
- Product Pricing
- Factor Pricing

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Types or Concepts of Equilibrium

University of Mumbai

CEMCA

Concept of Equilibrium

Learning Objectives

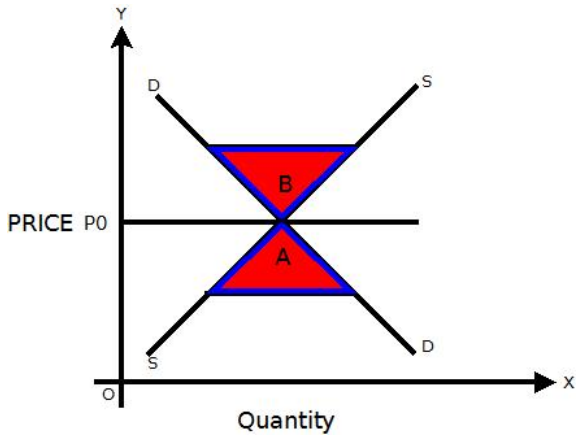
After reading this chapter, you are expected to be able to:

1. *To demonstrate an understanding of the concepts of equilibrium, economic equilibrium and types of equilibrium.*
2. *To describe the applications and limitations of partial equilibrium and general equilibrium.*
3. *To differentiate between partial and general equilibrium.*

Definition

The word equilibrium is derived from the Latin word aequilibrium which means equal balance. Its use in economics is imported from physics. In physics it means a state of even balance in which opposing forces or tendencies neutralize each other. Prof. Stigler defines equilibrium in his sense in these words:" equilibrium is a position from which there is no net tendency to move, we say net tendency to emphasize the fact that it is not necessarily a state at sudden inertia but may instead represent the cancellation of power forces. In economics, equilibrium implies a position of rest characterized by absence of change.

Market equilibrium, for example, refers to a condition where a market price is established through competition such that the amount of goods or services sought by buyers is equal to the amount of goods or services produced by sellers. It is the point at which quantity demanded and quantities supplied are equal. This price is often called the equilibrium price or market[1] clearing price and will tend not to change unless demand or supply change.



Price of market balance:

- **P - price**
- **Q - quantity of good**
- **S - supply**
- **D - demand**
- **P0 - price of market balance**
- **A - surplus of demand - when P<P0**

- **B - surplus of supply - when P>P0**

Static Equilibrium

"According to Prof. Mehta". "Static equilibrium is that equilibrium which maintains itself outside the period of time under consideration ".It is state of bliss which every individual firm, industry or factor wants to attain and once reached, would not like to leave. Consumer is in equilibrium when he gets maximum satisfaction from a given expenditure on different goods and services.Any move on this part to reallocate his expenditure among his purchases will decrease rather than increase his total satisfaction. A firm is in equilibrium when its profit is the maximum and it has no incentive to expand or contract its output. It is a position in which neither the adjusting firms have any tendency to live nor for new firms to enter the industry. In other words, an industry is in equilibrium when all firms are earning only normal profits.

Static equilibrium is of three types:

1. **Micro static**.
2. **Macro static and**
3. **Comparative static**

Micro static:

An economic model refers to relationship among different variables in which one variable appears in more than one relationship. In the micro static models of price determination, supply and demand relationship determine price at a point of time which are also constant through time. The given demand and supply functions are

D= (P) ----- I

S= (P) ----II

Where,

D = demand

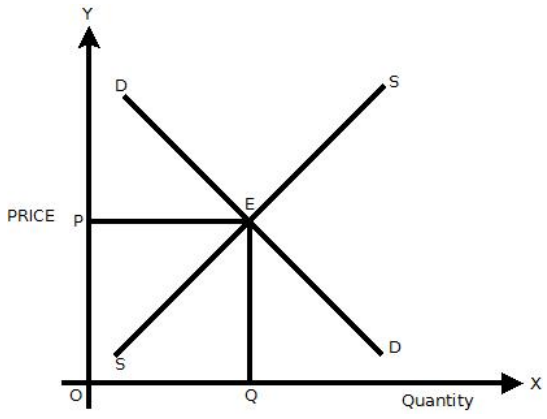
P = price

S = supply

The equation I shows that demand is inversely proportional to price i.e. if price decrease the demand will rise and if price increases, the demand will fall keeping other things constant. On the other hand equation II shows that supply is also the function of price i.e. if price increase supply will rise and if price decrease supply will fall, other things remaining constant.

From equations I and II
D=S ------III

The micro static relationship is illustrated with the help of diagram.



The above diagram shows DD and SS the demand and supply curves respectively. They intersect at point E where quantities of demand and supplied equals to OQ at price OP. This is static analysis of price determination, for all variables such as quantity supplied, quantity demanded and price refer to the same point or period of time.

Generally, the economists are interested in the equilibrium values of the variables which are

attained as a result of the adjustment of the given variables to each other. That is why economic theory has sometimes been called equilibrium analysis. Till recently, the whole price theory in which we explain the determination of equilibrium prices of the products and factors in different market categories were mainly static analysis. The values of the various variables such as demand, supply, and price were taken to be relating to the same point or period of time.

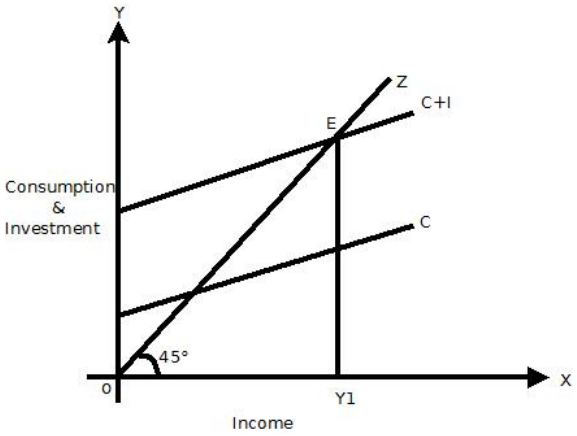
Macro-Static:

The concept of **Macro-Static** explains the static equilibrium position of the economy. This concept is best explained by Prof. Kurihara in these words: "If the object is to show a still picture of the economy as a whole, the macro-static method is the appropriate technique.. This technique is one of investigating the relations between macro-variables in final position of equilibrium without reference to the process of adjustment implicit in that final position". Such a final position of equilibrium may be shown by the equation Y = C + I

Where, Y = Total Income

C = Total consumption expenditure

I = Total Investment expenditure



In a static Keynesian model, the level of equilibrium is determined by the interaction of aggregate supply function and the aggregate demand function. In diagram OZ shows aggregate supply function and C + I line represents aggregate demand function. The line OZ and C + I intersect at point E, which determines equilibrium level of income at OY_1. It simply shows a timeless identity equation without any adjusting mechanism.

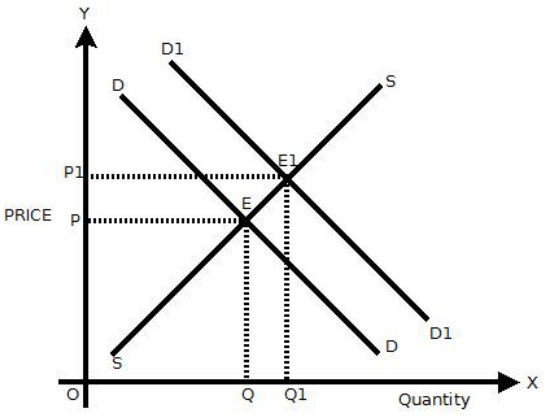
Comparative Static:

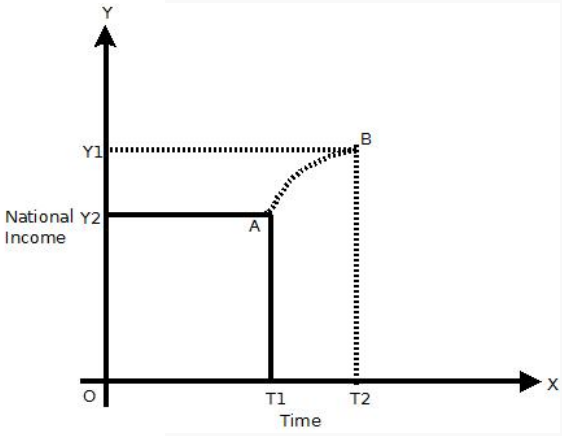
A **Comparative Static** analysis compares one equilibrium position with another when data have changed and system has finally reached another equilibrium position. It does not show how the system has reached the final equilibrium position with a change in data. It merely explains and compares the initial equilibrium position with the final one reached after the system has adjusted to a change in data.

Thus, in comparative static analysis, equilibrium positions corresponding to different sets of data are compared.

Let us see few examples of comparative static analyses.

Consider our previous example of static analysis of demand and supply which determine the equilibrium quantity and price. We can thus think of an analysis in which we start with a system in equilibrium. We now introduce a change and study the ultimate effect of a change. This can be explained with the following diagram





The original equilibrium between DD the demand curve and SS the supply curve is at E_1. When

demand increases to D_1D_1, 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 concerned only with explaining the new equilibrium position at point E_2 and comparing it with E_1. We are not concerned with the whole path the system has travelled from E_1 to E_2. Alfred Marshall has made extensive use of comparative static in his time-period analysis of pricing under perfect competition.

Although the dynamic analysis of the two equilibrium positions with different sets of data is more comprehensive and informative.

Limitations of Comparative Statics Analysis

- It fails to predict the path which the market follows when moving from one equilibrium position to another.
- It cannot predict whether or not a given equilibrium position will ever be achieved. For this purpose we need dynamic analysis.

Dynamic Equilibrium

When after a fixed period the equilibrium state is disturbed it is called dynamic equilibrium.

In dynamic equilibrium prices, quantities, incomes, tastes, technology etc are constantly changing.

For e.g. suppose some more persons develop the taste for fish, s a result the demand for fish will increase seller will at once raise the price and thus change the behavior of the old buyers. The market will be thrown into a state of disequilibrium and will remain so till the supply of fish is increased to the level of the new demand. When new equilibrium will be brought in by the forces contenting forces.

The word dynamic 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 sequence of events for the knowledge to be born. The main purpose is to know as to how complex of current events will shape itself I the future. To do so it is necessary to visualize the way it has itself arisen out of the past events. The moment we talk of sequence of events, the elements of time creeps into our analysis. Economics is thus a process of change through time.

Dynamic equilibrium is of two types

1. **Micro Dynamic equilibrium**
2. **Macro Dynamic equilibrium**

Micro-Dynamics (cobweb)

It is used to explain the dynamics of demand, supply and price over long period of time. The cob-web model (or Theorem) analyses the movements of prices and outputs when supply is wholly determined by prices in the previous period.

As prices moves up and down in cycles, quantities produced and also seem to move up and down in a counter-cyclical manner (e.g. prices of perishable commodities like vegetables).

In order to find out the conditions for converging, diverging or constant cycles: one has to look at the slope of the demand curve and then of the supply curve.

Assumption

1. The cob-web Model is based on the following assumption:
2. The current year's (t) supply depends on the last year's ($_{t-1}$) decisions regarding output level.
3. Hence current output is influenced by last year's price. i.e. P ($_{t-1}$)
4. The current period or year is divided into sub-periods of a week or fortnight.
5. The parameters determining the supply function have constant values over a series of periods.
6. Current demand (Dt) for the commodity is a function of current price (Pt).
7. The price expected to rule I the current period is the actual price in the last year.
8. The commodity under consideration is perishable and can be stored only for one year.
9. Both supply and demand function are linear .i.e. both are straight line curves which increases or decreases at a constant proportion.

The Cob-web Model

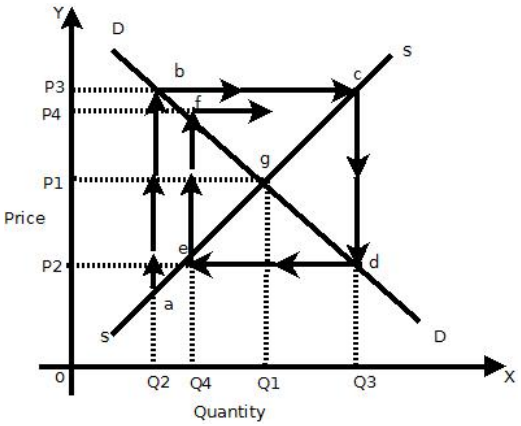
There are two types of Cob-web Models:

1. **Convergent**
2. **Divergent**
3. **Continuous**

(1) Convergent Cob-web

Under this model the supply is a function of previous year i.e. S= f ($_{t-1}$) ('t' is the current period and'$_{t-1}$' is a previous period) and on the other hand the demand is the function of price i.e. D_t=f (P). The equality between the quantity supplied and quantity demand is called as Market equilibrium.i.e. S_t=D_t. Equilibrium can be established only through a series of adjustment if current supply is in response to the price during the last year. But this adjustment will take place over a several consecutive periods.

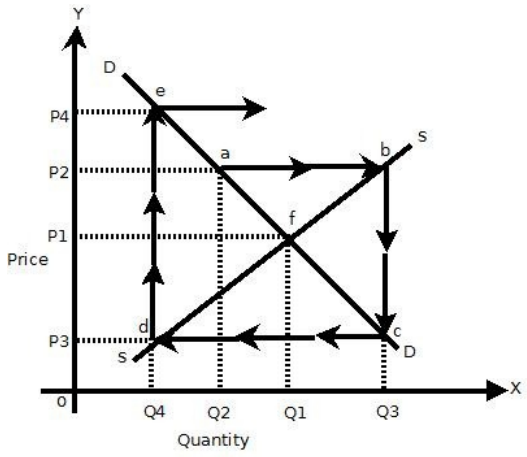
For e.g. suppose we take the example of onion growers who is producing one crop in a year. The onion growers will grow this year on the assumption that the price of onions this year will be equal to price in the last year. The market demand and supply curves for onions are represented by DD and SS curves respectively in diagram.



Suppose the price in the last year was OP_1 and Producers decide the equilibrium output OQ_1 this year. Now suppose there is crop failure due to natural calamities which decrease the output OQ_2 which is less than OQ_1 (i.e. equilibrium output). Lack of supply will increase the price to OP_2 in the current period. In the next period, the onion growers will produce OQ_3 quantity in response to the higher price OP_2.But this is more than the equilibrium quantity OQ1 which is the actual need of the market. The excess supply will lower the price to OP_3. This will encourage the producer to change the producer plan, where they will reduce the supply to OQ4 in the third period. But this quantity is less than the equilibrium quantity OQ_1. This will lead to again rise in price to OP_4, which in turn will encourage the producers to produceOQ_1 quantity. The equilibrium will be established at point g where DD and SS curves intersect. This series of adjustments from point a,b,c,d,and e to f is traced out as a cobweb pattern which converge towards the point of market equilibrium g. This is also called as the dynamic equilibrium with lagged adjustment.

(2) Divergent Cob-Web

The divergent cob-web is unstable cobweb when price and quantity changes move away from the equilibrium posting. This can be explained with the help of following diagram,

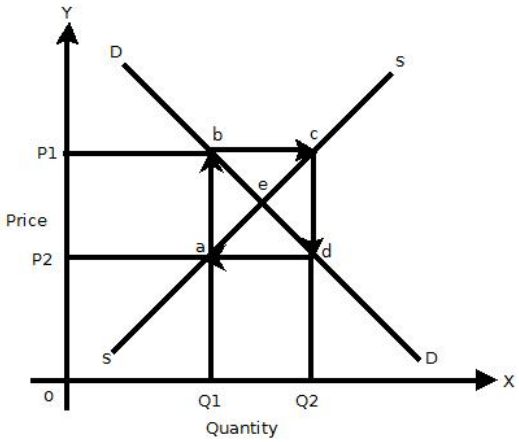


We will start with the initial equilibrium price is OP_1 and equilibrium quantity OQ_1. Now suppose there is a temporary disturbance that causes output to fall to OQ_2. Due to lack of supply the price will rise to OP_2.

The increase in price will in turn raise the output to OQ_3 which is more than the equilibrium output OQ_1. The increase in supply will lead to fall in price to OP_3. This fall in price will increase the demand and there will be excess demandOQ_2 than supply. The excess demand will shoot up the price to OP_4. This shows that the price will be still away from the equilibrium after the adjustment by the producers. This is called as Divergent cob-web.

(3) Continuous cob-web

The cob-web models in this show the continuous changes in price and quantities.



Suppose we start with the price OP_1 as shown in the diagram. As the supply will be more due to high price in the market. On the other hand the demand will be less as compared to the supply OQ_2 and the demand will reduced to OQ2. The fall in demand will force the producer to decrease price to OP_2 in next period. But at this price OP_2 the demand will be OQ_2 which is more than the supply OQ1 which reduced. This way the prices and quantities will circulate constantly around the equilibrium.

Macro-Dynamics (cobweb)

According to Kurihara," 'Macro-Dynamics' treats discrete movements or rates of change of macro-variables. It can be explained in terms of the Keynesian process of income propagation (the investment multiplier) where consumption depends on income i.e. $C = f(Y_{t-1})$

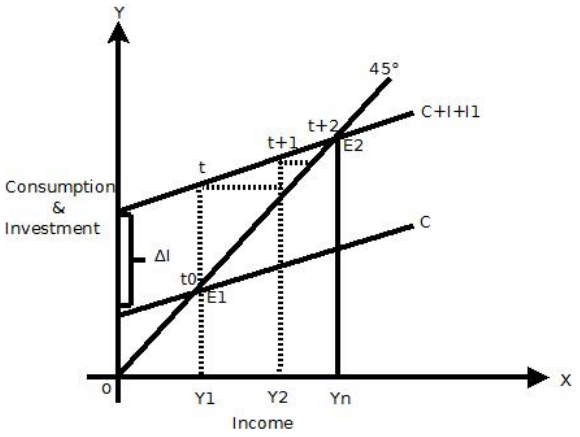
Where

C = Consumption

Y = Income

f = function

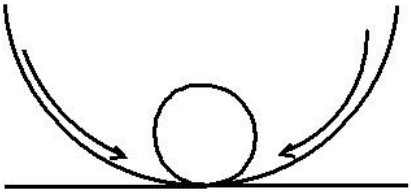
The function shows that the consumption in the current period (t) depends on the Y in the previous period ($_{t-1}$). On the other hand investment is a function of time and of constant autonomous investment ΔI (Autonomous investment is the investment which does not changes due to changes in income.i.e. changes in investment does not take place due to change in income).For e.g. government does the investment for welfare of the people and not for profit expectation. So investment function can be written as $It = f(\Delta I)$. This can be explained with the following diagram.



The above diagram shows that C is the aggregate demand function and 45^0 degree line is the aggregate supply function. Suppose we start with the time period t_0 where with an equilibrium level of income OY_1, investment increased from I_0 to I_1, this can be seen by the new aggregate demand function line $C + I + I_1$.But in period t, consumption lags behind and it is still on the equilibrium point E_1. In next period $_{t+1}$ consumption increased with the increase in investment, which lead to increase in income from OY_1 to OY_2. This is the process of income prorogation which will continue till the aggregate demand function $C + I + I_1$ intersects the aggregate function 45^0 line at point E_2 in the nth period. The new equilibrium level of income is at OY_n. The curved steps from t_0 to E_2 show the macro-dynamic equilibrium path.

(1) Stable Equilibrium

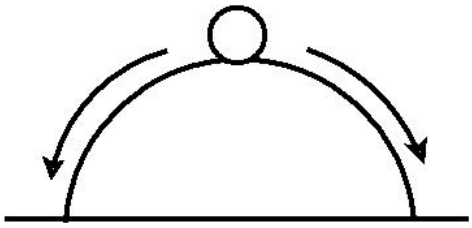
Equilibrium is said to be stable when the economy is disturbed on which it depends and again resume to its original position that is the disturbance in the equilibrium is self adjusting so that the original equilibrium is restored. This stable equilibrium can be seen with the diagram. In words of Marshall "When the demand price is equal to the supply price, the amount produced has no tendency either to be increased or to be diminished, it is an equilibrium. Such equilibrium is stable: that is, the price, if displaced a little from it, will tend to return, as a pendulum oscillates about its lowest point. Another famous simile is that of a bowl and a bowl given by Schumpeter. A bowl that rest in a bowl is in stable equilibrium because if disturbed it will eventually come to the rest in its initial position after moving back and forth.



(2) Unstable Equilibrium

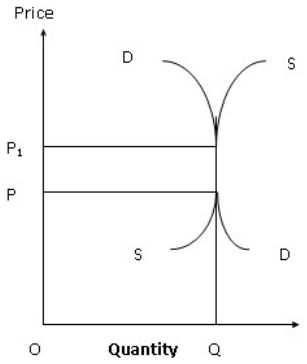
In case of unstable equilibrium the disturbance in the economy will lead or exaggerate the further disturbances will never to its original position.In Pigou's words, "If the small disturbance calls out further disturbing forces which act in a cumulative manner to drive the system from its initial postion," it is in unstable equilibrium. "As an egg if balanced on one of its ends would at the smallest shake fall down, and lie length ways, "as pointed out by Marshall. If the bowl is inverted and the ball is perched on its top, it will be in unstable equilibrium. For once the ball is pushed; it falls off the top of the bowl to the ground and does not return to its original position, as shown in figure.

Another type of equilibrium generally referred to is neutral equilibrium.According to Prof. Pigou, "An egg lying on its side is in neutral equilibrium." The static neutral equilibrium condition is illustrated in fig. and the dynamic in figure. In fig E is the initial equilibrium point where OQ quantity is demanded and supplied at OP price. With the rise in the price to OP1, E1 becomes the new equilibrium point but the quantity demanded and supplied remains the same, i.e. OQ. Thus, the price range PP1 (=EE1) represents neutral equilibrium.Neutral equilibrium is 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.



(3) Neutral Equilibrium

Neutral equilibrium is 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. When an initial equilibrium position is disturbed, the forces of disturbance bring it to the new position of equilibrium where the system has come to rest. A ball on the billiard table if disturbed will come to rest at the new position to which it has moved. According to Prof. Pigou, "An egg lying on its side is in neutral equilibrium." The static neutral equilibrium condition is illustrated in figure.



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Partial Equilibrium

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 unit corresponding to a particular set of data.Partial or particular equilibrium analysis, also known as micro economic analysis, is the study of the equilibrium position of an individual, a firm, an industry or a group of industries viewed in isolation. In other words, this method considers the changes in one or two variables keeping all others constant, i.e., ceteris paribus (others remaining the same). The ceteris paribus is the crux of partial equilibrium analysis.For Example

(a) Consumer's Equilibrium: 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.

The conditions are: 1) the marginal utility of each good is equal to its price (P), i.e.

$$\frac{MU_A}{P_A}=\frac{MU_B}{P_B}=\ldots\ldots=\frac{MU_N}{P_N};$$

And (2) the consumer must spend his entire income (Y) on the purchase of goods, i.e.

$$Y=P_AQ_A+P_BQ_B+\ldots\ldots\ldots+P_NQ_N.$$

It is assumed that his tastes, preferences, money income and the prices of the goods he wants to buy are given and constant.

(b) Producer's Equilibrium: A producer is in equilibrium when he is able to maximise his aggregate net profit in the economic conditions in which he is working.

(c) Firm's Equilibrium: A firm is said to be in long-run equilibrium when it has attained the optimum size when is ideal from the viewpoint of profit and utilization of resources at its disposal.

(c) Industry's Equilibrium: 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.

*Assumptions

1. Commodity price is given and constant for the consumers.
2. Consumer's taste and preferences, habits, incomes are also considered to be constant.
3. Prices of prolific resources of a commodity and that of other related goods (substitute or complimentary) are known as well as constant.
4. Industry is easily availed with factors of production at a known and constant price compliant with the methods of production in use.
5. Prices of the products that the factor of production helps in producing and the price and quantity of other factors are known and constant.
6. There is perfect mobility of factors of production between occupation and places.

General Equilibrium

Leon Walras (1834-1910), a Neoclassical economist, in his book 'Elements of Pure Economics', created his theoretical and mathematical model of General Equilibrium as a means of integrating both the effects of demand and supply side forces in the whole economy.Elements of Pure Economics provides a succession of models, each taking into account more aspects of a real economy.General equilibrium theory is a branch of theoretical microeconomics.The partial equilibrium analysis studies the relationship between only selected few variables, keeping others unchanged.Whereas the general equilibrium analysis enables us to study the behaviour of economic variables taking full account of the interaction between those variables and the rest of the economy.In partial equilibrium analysis, the determination of the price of a good is simplified by just looking at the price of one good, and assuming that the prices of all other goods remain constant. Thus the economy is in general equilibrium when commodity prices make each demand equal to its supply and factor prices make the demand for each factor equal to its supply so that all product markets and factor markets are simultaneously in equilibrium.Such a general equilibrium is characterized by two conditions in which the set of prices in all product and factor markets is such that

1) All consumers maximize their satisfactions and all producers maximize their profits and

2) All markets are cleared which means that the total amount demanded equals the total amount supplied at a positive price in both the product and factor markets.

To explain it, we begin with a simple hypothetical economy where there are only two sectors, the household and the business. The economic activity takes the form of flow of goods and services between these two sectors and monetary flow between them. These two flows, called real and monetary are shown in figure.

Activity

TRY OUT THIS QUIZ

[Activity]

Key Terms

Economic equilibrium, stable equilibrium, unstable equilibrium, partial equilibrium, general equilibrium

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Basic Tools in Economic Analysis

BASIC TOOLS OF ECONOMIC ANALYSIS

Introduction

Economic theories are formulated to explain different phenomenon. They try to explain the relationship between two or more variables. While formulating theories a number of tools are used by experts in this field. The tools of economic analysis are found in the realm of Mathematics. Mathematics is being profusely used in modern economic analysis. Mathematics is regarded as the **second language** for the students of economics. Geometry is being increasingly resorted to in order to provide pictorial presentation of economic behavior. Diagrams and Graphs provide visual impact and help to grasp and learn economics with interest and ease. A Chinese proverb says “A picture is worth a thousand words”.

Modern economists have turned to Calculus, Matrix, Algebra and Derivatives to use them as fundamental tools to express complicated aspects of economic theories and models more precisely and accurately. All these applications of mathematics are significant as a tools and techniques to impart conciseness, precision and rigour to economic analysis.

In brief, get acquainted with the terms such as Variables, Ceteris Paribus, Functions, Equations, Identities, Graphs and Diagrams, Lines and Curves, Slopes, Limits and Derivatives, Time Series and so on. These are the basic tools of economic analysis.

Learning Objectives

After reading this chapter, you are expected to be able to:

Concepts

VARIABLES

Variables play an important role in economic theories and models. A variable is a magnitude of interest can be defined and measured. In other words a variable is something whose magnitude can change. It assumes different values at different times or places. Variables that are used in economics are income, expenditure, saving, interest, profit, investment, consumption, imports, exports, cost and so on. It is represented by a symbol.

Variables can be endogenous and exogenous. An endogenous variable is a variable that is explained within a theory. An exogenous variable influences endogenous variables, but the exogenous variable itself is determined by factors outside the theory.

CETERIS PARIBUS

Ceteris paribus is a Latin phrase meanings, “all other things remaining the same” or all relevant factors being equal. In Economics the term “Ceteris Paribus” is used quite often to assume all other factors to remain the same, while analyzing the relationship between any two variables.

Ceteris Paribus is an assumption which we are compelled to make due to complexities in the reality. It is necessary for the sake of convenience. The limitations of human intelligence and capacity compel us to make this assumption. Besides, without the assumption we cannot reach on economic relations, sequences and conclusions. In fact, there are large number of variables interacting simultaneously at a given time. If our analysis has to be accurate we may have to examine two variables at a time which makes it inevitable to assume other variables to remain unchanged.

For instance, if we try to establish the relationship between demand and price, there may be other variables which may also influence demand besides price. The influence of other factors may invalidate the hypothesis that quantity demanded of a commodity is inversely related to its price. If rise in price takes place along with an increasing in income or a change technology, then the effect of price change may not be the same. However, we try to eliminate the interrupting influences of other variables by assuming them to remain unchanged.

The assumption of *Ceteris Paribus* thus eliminates the influence of other factors which may get in the way of establishing a scientific statement regarding the behavior of economic variables.

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FUNCTION

A '***function'*** explains the relationship between two or more economic variables. A simple technical term is used to analyze and symbolizes a relationship between variables. It is called a function. It indicates how the value of dependent variable depends on the value of independent or other variables. It also explains how the value of one variable can be found by specifying the value of other variable.

For instance, economist generally links demand for good depends upon its price. It is expressed as **D = *f* (P)**. Where D = Demand, P = Price and *f* = Functional relationship.

Functions are classifieds into two type namely explicit function and implicit function. Explicit function is one in which the value of one variable depends on the other in a definite form. For instance, the relationships between demand and price Implicit function is one in which the variables are interdependent.

EQUATIONS

Economic theory is a verbal expression of the functional relationships between economic variables. When the verbal expressions are transformed into algebraic form we get Equations. The term equation is a statement of equality of two expressions or variables. The two expressions of an equation are called the sides of the equation. Equations are used to calculate the value of an unknown variable. An equation specifies the relationship between the dependent and independent variables. Each equation is a concise statement of a particular relation.

For example, the functional relationship between consumption (C) and income (Y) can take different forms.The most simple equation; C = a (Y) states that consumption (C) is related to income (Y). It says nothing about the form that this relation takes.

Here ‘a’ is constant and it has a value greater than zero but less than one (0<a<1). Thus the equation shows that C is a constant proportion of income. For instance, if ‘a’ is 1/2then the consumer would always spend 50% of the income on consumption. The equation shows that if income is zero, consumption will also be zero.

C = a + b Y is yet another form of consumption function. Here value of a is positive and b is 0<b<1.

IDENTITIES

An identity explains an equilibrium condition or a definitional condition. A definitional identity explains that two alternative expressions have exactly the same meaning. For example, total profit is defined as the excess of total revenue over total cost, and we can denote as:

$\pi \equiv$ TR - TC

Where π is total profit, TR is total revenue and TC is total cost.

Similarly, saving is defined as the difference between income and consumption expenditure and we can say;

$S \equiv Y - C$

You are required to note that an identity is denoted by a three - bar sign (≡).

The distinction between an identity and an equation is very subtle and important. An identity is a relation that is true for all values of the variables; no values can be found that will contradict it. For instance, $(x + y)^2 = x^2 + 2xy + y^2$ is an expression which is true for any numerical value of x and y. Identities are statements that are compatible with any state of the universe. In case of National Income accounting we have an important identity between National Income (Y) ≡ National Output (O) ≡ National Expenditur (E)

Hence; **$Y \equiv O \equiv E$**

Identities are mere “truisms”, they cannot form the basis of any theory.

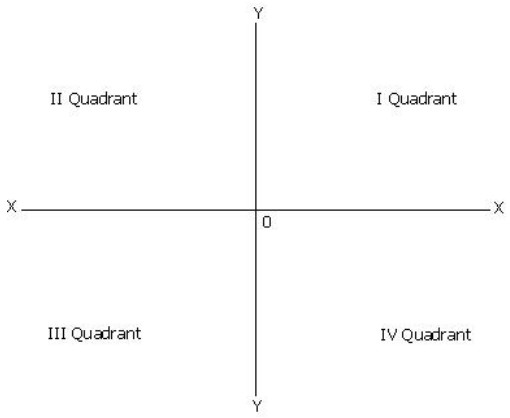
GRAPHS AND DIAGRAMS

A graph or a diagram presents the relationship between two or more sets of data or variables that are related to one another. Graph is most commonly used tool in modern economics. Graph depicts the functional relationship between two or more economic variables. The use of graph provides a better understanding of the economic generalizations. Graph presents a visual picture of an abstract idea. Also it is useful for accuracy and precision.

Graph can be drawn only two dimensional figures on a plain paper. It represents the values of only two variables at a time. The common method of constructing a graph or a diagram is described below:

A graph has a horizontal line termed as X axis and a vertical line termed as Y axis. The point of intersection between X and Y axis is termed as 'origin' point.

The surface is divided into four parts, each part is called a quadrant. The four quadrants are numbered in anticlockwise direction as depicts in following diagram.

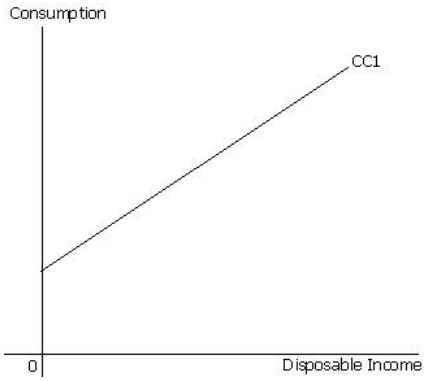


The first quadrant depicts the positive values of both X and Y. It is called positive quadrant. Generally, economic theories are deals with the positive quadrants.

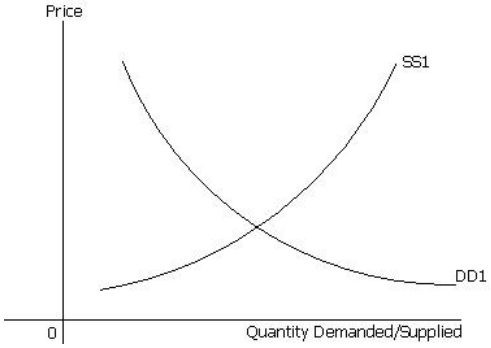
At times the terms “Graph” and “Diagram” are used interchangeably. Diagrams, like graphs, are pictorial presentations. Diagrams may be in the form of figures *such* as explaining the circular flow of national income. Graphs are quite meticulous whereas diagrams can be based on abstraction. For instance, Pie diagram is a best example of a diagram that indicates through slicing the percentage- wise composition of a phenomenon, such as how much percentage of national income is generated from which sector of the economy.

LINES AND CURVES

The functional relationship between the variables may be linear or non-linear. A **line** or a **curve** is nothing but the locus of various points. A line depicts the relationship between the variables. For example, the relationship between consumption and income as shown in the following diadram:



Line CC_1 is a straight line and has a positive slope. It depicts that aggregate consumption is positively related to aggregate disposable income. It explains that, an increase in disposable income will promote to an increase in consumption. Many economists try to set up the relationship between economic variables in different ways. One of the most popular and easy method is through curves. A non linear function of graph is depicted in terms of curve. Let us consider the following curves.

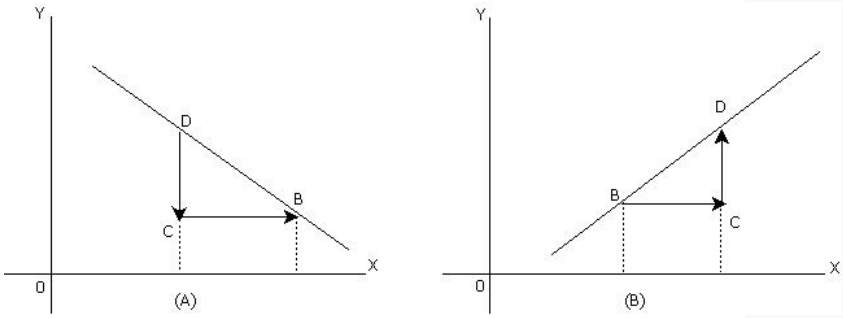


In the following diagram,DD_1 is a smooth downward sloping non linear demand curve. It explains the relationship between quantity demanded of good X at various prices. Moreover, SS_1 is an upward sloping supply curve. It is also a non-linear curve and shows relarionship between quantity supplied of good X at various prices.

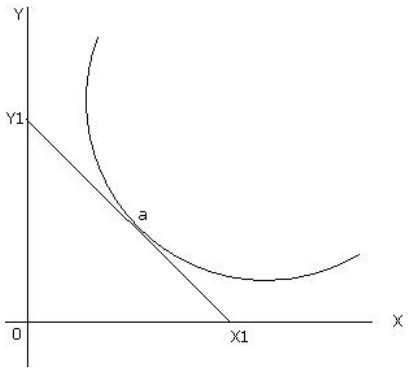
SLOPE

Slope is an important term in modern economic analysis. Slope is defined as the amount of change in the variable measured on the vertical or Y axis per unit change in the variable measured on the horizontal or X axis. It is expressed as $\Delta Y/\Delta X$, where delta (Δ) stands for a change in the variable. The slope of a curve is an exact numerical measure of the relationship between the change in the variable Y to change the variable X.

Slope is also popularly termed as 'the rise over the run'. Here rise is the vertical distance while run is the horizontal distance. The measurement of slope can be shown as follows:



In both the diagrams (A) and (B) slope = vertical distance/horizontal distance. i. e. CD / BC. However, in diagram (A), slope is negative as the relationship between X and Y is inverse. Here units of Y decrease with increase in the units of X. In Diagram (B) the curve is slopping upwards, indicating a positive relationship between X and Y. Here units of Y increase with increase in the units of X. If the curve is non-linear, then a tangent is drawn at the given point and then slope is measured as the vertical distance/horizontal distance. This is shown in the following diagram with a non-linear curve. We measure slope at point 'a' by drawing a tangent at point 'a'. Y_1X_1 is the tangent drawn at point 'a'. Slope of the curve at point 'a' is given as $0Y_1/0X_1$



The main properties of slope are: i) It can be numerically measured. ii) In a straight line, the slope is constant one. iii) The nature of the relationship between two variables can be indicated with the help of slope. If the slope is negative then it indicates inverse relationship between the two variables and if the slope is positive, it indicates direct relationship. Slope is not the same as steepness. The scale of the graph determines steepness, while the slope indicates the change in one variable due to a change in other variable.

A curve or anon –linear line is whose slope changes. Sometimes it is necessary to indicate the slope of a line at a given point. The slope of a curved line at a point is given by the slope of the straight line which is tangent to the curve at the given point.

Diagram

In the above diagram, the slope of the tangent at point B can be measured by, first drawing the line FBJ tangent to the curve at point B. Then the slope of the line which is tangent is measured as

NJ / MN. Similarly, the tangent line GDH gives us the slope of the line at point D of AE curve.

PRODUCTION POSSIBILITY FRONTIER:

The concept of Production Possibility Curve (PPC) is developed by the famous economist Prof. Samuelson. It deals with the basic tool and core subject matter of modern economics particularly scarcity, choice and efficiency of resources.

Production Possibility Curve is a graphic presentation of alternative production possibilities facing an economy. As the total productive resources of the economy are limited, the economy has to choose between different goods. The productive resources can be employed for the production of various alternative goods. It has to be decided which goods are to be produced more and which one less. In deciding what amount of different goods are to be produced, the society would in fact be deciding about the allocation of resources among different possible goods. How much labour should go into raising wheat on the farms and how much should be employed in the manufacturing cloth. How many factories would produce armaments for the army and how many should produce consumer goods for civilians. We assume fixed resources, full employment, complete technical efficiency and a given technology.

Production Possibility Curve can be illustrated by an example. Let us suppose an economy has certain amount of resources which can be used for producing two goods namely mo Technological progress by improving bils and clothes. If all the resources used for producing mobiles then production of clothes is impossible and vice versa. The economy is supposed to produce a combination of both the goods. The various production possibilities of both the goods can be depicted through a table and a diagram.

Possibilities	Clothes (Thousands Meters.)	Mobiles
A	O	20
B	1	19
C	2	17
D	3	14
E	4	10
F	5	00

With the above possibilities, if all resources are used for the production of Mobiles, then production of clothes will be zero. On the other hand if the resources are entirely used for production of clothes then production of mobiles will be zero. In between these two extremes, there are a number of other possibilities. When the production of clothes is increased the production of mobiles will come down and vice versa. The production possibilities can be shows with the help of below diagram.

Diagram

In the above diagram, PP1 is the production possibility curve. It explains the schedule along with the two goods can be substituted for each other. If all the resources are used for the production of clothes, production of mobiles will be zero and vice versa. Points B,C, D and E represents the combinations of both the goods. If combination B is selected more of mobiles and less of clothes will be produced. On the other hand, combination of E signifies production of more clothes and less of mobiles. PPC shows the maximum amount of the two goods that can be produced given the inputs and technology.

The PPC has two properties: (a) PPC slopes downwards from left to right and (b) It is concave to the Origin point.PPC helps to find out solutions for basic problems such as- what to produce, how to produce, whom to distribute, how to achieve optimum utilization of resources, etc..

The problem of scarcity and concept of Opportunity cost are well brought out by production curve. PPF also indicates the level of efficiency attained by an economy in resource utilization. Moreover, the stage of development of the economy is also indicated by PPC.

Economic Growth and Shift in the Production Possibility Curve:

It is important to understand, if the productive resources expand or increase the PPC will shift outward and to the right showing that more of both goods can be produced than before. Further, when the economy makes progress in technology, that is, when the scientists discover new and innovative ways of doing things, the PPC will shift to the right and will indicate the possibility of producing more of both the goods such as from P-P1 to P2- P3 in the below diagram. The following diagram depicts the shift in the process of development.

Technological progress by improving productive efficiency allows the society to produce more of both the goods with the given and fixed amount of resources. This will mean full utilization of available labour and capital resources, the level of national income, output and employment will rise and the existing unemployment and under utilization of productive capacity will be removed. These measures aimed at generating economic growth will involve stepping up of the rate of capital accumulation and making progress in technology.

SCATTER DIAGRAM:

It is in the form of a chart indicating the relationship between two variables. One variable is represented on the X axis and the other on the Y axis. One dot on the graph will represent the value of both the variables. The relation between the two variables is indicated by the way the dots lies in the scatter diagram. Correlation between the two variables is indicated by either an upward or downward movement. If it is not possible to trace any trend in the diagram, then the variable do not have any correlation chart. Scatter diagrams can shows in the following different shapes:

Diagram

DERIVATIVES AND LIMITS:

The term derivative can be understood by looking into the function Y = f(x). In this case the value of 'y' also depends on the changes in the value of x. In such a case we can find the rate of change in y in response to change in x.

The derivative explains the rate of change in y when Δx is very small. If units in which x and y , are given or known, the derivative can be expressed as so many units of y per units of x. The derivatives is itself is a function of x. In other words, for ach value of x, there is unique corresponding value for the derivatives function. The derivative of a function gives rate of change of f (x) at x. If it is positive the function is increasing at x and if it is negative, the function is

decreasing at x.

One of the major problems calculus deals with is ‘to find the slope of the tangent line at a point on a curve’.

Given a simple function consider, a fn f(x) and any two points P (x1y1) and Q (x2 y2) on it.

The slope of the chord PQ is obtained by ΔyΔx. As q move closer and closer to point P, the curve reduces itself to a straight line which just touches f (x) only at a point and passes off. This is the geometrical tangent to f(x) at P, and the slope of this tangent is called the derivative. However, derivative is the slope of the tangent at a point on the curve. Therefore we have to take

limx→0ΔyΔx

If the limit of the incremental ratio at x, given by:

limh→0f(x=h-(x)exists, it is called the derivatives of f(x) at x.

Diagram

.

Conclusion

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1. Lipsey and Steiner: Economics,
2. Lipsey: An Introduction to Positive Economics,
3. Samuelson Paul: Economics,
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Introduction to Demand Theory

(Redirected from Consumer Behaviour)

University of Mumbai

MICROECONOMICS

Demand Analysis

Introduction

What is demand in economics?

People demand goods and services in an economy to satisfy their wants. All goods and services have wants satisfying capacity which is known as “UTILITY” in economics. Utility is highly subjective concept; it is different from person to person. Utility (level of satisfaction) is measured by means of introspection. By demand for goods and services economists essentially mean is willingness as well as ability of the consumer in procuring and consuming the goods and services. Thus, demand for a commodity or service is dependent upon (a) its utility to satisfy want or desire (b) capability of the prospective consumer to pay for the good or service. In nutshell therefore we can state that -

When desire is backed by willingness and ability to pay for a good ot service then it becomes Demand for the good or service

Conceptually, demand is nothing but consumer’s readiness to satisfy desire by paying for goods or services. A desire accompanied by ability and willingness to pay makes a real or effective demand.

Learning Objectives

After reading this chapter, you are expected to be able to:

- Understand the Concept of Demand
- Understand the Factors impacting Demand
- Understand the relationship between Demand and Price
- Understand the relationship between demand and other factors like Income of a consumer, Price of related goods, Advertisement, Change in Population etc

Significance of the concept of demand

Demand is one of the most important decision making variables in present globalised, liberlised and privatized economy. Under such type of an economy consumers and producers have wide choice. There is full freedom to both that is buyers and sellers in the market. Therefore Demand reflects the size and pattern of the market. The future of a producer is depends upon the well

analysed consumer's demand. Even the firm dose not want to make profit as such but want to devote for 'customer services' or 'social responsibilities'. That is also not possible without evaluating the consumer's tastes, preferences, choice etc. All these things are directly built into the economic concept of demand.

The survival and the growth of any business enterprise depends upon the proper analysis of demand for its product in the market. Demand analysis has profound significance to management for day today functioning and expansion of the business. Thus the short term and long term decisions of the management are depend upon the trends in demand for the product. Any rise or fall in demand for the product has to be to find out reasons and revised production plans, technology or change in advertisement, packging, quality etc.

The market system works in an orderly manner because it is governed by certain certain Fundamental Laws of Market known as Law of Demand and Supply The demand and supply forces determine the price of goods and services in the market. The laws of demand and supply plays very important role in economic analysis .Thomas Carlyle, the famous 19th century historian remarked "It is easy to make parrot learned in economics; teach a parrot to say demand and supply" The most important function of microeconomics is to explain the laws of demand and supply, market mechanism and working of the price system. Here we will discuss the concept of demand and demand analysis.

Law of Demand

Law of demand states that whenever price of a product increases then the demand for that product decreases and vice versa provided other things remain constant. Here these other things are Income of the individual, Price of related goods, Tastes and preferences, Population, Advertisement etc. While studying the law of demand the direct relationship between price and demand is studied. This is because under the economic theory price of a product is considered as the main determinant of demand in the short run period.

Understanding Demand Function

Demand Function

As per the law of demand, demand is function of price provided other things remain constant

Dx = f (Px) Dx is demand for commodity X, which is dependent variable, and Px is the price of X, which is independent variable. The demand function if consideredv as linear or straight line function can be expressed in the form of following equation:

Dx = a + bPx

Where a and b are constants. 'a' is intercept and 'b' quantifies the relationship between Dx and Px. The demand price relationship can be both linear and non-linear. The relation ship between demand and the price can also be expressed as follows:

$\Delta Px \rightarrow \Delta Qdx$

$\uparrow Px \rightarrow \downarrow Qdx$

$\downarrow Px \rightarrow \uparrow Qdx$

Here Qdx indicates the change in the quantity of demand if the price changes and as per the law of demand an inverse or opposite relationship between price and quantity demanded of a commodity is assumed.In simple words, if the price of a product is high then its demand will be low and vice versa. This relationship is also exhibited in the digrammatic representation of the demand curve. To state more clearly, if we are digrammatically representing demand by taking demand on the X axis and the price of the product on the Y axis then we always get a demand curve sloping downwards from the left to right indicating the price demand relationship as expressed by the law of demand.

Understanding Demand Schedule

Demand Schedule

A demand schedule is the a tabular presentation of the different levels of prices at corresponding levels of quantity demanded of that commodity. It shows at different levels of prices higher or lower how the quantity demanded is different. This shows the relation ship between price and quantity demanded of a commodity i. e. law of demand.

Demand Schedule of Note Books

Price per Notebook (Px)	Quantity of Notebooks Demanded (Dx)
25	2
20	4
15	8
10	10
8	12

Demand Curve

Demand Curve

Demand curve is the graphical representation of the demand schedule. Demand curve is obtained by plotting a demand schedule on a graph. As discussed earlier, demand curve slopes downward from left to right. It has a negative slope. It shows there is inverse relationship between price and quantity demanded of a commodity.

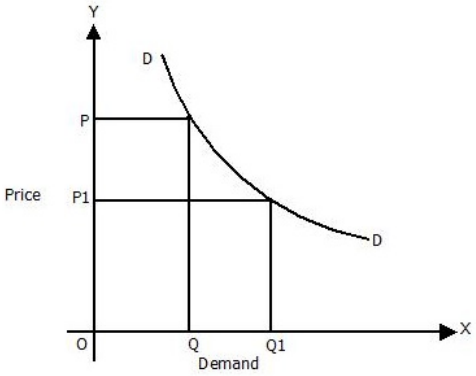
Again, as discussed earlier, Demand curve can be both Linear or Non-linear - If the Demand Curve is Non-linear then the eaquation of Demand is as follows:

Dx = aPx -b

If Demand Curve is Linear, then the equation of Demand curve is taken as follows:

Dx = a – bPx

The digrammatic representation of the Demand Curve can be as follows:



Understanding Variation of Demand

Variation in Demand

Expansion and Contraction of Demand

When demand changes due to change in price of that commodity then the phenomenon is known as variation or expansion or contraction in demand whereas when demand changes due to other factors, that is known as change in demand.

When we say the variation in demand takes place in the market for a particular product or service means this phenomenon occurs (that is rise or fall in demand) only because of change in its price.Here consumer remains on the same demand curve. He shifting up or down on the same demand curve as shown in dig. Therefore law of demand is concerned with the phenomenon that is VARIATION IN DEMAND which is accompanied by Rise and Fall in price, or known as expansion and contraction in demand.

Change in Demand

When we say the change in demand takes place in the market for a particular product or service means due change in its other factors like income, taste, preferences etc and not because of its price. Thus due to rise or fall in income of a consumer or change in preferences, taste etc there is rise or fall in demand for a commodity or services. Here quantity demanded of a commodity is more or less at same or higher or lower price. Here consumer shift on higher demand curve to the right or lower demand curve to the left. This phenomenon is known as Change in Demand which is accompanied by increase and decrease in demand.

Why the Demand Curve is Downward Sloping?

Why does the demand curve slope downward from Left to Right?

The reasons behind the law of demand and the shape of demand curve are following.

- Income Effect When price of a commodity falls, real income (i.e. purchasing power) of a consumer increases in terms of that commodity. So our rational will consume more of relatively cheaper. Such increase in demand due to increase in real income is called as income effect.
- Substitution Effect When price of commodity falls, its becomes relatively cheaper compare to its other close substitutes Rational consumer will definitely buy more units of relatively cheaper

good than relatively dearer whose price has remain same to maximize the satisfaction. On account of this factor is known as substitution effect.

- Diminishing Marginal Utility This also responsible for the for the increase in demand for a commodity when its price falls. When a person buys a commodity he exchanges his money income with the commodity in order to maximize his satisfaction. He continues to buy goods and services so long as marginal utility of money is less than marginal utility of commodity . (MUm < MUx)

Therefore general shape of demand curve is negatively sloping downward from left to right. It positively slopes upward from left to right in case of inferior , Giffen or complimentary goods.

Understanding About Other Determinants of Demand

Other Determinants of Demand

Along with price there are many other factors which also influence the demand for a commodity. They are prices of its close substitutes, income of consumer, wealth, size of population, fashion, taste of consumer etc.

Therefore new demand function for long run is :

Dx = f (Px, Py,_Pn, Y , W, A, F ,Zp, T, etc) Where: Dx = Demand for a commodity

Px = Price of a commodity

Py = Price of a Y good which is close substitute for X good

Pn = Prices of n number of close substitutes

Y = Income of a consumer and Engle curves

W = Wealth of a consumer

A = Advertisement and Publicity

F = Fashion or demonstration effect

Zp = Size and composition of population of population

T = Taste and Preferences of a consumer

Exp = Expected price and utility at equilibrium

Cr = Existing short- term credit facilities

And there can be many more similar factors that may impact demand. All the above factors play very important role in the determining demand for a commodity or service if all the above stated factors are taken as variable. Here, it is important to understand that Law of Demand assumes partial equilibrium which means that if other things remain constant then whenever the price of a commodity changes then the demand for that commodity changes in the opposite direction.

If on the other hand, general equilibrium analysis is used in explaining the demand then impact of some of these other factors can be explained as follows:

- Price of a commodity – As the price of commodity falls a commodity becomes cheaper in a market and rational consumer will try to demand more units of the same to maximize his satisfaction and vice- versa when price rises. Therefore rise in price fall in demand and fall in price rise in demand.
- Prices of Close substitute - Demand for a commodity is also depend upon the prices of its close substitutes. If price of close substitute falls then demand for that commodity also falls and vice-versa. Therefore demand is also depends upon the number and degree of close substitutes available in market and the range of price change.
- Income of a consumer - Consumer's income is the basic determinant of the quantity demanded of the product. Generally the people with higher disposable income spend a larger amount of income than those with the lower income. Income demand relationship is more varied nature than that between demand and its other determinants. To explain the varied relationship between income and demand we classify goods and services into four broad categories, viz.(a)essential consumer goods; (b) inferior goods; (c) normal goods; and (d)prestige good or luxury goods. This is shown through Engels law of family expenditure.

a) Essential Consumers goods b) Inferior goods c) Normal goods d) Prestige or Luxury Goods 4. Wealth of a consumer 5. Advertisement and Publicity 6. Fashion or Demonstration Effect 7. Size and Composition of Population

Types of Demand

TYPES OF DEMANDS

- Direct demand and Derived demand.
- Individual demand and Market demand.

Domestic and Industrial Demand Autonomous and Induced Demand New and Replacement Demand etc.

Activity

http://www.youtube.com/watch?v=b8Tx786AVsc

http://www.youtube.com/watch?v=ALUBpq_ww6s

http://www.youtube.com/watch?v=JWuHCaqDmck
http://www.youtube.com/watch?v=hqKOr6H_YFE&feature=related

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Let's Sum Up

Key Terms

Extension exercise

Enter your text here

References and Bibliography

Further Readings

Text in mooodle

Quiz in Moodle

Elasticity of Demand

University of Mumbai

CEMCA

MICROECONOMICS

Introduction

{{{2}}}

In the earlier discussion we were able to understand the relationship between demand and price. Recapitulating the discussion briefly, The Law of Demand states that “Other things remaining the same the demand for a commodity increases when its price falls and it decreases when its price increases".Thus according to the law of demand there is an inverse relationship between price and quantity demanded, other things remaining the same. These other things which are assumed to be constant are taste or preference of the consumer, income of the consumer, prices of related goods etc .If these factors undergo a change, then the inverse relationship may not hold good. However we also observe that for commodities like salt or rice we do not notice much of a change in demand whereas in case of goods like Air conditioners, Cars etc even with a small change there is substantial increase in demand. The Law of demand while stating the relationship between demand and price mentions only the direction of change in demand but does not mention anything about the magnitude of the change which is very essential in decision making process for the producer and Government.For example:

"If I lower the price of my product, will the sale increase?"

"If I raise the price, will it affect my profit?"

“If sales tax rate is increased will it have an effect on the revenue collection?"

are questions that need to be answered. This information as to how much or to what extent the quantity demanded of a good will change as a result of a change in its price is provided by the concept of Elasticity of Demand.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. To understand the nature of change and how it affects the decision taking.

2. How demand decisions in response to price changes vary for different types of goods?

Definition

Elasticity of Demand refers to the degree of responsiveness of quantity demanded to the changes in the determinants of demand .

There are mainly three quantifiable determinants of demand:-

1. Price of the Good

2. Income of the Consumer
3. Price of the Related Goods

Types of Elasticity Of Demand

As we have seen above there are three quantifiable determinants of demand,
Hence elasticity of demand can be of *three types*

1. **Price Elasticity of Demand**
2. **Income Elasticity of Demand**
3. **Cross Elasticity of Demand**

Price elasticity of Demand

Concept Of Elasticity of demand Alfred Marshall introduced the concept of elasticity in 1890 to measure the magnitude of percentage change in the quantity demanded of a commodity to a certain percentage change in its price or the income of the buyer or in the prices of related goods .In this section we look at the sensitivity of demand for a product to a change inthe product's own price.Since Price Elasticity of Demand is predominantly used in economic analysis it is alternatively referred to as Elasticity of Demand.

Definition

Price Elasticity of demand is the degree of responsiveness of demand to a change in its price.In technical terms it is the ratio of the percentage change in demand to the percentage change in price.
Thus,
Ep = Pecentage change in quantity demanded/Percentage change in price

In mathematical terms it can be represented as: $Ep = (\Delta q/\Delta p)\ (p/q)$

From the definition it follows that

1. when percentage change in quantity demanded is greater than the percentage change in price then, price elasticity will be greater than one and in this case demand is said to be elastic.
2. when percentage change in quantity demanded is less than the percentage change in price then, price elasticity will be less than one and in this case demand is said to be inelastic.
3. when percentage change in quantity demanded is equal to the percentage change in price then price elasticity will be equal to one and in this case demand is said to be unit elastic.

Numerical example

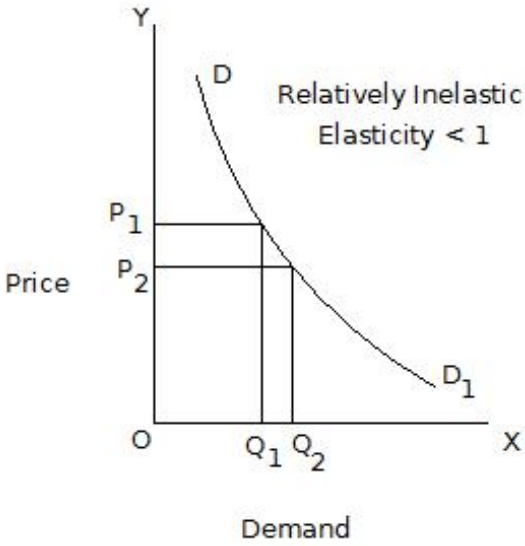
To calculate price elasticity of demand:

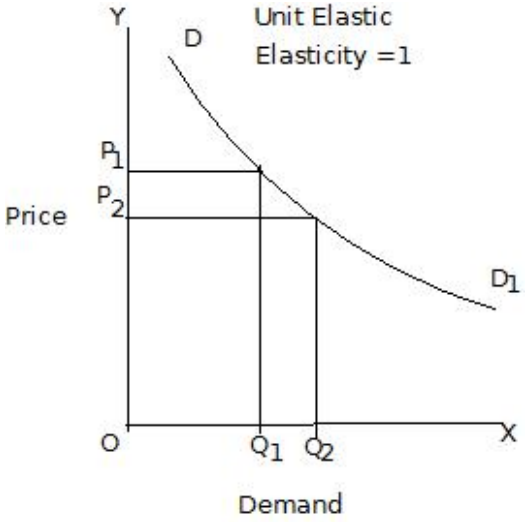
Let us consider a situation where Price of tea has increased from Rs.7 to Rs 8and as a result of this demand for tea has declined from 50 cups to 48 cups.
The price elasticity in this case can be calculated as follows:
Percentage change in demand = (New demand – Old demand)/Old demand
= (48-50)/50
= -0.04

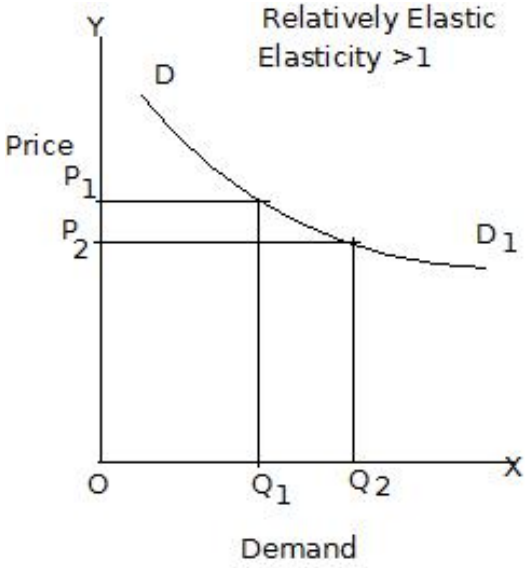
Percentage change in price = (New price –Old Price)/ Old price
= (8- 7)/ 7
= o.14
Price elasticity of demand = (percentage change in demand)/(Percentage change in price)
= - 0.04 /0.14
= -0.28
Since the Elasticity of Demand is less than one Demand is inelastic .

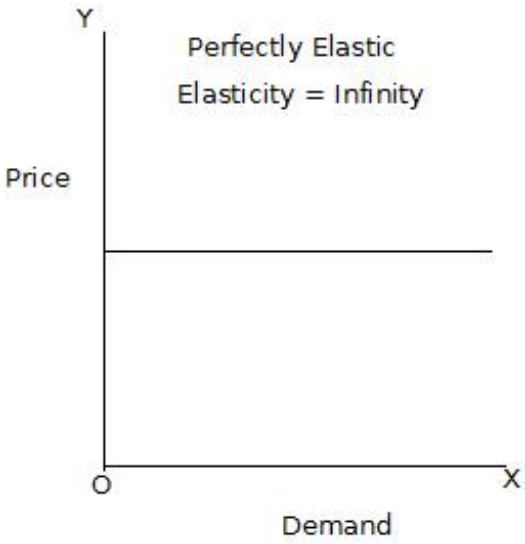
In other words we can say that for a 14% increase in price ,demand has declined only by 4% . The negative sign indicates the inverse relationship between demand and price.

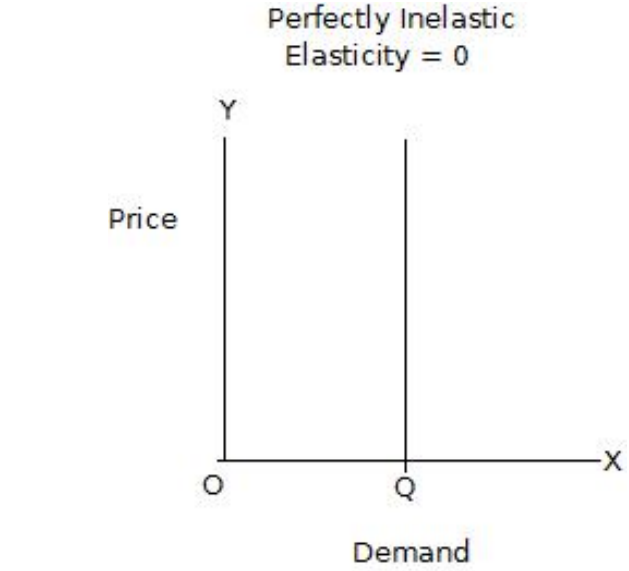
Diagrammatic representation Of Price Elasticity Of Demand











Determinants Of Price Elasticity Of Demand

There are number of factors which determine the price elasticity of demand. Let us consider some of these factors.

Firstly if **close substitutes** are available then there is a tendency to shift from one product to another when the price increases and demand is said to be elastic. For example, demand for two brands of tea. If the price of one brand A increases then the demand for the other brand B increases. In other words greater the possibility of substitution greater the elasticity.

Secondly how much of the income is spent on a commodity by the consumer. Greater the **proportion of income spent** on the commodity greater will be the elasticity.

Thirdly the **number of uses** to which the commodity can be put is important factor determining elasticity. If the commodity can be put to many uses then the elasticity will be greater.

Fourthly if two commodities are **consumed jointly** then increase in

the price of one will reduce the demand for both.

Fifthly **time element** has an important role to play in determining the elasticity of demand . Demand is more elastic if time involved is long. In the short run , it is difficult to substitute one commodity for another.

Sixthly **Cost of switching between different products and services**.There may be significant transaction costs involved in switching.In this case demand tends to be relatively inelastic.For example ,mobile phone service providers may include penalty clauses in their contracts.

Seventhly **Who makes the payment**, Where the purchaserdoes not directlypay for the goodthey consume, such as perks enjoyed by employees,demand is likely to be more inelastic.

Finally **Brand Loyalty**,An attachment to a certain brand either out of tradition or because of propriety barriers can override sensitivity to price changes, resulting in more inelastic demand.

Measurement of Elasticity of Demand

i. **Percentage Method** .
i. **Point Elasticity Method**.
ii. **Total Outlay Method**.
iii. **Arc Elasticity**.

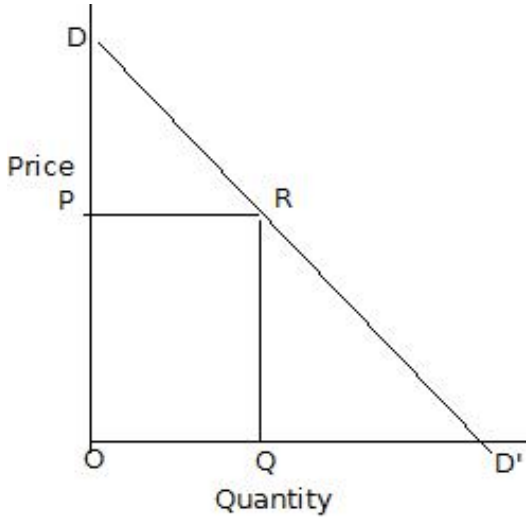
Let us discuss each of these measures in detail.

Percentage Method

Price elasticity can be measured by dividing the percentage change in quantity demanded in response to a small change in price ,by the percentage change in price. The definition and the numerical example disussed earlier explains the percentage method. Mathematically , price elasticity of demand ha s a negative sign since the change in quantity demanded is in opposite direction to the change in its price.Only goods which do not confirm to the Law of Demand like Veblen good or Giffen good have positive price elasticity of demand.Hence for sake of convenience in understanding the magnitude of response of quantity demanded of a good to a change in its price we ignore the negative sign and take into account only the numerical value of the elasticity.The accuracy of the percentage method is questioned on the ground that the value of the elasticity depends on which value is taken as the starting point in the calculation of percentage. For example, if quantity demanded increases from 10 units to 15 units, the percentage change is 50%, i.e., (15 − 10) ÷ 10 (converted to a percentage). But if quantity demanded decreases from 15 units to 10 units, the percentage change is −33.3%, i.e., (15 − 10) ÷ 15.Two alternative measures avoid or minimise the shortcoming of the percentage method. Now we proceed to understand the Point elasticity method.

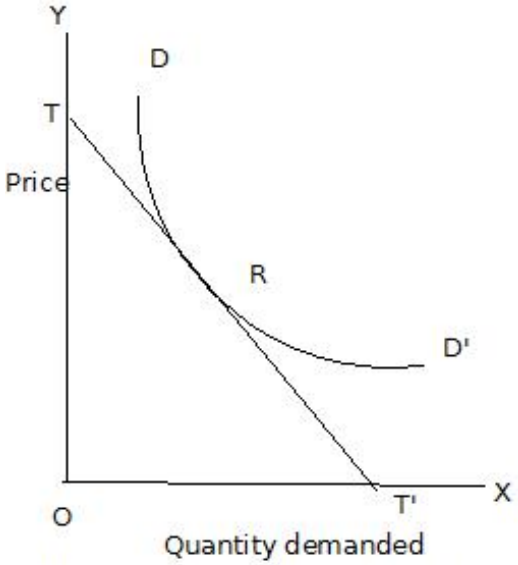
Point Elasticity Method

Measuring Elasticity Of Demand on a Linear demand Curve
Let a straight line demand curve DD' be given and we have to measure price elasticity of demand at the point R on this demand curve.



The measure of price elasticity of demand is given by : Ep =(Δq/Δp) (p/q) The first term in this formula ,(Δq/Δp) is the reciprocal of the slope of the demand curve DD'(slope of the demand curve is equal to Change in price divided by change in quantity demanded and will be the same all along the straight line demand curve). The second term is the original price divided by the Original Quantity. Thus
Ep =(1/slope)(p/q)
Now at point R in the diagram, Original price p = OP and Original quantity q = OQ. Further ,slope of the demand curve DD' is Δp/Δq = PD/PR
Substituting these in the above formula we have
Ep =[1/(PD/PR)](OP/OQ) = (PR/PD)(OP/OQ)
However PR =OQ and they will get cancelled and therefore
Ep = OP/PD
This represents the ratio of the distances on the vertical axis.
In a right angled triangle ODD',PR is parallel to OD'.
Therefore
Ep = OP/PD =RD'/RD
RD' is the lower segment of the demand curve DD' at point R and RD is its upper segment.
Therefore,
Ep = RD'/RD =Lower segment/Upper segment.

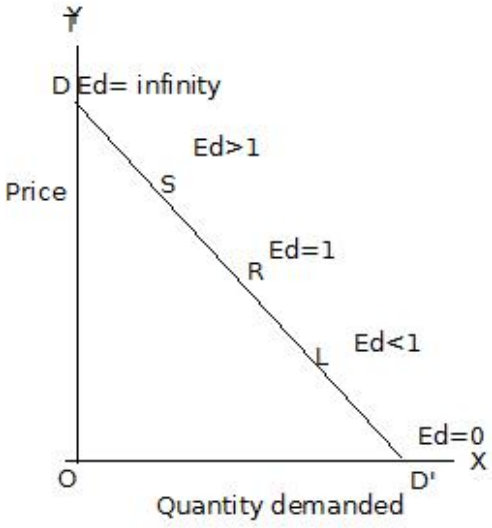
Measuring Price elasticity on a non –linear demand curve.



Measuring price elasticity at a point on a Non-Linear Demand curve

In order to measure elasticity in case of a non linear curve we draw a tangent at the given point R on the demand curve DD' and then measure price elasticity by finding out the value of RT'/RT.

On a Linear Demand curve price elasticity varies from Zero to infinity. This can be represented diagrammatically as follows.In this diagram elasticity is being calculated at five points D,S,R,Land D'.



On a linear demand curve price elasticity variesfrom infinity to zero

Total Outlay Method

From the changes in the total expenditure made as a result of changes in its price ,we can know the price elasticity of demand for the good. However it should be taken note that it is possible to identify whether price elasticity of demand will be greater than one, less than one or equal to one only. The exact or accurate price elasticity of demand cannot be found. Let us under the relationship precisely. Unit Elasticity: With a change in the price of the good, quantity demanded increases, the total expenditure remaining the same, elasticity of demand is equal to one. The reason for this is ,if total outlay has to be the same then the percentage change in price has to be equal to percentage change in quantity demanded. Elasticity greater than one: With a decline in the price of the good, quantity demanded increases, the total expenditure also increases, elasticity of demand is greater than one. The reason for this is ,if total outlay has to increase then the percentage change in quantity demand has to be greater than percentage change in price. Similarly due to an increase in the price of a good if there is a fall in the demand and as a result there is a decline in the total expenditure then also the elasticity of demand is greater than one. Elasticity Less than one : With a decline in the price of the good, quantity demanded decrease, the total expenditure also decreases, elasticity of demand is less than one. The reason for this is ,if total outlay has to decreases then the percentage change in quantity demand has to be less than percentage change in price. Similarly due to an increase in the price of a good if there is an increase in the demand and as a result there is a increase in the total expenditure then also the elasticity of demand is less than one. Let us understand this method with the help of an illustration. The table given below gives data on the price per unit of pen, the quantity demanded at different price levels , the resultant expenditure and the elasticity of demand under different situations.

Price of pen in (Rs) P1	Quantity demanded Q1	Total expenditure R=P1*Q1	Elasticity of Demand
5.00	30	150	
4.75	40	190	Greater than one
4.50	50	225	Greater than one
4.25	60	255	Greater than one
4.00	75	300	Greater than one
3.75	80	300	Equal to one
3.50	84	294	Less than one
3.25	87	282.75	Less than one
3.00	89	267	Less than one

Arc Elasticity Method

Arc Elasticity of demand When price changes are large or we have to measure elasticity over an arc of the demand curve rather than at a specific point on the demand curve, the point elasticity method does not provide a true or correct measure of price elasticity of demand . Further, in such cases, the elasticity would be different depending on whether we choose original price and original demand or the subsequent price and quantity demanded as the basis for measurement of elasticity of demand. The outcome would be different under the two situation . Hence , when the change in price is quite large then accurate measure of price elasticity can be obtained by taking the average of original price and new price as well as average of the old quantity and new quantity as the basis of measurement of percentage changes in price and quantity. Thus if the price of a good declines from p1 to p2 and as a result the quantity demanded increases from q1 to q2 the average of the two prices is given by (p1+p2)/2 and Average of the two quantities is given by (q1+q2)/2 . Thus the formula for measuring Arc elasticity Is given by

$$E_p = \{\Delta q/(p1+p2)/2\} / \{\Delta p/(q1+q2)/2\}$$
$$= \{\Delta q/(q1+q2)\} \{\Delta p/(p1+p2)\}$$
$$= (\Delta q/\Delta p) \{(p1+p2)/(q1+q2)\}$$

Key Terms

1. Elasticity of demand
2. Elastic demand
3. Inelastic demand
4. Unit elastic demand
5. Perfectly Elastic
6. Perfectly inelastic
7. Perfectly Elastic
8. Arc elasticity
9. Point Elasticity
10. Linear demand curve
11. Non-Linear curve
12. Giffen good
13. Veblen good

Multichoice Questions

1. Price elasticity of demand is constant on a straight line demand curve.

- (a) True
- (b) False

2. For Inelastic demand changes in price and total revenue are inversely related.

- (a) True
- (b) False

3. If each of 50 buyers has an elasticity of demand for a commodity equal to 3 then the elasticity of for the 50 buyers taken together is 0.06.

- (a) True
- (b) False

4. Price elasticity of demand is always positive.

- (a) True
- (b) False

5. If cross elasticity of demand for two goods is 1.3, they are substitutes.

- (a) True
- (b) False

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Income Elasticity Of Demand

University of Mumbai

Income Elasticity Of Demand

Kaltura Income Elasticity of Demand

Introduction

{{{2}}}

So far we have been discussing about the change in demand as a result of a change in the price of the good . We found the consumer's demand varying differently with respect to each product. A further insight on this can be derived by studying what happens when the consumer has a change in his income. When the consumer's income increases, assuming that prices remain constant, The capacity of the consumer to purchase that good increases. We say that the real income of the consumer has increased. When the real income increases does the consumer buy more of this commodity. In reality the consumer does not buy more of all the goods. In some cases the demand increases, in some cases it decreases and in still other cases it remains the same. The measure of income elasticity of demand provides us the answer to these questions. It helps us understand the nature of the commodity and how it is perceived by the consumer.

Learning Objectives

After reading this chapter, you are expected to be able to:

i. **To understand the nature of the commodities and how a change in the income of the consumer affects the demand for a commodity.**

ii. **To understand how strategic decisions can be effectively taken with the knowledge of income elasticity of demand.**

Definition

Definition of income elasticity of demand. Income elasticity of demand refers to the degree of responsiveness of demand to a change in the income level.

From the definition it follows that

E y= Percentage change in quantity demanded /Percentage change in income

In mathematical terms it can be represented as: Ey =(∆q/∆y)(y/q)

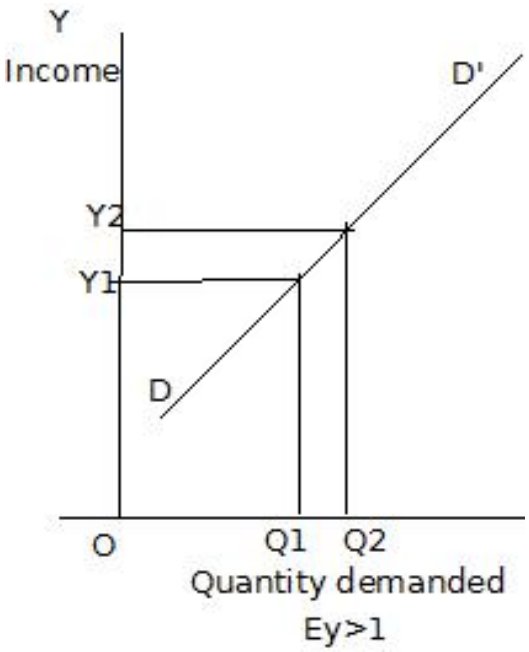
Numerical calculation of income elasticity

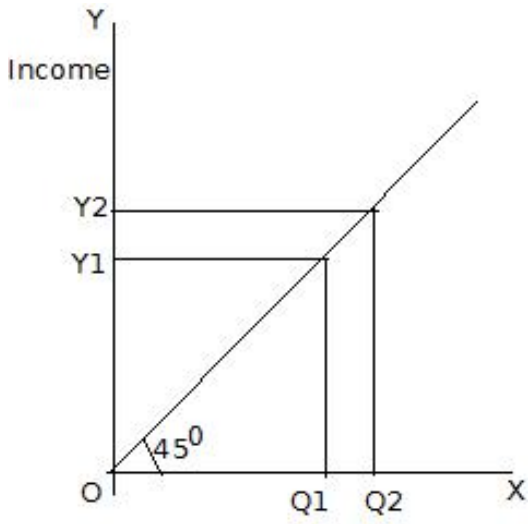
Now let us consider the data given below and calculate the income elasticity of demand.
Income of the consumer =Rs.5000/- Increased income =Rs.6000/- Original demand for butter = 2 Kg Increased demand for butter =2.50 Kg

From the data we get,
∆q =0.50
∆y =1000
y =5000
q =2

Substituting these values in the formula for income elasticity we get,
Ey =(∆q/∆y)(y/q)
=(0.50/1000)(5000/2)
=5/4
=1.25

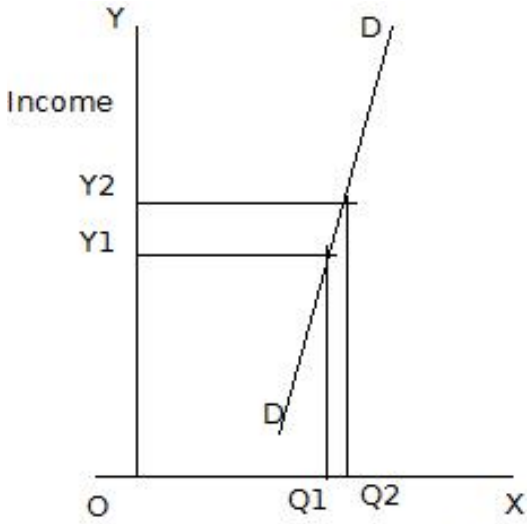
Diagrammatic representation of income elasticity





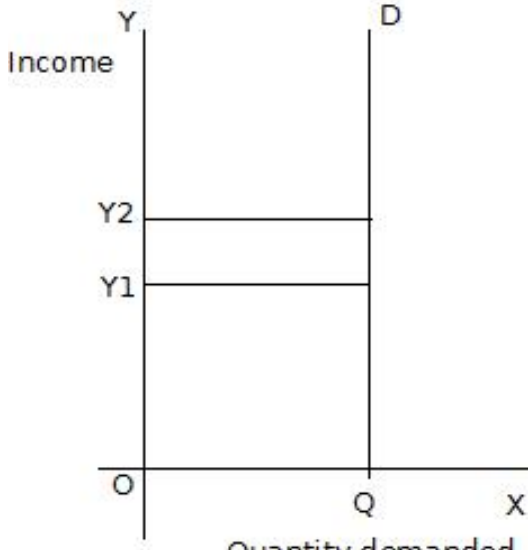
Quantity demanded

Ey=1



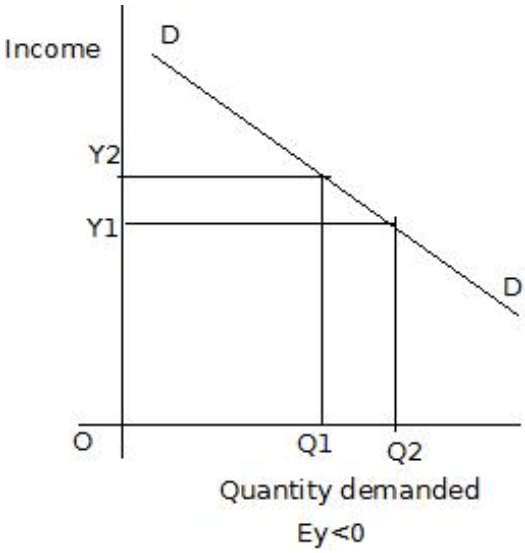
Quantity demanded

Ey<1



Quantity demanded

Ey=0



Relationship between nature of commodities and income elasticity

Now let us understand the different possibilities.

Normal good. Normal goods have positive income elasticity of demand. If with an increase in the income there is an increase in the demand for the good, we refers to this as **positive income elasticity** of demand. The increase could be large or small . Hence when the increase is such that percentage change in demand is less than the percentage change in income (income elasticity being greater than zero but less than one) it represents a **necessary good**(0<Ey<1).However if the percentage increase in demand is more than percentage increase in income then such commodities are considered as **luxury goods**(Ey>1).

Inferior goods Inferior goods have negative income elasticity of demand.If with an increase in the income there is a decrease in the demand for the good, we refers to this as **negative income elasticity** of demand(Ey<0). When the income of the consumer increases he finds it below his dignity to purchase some goods and hence when his income increases he prefers to consume less of the goods he used to purchase earlier or opts for some other good which according to him has a better position and are consumed by people belonging to the higher income group.

Note income elasticity of demand varies across product range.Further over a longrun period with changes in the taste and preference and consumer's perception of commodities elasticity of demand is likely to change.A product which was a luxury at one point of time becomes a necessity today. Consider the market for foreign travel.A few decades ago,long distance foreign travel was regarded as a luxury. Now as real price levels have come down and incomes have grown, a large number of people are travelling to different places for a short or long period.

Activity

1.1

a.Classify the commodities in your own consumption basket as normal goods,luxury goods and inferior goods.

b.Are the commodities mentioned below normal goods ,luxury goods or inferior goods ? Give reason for your answer.

Salt,camera,fruits,milk,Two wheeler,Cigarettes,medicines,Picasso's painting,Laptop.

Activity

1.2

The following table gives the quantity of a commodity X that a family would purchase at various income levels.
i) Find the income elasticity of demand of this family for Commodity X for various successive levels of this family's income .
ii)Over what range of income is Commodity X a Luxury,a necessity,or an inferior good for this family?

Income(Rs.per month)	Quantity(Units per month)
4000	100
6000	250
8000	350
10000	380
12000	450
14000	440
15000	410
16000	380
18000	350

Cross Elasticity Of Demand

University of Mumbai

Cross Elasticity Of Demand

Introduction

{{{2}}}

We have seen in the earlier section that in defining the demand relationship we have assumed Other things to remain constant. One of the factors which has been assumed to remain constant is the prices of other commodities. When the price of related commodities like complementary goods or substitutes Change what will be its impact on the demand? Two commodities X and Y are said to be complements if With an increase in the price of X not only the demand for X but the demand for Y also goes down. For example we can consider Pen and ink, Tea and sugar, car and petrol are complements. On the other hand two commodities X and Y are said to be substitutes if with an increase in the price of X the demand for Y increases. For example Coca-cola and Pepsi ,electricity and gas , travel by rail and travel by road are substitutes. We study impact of a change in the price of one good on account of a change in the price of another good which is a complement or substitute.

Learning Objectives

After reading this chapter, you are expected to be able to:

i. **Understand the relationship between two commodities and how a change in the price of one commodity affects the demand for the other commodity.**

ii. **Understand how decision needs to be carefully taken with respect to changing relationship between commodities.**

Definition

Cross elasticity of Demand is defined as :*The degree of responsiveness of demand for commodity X* on account of a change in the Price of Commodity Y .

From the definition it follows that

Exy = (Percentage change in quantity demanded of x)/(Percentage change in the price of Y)

In mathematical terms it can be represented as:

Exy == (∆Qx/∆py)(Py/Qx)

Numerical illustration

Let us consider an example.If the price of coffee rises from Rs.6/- to Rs.7/- per cup and as a result the consumer's demand for tea increases from 60 cups to 70 cups,then the cross elasticity of demand of tea(x) for coffee(y) can be found out as follows:
∆Qx =70-60 =10
Qx =60
∆py =7-6 =1
Py = 6

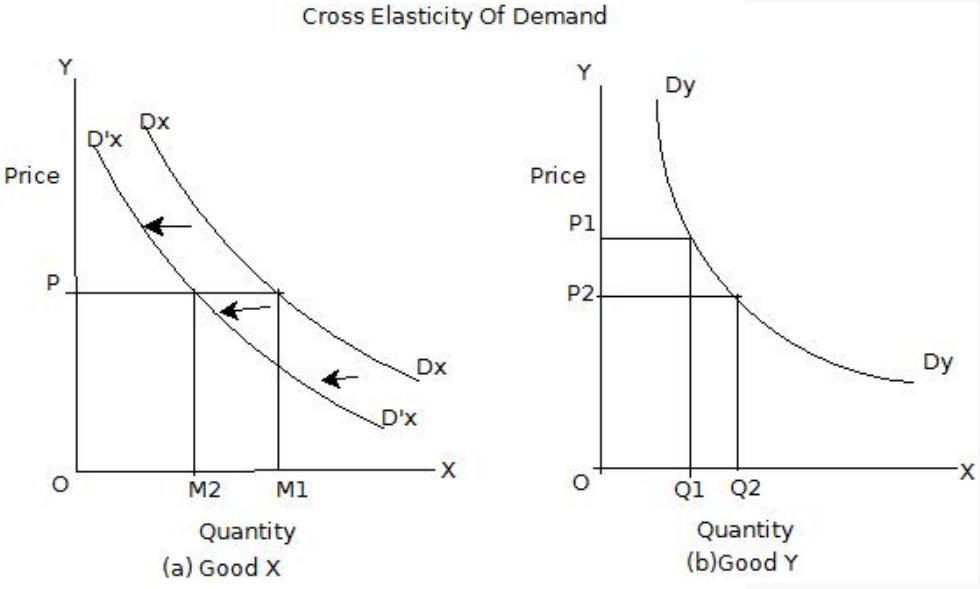
Cross elasticity of demand = Exy = (∆Qx/∆py)(Py/Qx)
=(10/1)(6/60)
=1
We can see that with an increase in the price of coffee(Y) the demand for tea (X) has increased.The two commodities are considered as substitutes. In this case the consumer substitutes tea for coffee.

Relationship between nature of commodities and Cross elasticity

If *Exy is greater than zero*, X and Y are **substitutes** because an increase in Py leads to an increase in Qx as X is substituted for Y in consumption. On the other hand if *Exy is less than zero* , X and Y are **complements** because an increase in Py leads to a reduction in Qy and Qx both.

Diagrammatic representation of cross elasticity of Demand Cross elasticity

The following diagram indicates the effect of change in price of good Y (Price of X remaining the same) on the demand for good X.With a decrease in the price of good Y from OP1 to OP2 the demand for good Y declines from OQ1 to OQ2 and the demand for X also declines from OM1 to OM2 . The two commodities X and Y are said to be complements.



Note

There are certain points to be taken note of with respect to cross elasticity of demand.

- Exy need not be equal to Eyx because the responsiveness of Qx to change in price of Y need not be equal the responsiveness of Qy to a change in the price of X.
- A high positive cross elasticity is associated with high degee of similarity between commodities.
- The above definition of substitutes and complements is sometimes referred to as gross definition since it refers to the market response.

Activity

1.1

a.Classify the commodities in your own consumption basket as normal goods,luxury goods and inferior goods.

b.Are the commodities mentioned below normal goods ,luxury goods or inferior goods ? Give reason for your answer.

Salt,camera,fruits,milk,Two wheeler,Cigarettes,medicines,Picasso's painting,Laptop.

Activity

1.2

Colgate sells its standard size toothpaste for Rs.30.Its sales have been on an average 8000 units per month over the past year. Recently its close competitor Binaca reduced the price of the same standard size from Rs.40 to Rs.35.As a result ,Colgate sales declined by 1200 units per month.

- Calculate the Cross elasticity of demand between the two products.
- What does your estimate indicate about the relationship between rhe two products?

Promotional Elasticity of Demand

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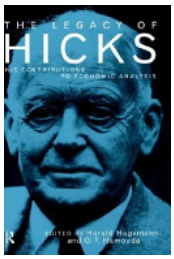
Promotional / Advertising Elasticity of Demand

Introduction

In today's competitive, globalized world, promotions of products and services have become very important. We wonder how much do companies spend on such aggressive marketing and whether it is worth it. Do they get returns on such advertising expenditure?

To understand this, the concept of advertising elasticitywhich is also known as promotional elasticity of demand is useful. This concept was popularized by a noted Economist – John Hicks.



Learning Objectives

After reading this chapter, you are expected to be able to:

1.Comprehend the concept of promotional elasticity of demand.

2.Calculate the coefficient of advertising elasticity of demand.

3.Learn the applicability of this concept in decision making of firms.

Meaning of Promotional Elasticity of Demand or Advertisng Elasticity Of Demand

AED measures degree of change in demand brought about by change in advertising expenditure.

Definition: Proportionate change in demand brought about by a unit change in advertising expenditure.

AED can be expressed as

AED = (Δ Dx)/(Δ AE) x AE/Dx

Where Dx = Original (initial) Demand for commodity x ΔDx = Change in demand for x AE = Original Advertising Expenditure Δ AE = change in Advertising Expenditure It can also be expressed as

AED = (% change in Dx)/(% change in AE)

Relatively Elastic Demand

If AED > 1, it is relatively elastic demand.
It means that demand is more sensitive to the advertising expenditure and proportionately giving more than proportionate increase in demand.

Promotional expenditure is exerting more than proportionate effect on demand e.g. When this soft drink company ' Cool ' has raised its promotional expenditure by 25%, demand may rise by 50%

AED = % change in Dx% change in AE

= 50 %25 % = 2

AED = 2 (> 1, Relatively Elastic Demand)

Relatively Inelastic Demand
If AED < 1, it is relatively inelastic demand.

It means that change in advertising expenditure brings about less than proportionate change in demand. E.g. when this soft drink company 'Cool' spends 25% additional expenditure on promoting its new product, demand rises only by 5%

AED = % change in Dx% change in AE = 5 %25 % = 0.2

AED = 2 (< 1, Relatively Inelastic Demand)

Perfectly Inelastic Demand
If AED = 0 it is Perfectly Inelastic demand.

It means that increase in advertising expenditure has no effect at all on demand e.g. When the company ' Cool ' spends 25% additional expenditure on advertising, its new product demand remains rigid or constant. In such a case, advertising strategy is ineffective.

AED = % change in Dx% change in AE = 0 %25 % = 0

AED = 0 (Perfectly Inelastic Demand)

Factors Influencing AED

1.Type of product i.e. whether the product is already existing or new product
2.Brand name.
3.Number of competitors and substitutes in the market.
4.Strategies of competitors
5.Frequency of advertisements.
6.Mode of advertisements.
7.Time of advertisements.
8.Other factors influencing demand like tastes, professions, income etc.

Applications / Uses of AED

1.Helps in evaluating success of adverting campaign.
2.Helps the firms in deciding advertising expenditure or budget.
3.Helps in choosing more effective media for promotion.
4.Helps in withdrawing ineffective promotional campaigns.
5.Helps in strategic management to respond to competitor's promotional policies.
6.Helps in building brands.

Limitations of AED

1.Value of AED does not help in analyzing effect of advertising a single product.
2.Difficult to analyze the effectiveness of promotional strategies at a particular period of time, especially when the campaigns are over a long period of time
3.The Purpose of campaigns may be to create brands, rather than only influencing size of demand.
4AED does not take into account effect of other factors influencing demand.

Values of Advertising Elasticity of Demand and their significance

Numerical Values of Advertising Elasticity of Demand will vary from zero to infinity.It would mean that if AED is zero,advertisng expenditure has no effect on demand at all.

Unit Elastic Demand

If AED = 1, it is unit elastic demand.

It would mean that advertising expenditure is giving just exactly proportionate returns in terms of demand e.g. This means that if a soft drink company has increased its advertising expenditure by 25%, the demand will also rise exactly by 25%.

AED = (% change in Dx)/(% change in AE) = (25 %)/(25 %) = 1

AED = 1 (Unit Elastic Demand) }}

Quiz on the Topic

Activity

1. Observe different advertisements on TV.

2. Listen to advertisements on radio.

3. Try to recollect an effective advertisement in the newspaper or magazine.

4. Collect information about cost of advertising campaign and its returns in terms of demand or revenue.

E.g. • Cost of changing Airtel logo and increase in sales after it.

• A soft drink company sponsoring the college festival and increase in sales of that soft drink in the college canteen.

• Cost of inviting a brand ambassador for the event.

• Number of times (frequency) and the time interval if advertising on TV. (For sports items during international cricket matches).

• Brands / Products associated and marketed in the films.

• Promotional expenditure of popular films and revenue earned.

• Expenditure increased by the youth channel on the talk shows and increase in TRP.

• Expenditure on commercial hoardings in public places.

• Expenditure increased by the popular newspapers on events/competitions and increase.

Self-Assessment Questions (SAQs)

State whether the following statements are True or False:

1.Promotional elasticity of demand measures the sensitivity of income to changes in advertising expenditures
2.Unit Advertising elasticity of Demand brings more than proportionate change in demand in response to advertising expenditure
3.When AED >1; 1, the advertising campaign is effective
4.If AED < 1, the campaign is not successfully utilizing its promotional expenditure.
5. AED does not give us precise effect of advertisements on sales of the specific product at the specific time.

Calculate AED for the following situation

The 'Big Style company selling T shirts increased its advertising expenditure from Rs 5 Lakhs to Rs 10 Lakhs per annum. Sales of shirts increased from 20 Lakhs shirts per annum to 30 Lakhs shirts annum.

1. Comment on the effectiveness of the advertising situation of the above company.

2. Could there have been any other factors besides advertising influencing demand for shirts? List such other factors.

Lets Sum Up

● AED is the degree of responsiveness of demand to changes in advertising expenditure or promotional expenditure.

● Value of AED ranges between zero and infinity

● AED = % change in Dx% change in AΔ

Value of AED	Type of elasticity	Effectiveness of Advertising campaign
1	Unit	Neutral
>1	Relatively Elastic	Effective Advertising
<1	Relatively Inelastic	Ineffective Advertising
=0	Perfectly Inelastic	No effect on demand or sales

● D depends not only on promotions but also on other factors which are assumed to remain constant

Key Terms

- AED
- Relatively Elastic AED
- Relatively Inelastic AED
- Unit Elastic AED
- Perfectly Elastic AED
- Perfectly Inelastic AED

http://vle.south.du.ac.in//mod/quiz/index.php?id=320

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Category: Economics

Indifference Curve Analysis

University of Mumbai

MICROECONOMICS

INDIFFERENCE CURVE & IT'S PROPERTIES

Introduction

In Microeconomics, the Indifference Curve Analysis is an important analytical tool in the study of consumer behaviour. The indifference curve analysis was developed by the British economist Francis Ysidro Edgeworth, Italian economist Vilfredo Pareto and others in the first part of the 20th century.J.R.Hicks & R.G.D. Allen in their research paper,' A Reconsideration of the Theory of Value' criticized Marshallian cardinal approach of utility and propounded Indifference curve theory of consumer's demand. It is also called as Ordinal Approach.

Learning Objectives

After reading this chapter, you are expected to be able to:

Learning Goal 1: Demonstrate an understanding and significance of the concept of Indifference Curve.

Learning Goal 2: Describe the properties of Indifference Curve.

Learning Goal 3: Understand the relevance of ordinal approach to consumer behaviour.

Concept of Indifference Curve

An indifference curve is a locus of combinations of goods which derive the same level of satisfaction, so that the consumer is indifferent to any of the combination he consumes.If a consumer equally prefers two product bundles, then the consumer is indifferent between the two bundles. The consumer gets the same level of satisfaction (utility) from either bundle. Graphically speaking, this is known as the indifference curve. An indifference curve shows combinations of goods between which a person is indifferent.

Symbolically,in the equation form,

An Indifference Curve = $U = f(x_1, x_2, x_3, ...x_n) = k$ .....where, k is a constant.

Significance of Indifference Curve Analysis:

In indifference curve approach only ordination of preferences is needed.It overcomes the weakness of Cardinal measurement as the satisfaction cannot be measured objectively.

The cardinal approach provides the assumption of constant utility of money, which is unrealistic.In indifference curve approach, this assumption has been dropped.

Indifference curve approach is base for the measurement of 'consumer's surplus'.In a way it contributes to the Welfare economics.

Indifference curve is a better tool to classify substitutes and complementary goods.

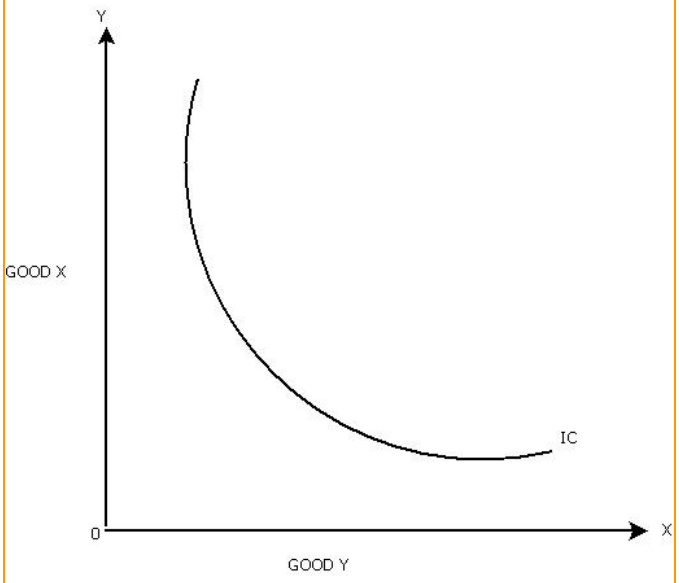
Properties of Indifference Curves

The main attributes or properties or characteristics of indifference curves are as follows:

1) Indifference Curves are Negatively Sloped:

The indifference curves must slope downward from left to right. As the consumer increases the consumption of X commodity, he has to give up certain units of Y commodity in order to maintain the same level of satisfaction.

DIAGRAM:

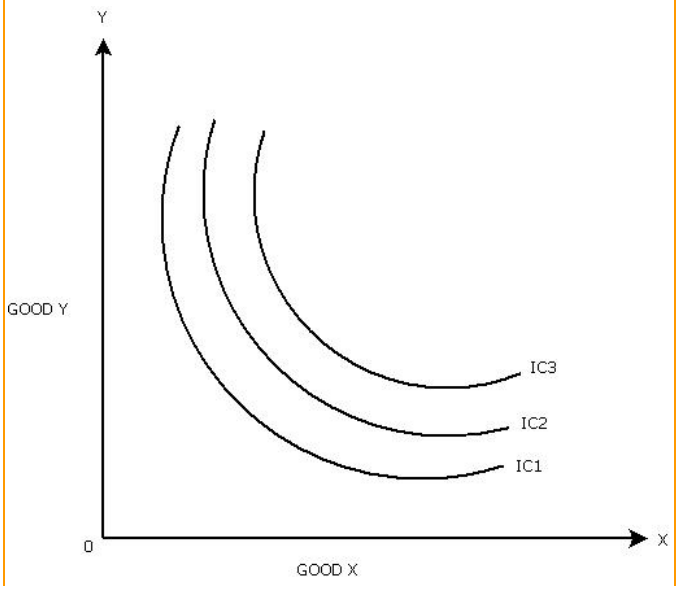


In the above diagram, two combinations of commodity cooking oil and commodity wheat is shown by the points a and b on the same indifference curve. The consumer is indifferent towards points a and b as they represent equal level of satisfaction.

(2) Higher Indifference Curve Represents Higher Level of Satisfaction:

Indifference curve that lies above and to the right of another indifference curve represents a higher level of satisfaction. The combination of goods which lies on a higher indifference curve will be preferred by a consumer to the combination which lies on a lower indifference curve.

Diagram:

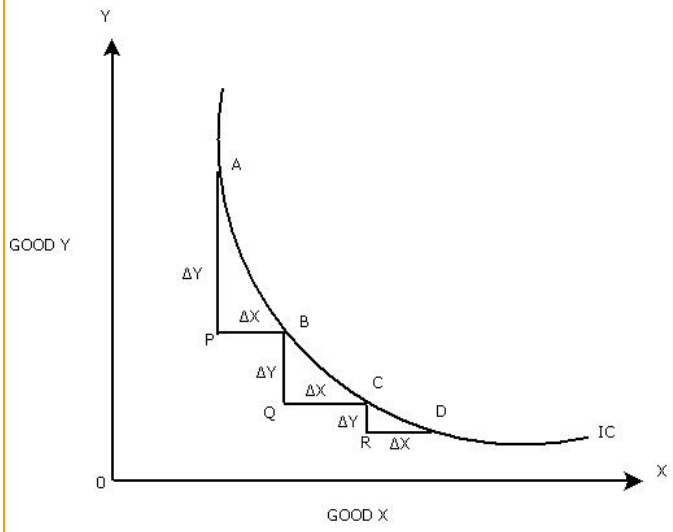


In this diagram, there are three indifference curves, IC1, IC2 and IC3 which represents different levels of satisfaction. The indifference curve IC3 shows greater amount of satisfaction and it contains more of both goods than IC2 and IC1. IC3 > IC2> IC1.

(3) Indifference Curves are Convex to the Origin:

This is an important property of indifference curves. They are convex to the origin. As the consumer substitutes commodity X for commodity Y, the marginal rate of substitution diminishes as X for Y along an indifference curve. The Slope of the curve is referred as the Marginal Rate of Substitution. The Marginal Rate of Substitution is the rate at which the consumer must sacrifice units of one commodity to obtain one more unit of another commodity.

Diagram:



In the above diagram, as the consumer moves from A to B to C to D, the willingness to substitute good X for good Y diminishes. The slope of IC is negative.In the above diagram, diminishing MRSxy is depicted as the consumer is giving AF>BQ>CR units of Y for PB=QC=RD units of X. Thus indifference curve is steeper towards the Y axis and gradual towards the X axis. It is convex to the origin.

If the indifference curve is concave, MRSxy increases. It violets the fundamental feature of consumer behaviour.

If commodities are almost perfect substitutes then MRSxy remains constant. In such cases the indifference curve is a straight line at an angle of 45 degree with either axis.

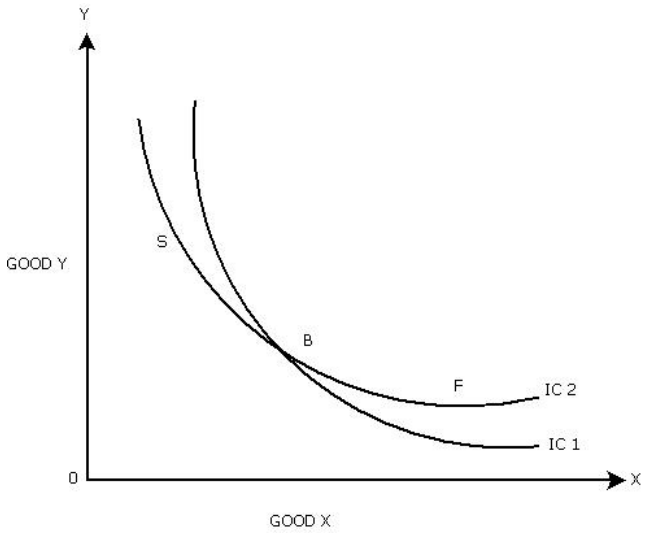
If two commodities are perfect complements, the indifference curve will have a right angle.

In reality, commodities are not perfect substitutes or perfect complements to each other.Therefore MRSxy usually diminishes.

(4) Indifference Curves cannot Intersect Each Other:

The indifference curves cannot intersect each other. It is because at the point of tangency, the higher curve will give as much as of the two commodities as is given by the lower indifference curve. This is absurd and impossible.

Diagram:



In the above diagram, two indifference curves are showing cutting each other at point B.

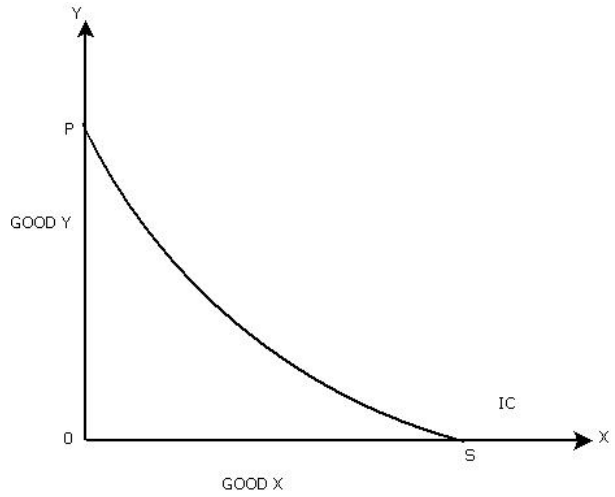
The combinations represented by points B and F given equal satisfaction to the consumer because both lie on the same indifference curve IC2. Similarly the combinations shows by points B and E on indifference curve IC1 give equal satisfaction top the consumer.

If combination F is equal to combination B in terms of satisfaction and combination E is equal to combination B in satisfaction. It follows that the combination F will be equivalent to E in terms of satisfaction. This conclusion looks quite funny because combination F on IC2 contains more of good Y (wheat) than combination which gives more satisfaction to the consumer. We, therefore, conclude that indifference curves cannot cut each other.

(5) Indifference Curves do not Touch the Horizontal or Vertical Axis:

One of the basic assumptions of indifference curves is that the consumer purchases combinations of different commodities. He is not supposed to purchase only one commodity. In that case indifference curve will touch one axis. This violates the basic assumption of indifference curves.

Diagram:



In the above diagram, it is shown that the in difference IC touches Y axis at point P and X axis at point S. At point C, the consumer purchase only OP commodity of Y good and no commodity of X good, similarly at point S, he buys OS quantity of X good and no amount of Y good. Such indifference curves are against our basic assumption. Our basic assumption is that the consumer buys two goods in combination.

Case Study

Ms Amita's Indifference Curve is based on her commodity baskets of rice and wheat.Each basket gives her equal level of satisfaction.

What is the Marginal Rate of Substitution for Ms.Amita?

Basket	Wheat	Rice
1	4	20
2	5	16
3	6	13
4	7	10

Activity

TRY OUT THIS QUIZ

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Let's Sum Up

Consumer would derive equal satisfaction at any point along a given indifference curve, as each point brings the same level of satisfaction to the consumer. Hence consumer is indifferent about the various combinations of two goods along with the indifference curve.

Properties of Indifference Curves

1. Indifference Curves are Negatively Sloped. Indifference curves are downward sloping. If the quantity of one goods is reduced, then you must have more of the other good to compensate for the loss.

2. Higher Indifference Curve Represents Higher Level of satisfaction. Higher indifference curves are preferred to lower ones, since more is preferred to less (non-satiation).

3. Indifference curves are convex to the origin (in most cases).The slope of the curve is referred as the Marginal Rate of Substitution. The Marginal Rate of Substitution is the rate at which the consumer must sacrifice units of one commodity to obtain one more unit of another commodity.

4. Indifference curves do not intersect with each other.

Key Terms

Extension exercise

Enter your text here

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CONSUMER'S EQUILIBRIUM

MICROECONOMICS

CONSUMER'S EQUILIBRIUM

Introduction

All consumers strive to maximize their utility. We try to get as much satisfaction as we can. The consumer's scale of preference is derived by means of indifference mapping that is a set of indifference curves which ranks the preferences of the consumer. Getting to the indifference curve which is farthest from the origin gives the highest total utility. Although the goal of the consumer is maximization of satisfaction, the means of achieving the goal is not clear. Higher indifference curve not only gives higher satisfaction but also are more expensive. Here we are confronted with the basic conflict between preferences and the prices of the commodities consumer wants to consume. With a given amount of money income to spent, we cannot attain the highest satisfaction but have to settle for less.

Learning Objectives

After reading this chapter, you are expected to be able to:

- 1.The consumer is to reach the highest indifference curve that is compatible with his budget constraint.
- 2.The consumer attains equilibrium when he is able to consume the most preferred commodity bundle which gives him the highest utility.
- 3. It is a state of stability where there is no tendency to rearrange the combinations of goods preferred by the consumer.

Assumptions

.

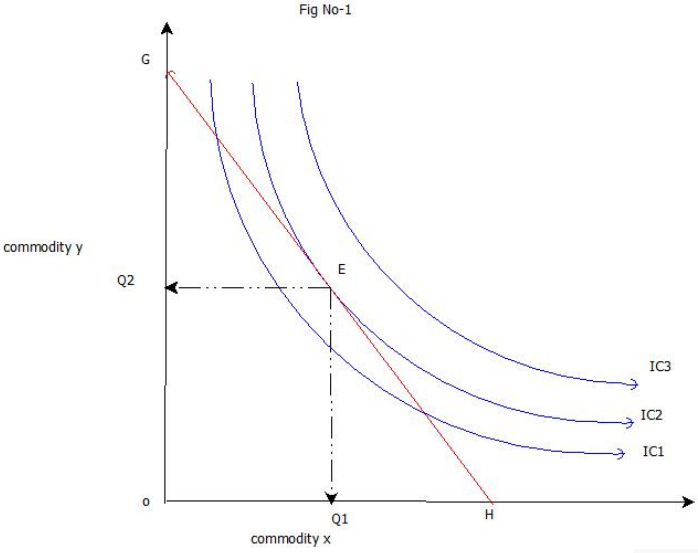
- 1.There are two goods i.e commodity X and commodity Y .
- 2.The consumer's preference scale for combination of two goods is exhibited by indifference map.
- 3.The prices of goods are given and remain constant.
- 4.The consumer has a given income which sets to limits to his maximizing behavior.

Conditions for consumer's equilibrium

- 1.A given budget line must be tangent to an indifference curve , or the marginal rate of substitution between commodity X and commodity Y ($MRS_{x,y}$) must be equal to the price ratio between the two goods $\frac{PX}{PY}$.
- 2.At the point of equilibrium, indifference curve must be convex to the origin.

The limitation on utility maximization is evident. We want to reach the highest indifference curve with our limited income. You can go only as far as your budget constraint allows. Suppose you have only 50 rupees to spend on good X and good Y. The price of a unit of X is 10 rupees where as the price of good Y is 5 rupees. You can have as many as 5 units of good X if you want to forsake good Y. Similarly you can have 10 units of good Y with the same 50 rupees.The budget constraints illustrates all combination of goods you can buy with a limited income. In this case the budget line illustrates the combination of X and Y , that can be purchased with 50 rupees.

Fig No-1



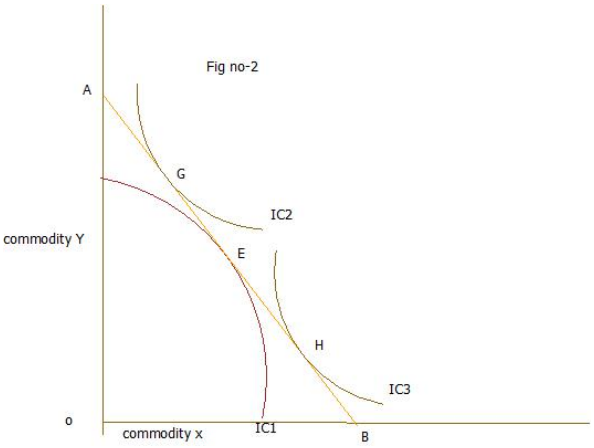
Above diagram explain the process of consumer's equilibrium . The consumer's preference scale is described by means of indifference mapping .Then we impose a budget line that reflects our income. In this case we have r 50 and the price of good X and good Y is r 10 and r 5 respectively. Therefore, we can afford only those combinations that are on or inside the price line GH.

In this diagram every combination on the price line GH cost you the same amount of money. In order to maximize the utility , we will try to reach the highest indifference curve which you could get with a given expenditure of money and given prices of two goods.The budget line touches IC2 at point E represents the most utility. This is the highest attainable indifference curve with which you can get OQ1 units of good X and OQ2 units of good Y for r 50. Any other affordable combinations on the price line GH gives you less satisfaction, because that will be on a lower indifference curve IC1. With this we conclude that the point of tangency between the budget line and an indifference curve represents optimal consumption. It is the affordable combination that maximize our utility.

At the tangency point E the slope of the price line GH and indifference curve are equal. Slope of the indifference curve shows the marginal rate of substitution of X for Y. The price line indicates the ratio between the prices of two goods (PX/PY). Thus at the equilibrium point E,**MRSXY=Price of good x/Price of good y= PX/PY**

The tangency between the given price line and an indifference curve is a necessary but not a sufficient condition consumer's equilibrium .The second condition for consumer's equilibrium is convexity of indifference curve to the origin .**Which means MRSxy is falling at the point of equilibrium**.

Fig no-2



In fig no -1 indifference curve IC2 is convex to the origin at point E, is the optimum or best choice for the consumer .The consumer attains a stable equilibrium position where he is able to consume the most preferred combination which gives him highest utility. In figure no -2 ,IC1 is concave to the origin at point E. Price line AB is tangent to the indifference curve IC1 at point E and the marginal rate of substitution of X for Y is equal to the price ratio of two goods (PX/PY). But E cannot be the position of stable equilibrium because satisfaction would not be maximum .There are other combinations like G and H in the given price line will be on higher indifference curve .The congumer by moving along the given price line AB can go to other tangency pointsuch as G and H and obtain greater satisfaction than at point E.

Marginal Utility and Price

The slope of the indifference curve shows the marginal rate of substitution of good X for good Y, while the slope of price line indicates the ratio between prices of two goods i.e. (PX /PY). Consaumer equilibrium was represented as the combination of good X and good Y can be written as

$$\frac{MU\,of\,Good\,X}{Price\,of\,Good\,X} = \frac{MU\,of\,Good\,Y}{Price\,of\,Good\,Y}$$

Alternatively,

$$\frac{MU\,of\,Good\,X}{MU\,of\,Good\,Y} = \frac{Price\,of\,Good\,X}{Price\,of\,Good\,Y}$$

This equation explains that at the point of equilibrium the relative marginal utilities of good X and good Y should equal to their relative prices. In other words , if good X cost twice as much as good Y , then marginal utility of good X must yield double , then the consumer is in an optimal state.

The slope of the budget constraint equal the relative prices of the two goods. In Fig-1, the slope of the price line equal to the price of goods X and good Y. It means the rate of substitution between the good X and good Y is 1:2. The relative marginal utilities of the two goods are reflected in the slope of the indifference curve. It is the marginal r ate of substitution which is equal to the relative marginal utilities of the two goods.

At the point of optimal consumption E in fig-1 the budget constraint is tangent to the indifference curve IC2. Which means,

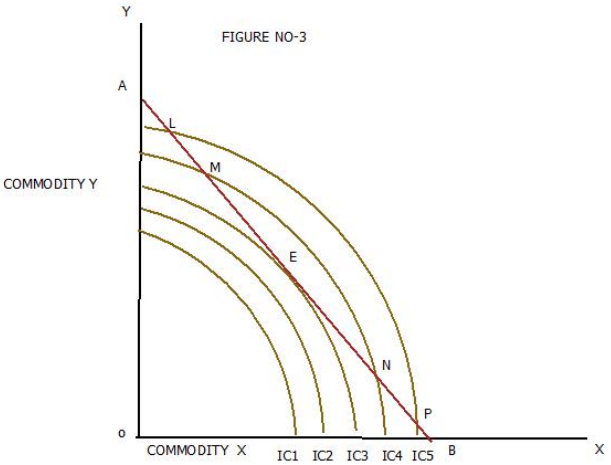
$$\frac{MU\,of\,Good\,X}{MU\,of\,Good\,Y} = \frac{Price\,of\,Good\,X}{Price\,of\,Good\,Y}$$

Or Marginal rate of substitution of X for Y = $\frac{PX}{PY}$

Consumer's Equilibrium and Non-normal cases

As we discussed earlier , indifference curves are usually convex to the origin .Convexity of indifference curve implies the marginal rate of substitution of X for Y decreases .The possibility of concavity cannot be ruled out in some exceptional cases. But at the same time concavity implies **increasing marginal rate of substitution of X for Y** .The consumer will choose or buy only **one good**.

Fig No-3

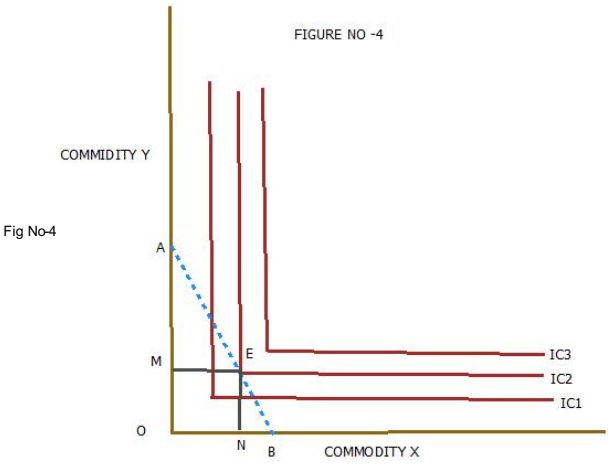


The price line AB is tangent to the indifference curve IC2 . But the consumer cannot be in equilibrium at point E because it can obtain grater satisfaction by moving along the given price line .Consumers satisfaction increases by either moving upward or downward till he reaches the extremity points A on the y-axis or B on the x –axis.

In these cases consumer will choose only one of two goods, depending on his scale of preference and level of satisfaction between good x and good y. In the above diagram A lies on a higher indifference curve than Therefore the consumer will choose only Y and buy OA of commodity Y. It is also noted that consumer is not tangent to the indifference curve at point A .Therefore consumer's equilibrium cannot be establish at point A .

In case of perfect complementary goods ,the shape of the indifference curve have a right –angled .The equilibrium of the consumer cannot be established because only one point of the indifference curve is tangent to the price line AB.

Fig No-4



In figure no -4 the price line AB is tangent to the indifference curve at point E and no other tangency point is possible .**There is no marginal rate of substitution between X and Y but only one combination is available with the consumer that is ON of X and OM of Y** .

Activity

Study the following diagrams and establish consumer's equilibrium.

Fig No-5 and Fig No -6

Fig No-5

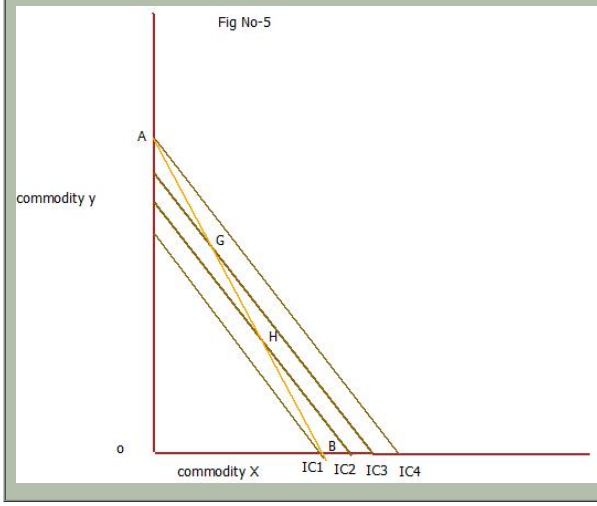
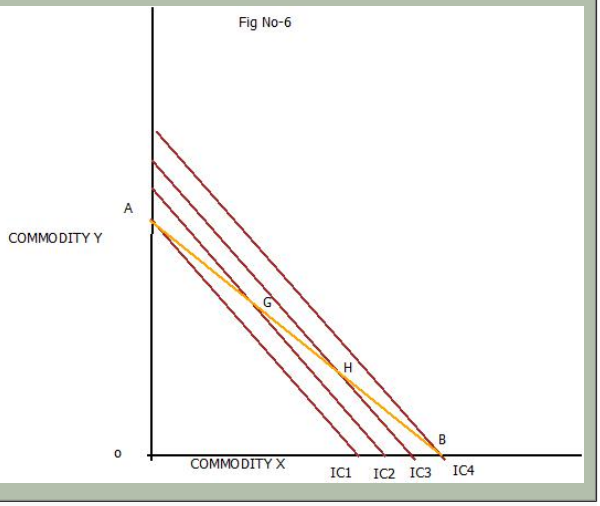


Fig No-6



Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

- 1.Discuss the conditions of consumer's equilibrium.
- 2.Show with diagrame, how does a consumer maximize his satisfaction with limited income and given prices of two goods X & Y.
- 3.Why the marginal rate of substitution of X for Y decreases at the point of equilibrium?
- 4."The tangency between the given price line and an indifference curve is a necessary but not a sufficient condition consumer's equilibrium ."Draw a diagrams to illustrate this statement.

Let's Sum Up

- 1. Indifference curves are usually convex to the origin .Convexity of indifference curve implies the marginal rate of substitution of X for Y decreases .
- 2.Consumer is confronted with the basic conflict between preferences and the prices of the commodities consumer wants to consume. With a given amount of money income to spent, we cannot attain the highest satisfaction but have to settle for less.
- 3.The slope of the indifference curve shows the marginal rate of substitution of good X for good Y, while the slope of price line indicates the ratio between prices of two goods i.e. (PX /PY). Consaumer equilibrium was represented as the combination of good X and good Y can be written as :

$$\frac{MU\,of\,Good\,X}{MU\,of\,Good\,Y} = \frac{Price\,of\,Good\,X}{Price\,of\,Good\,Y}$$

Key Terms

- **Marginal rate of substitution**-The rate at which one good is exchange for other.
- **Indifference map**- A set of indifference curves which ranks the preferences of the consumer. Getting to the indifference curve which is farthest from the origin gives the highest total utility.
- **Price line**-The slope of price line indicates the ratio between prices of two goods i.e. (PX /PY).
- **Budget constraint**-The budget constraints illustrates all combination of goods you can buy

with a limited income. In this case the budget line illustrates the combination of X and Y , that can be purchased with limited resources.

- **Convexity of the indifference curve**-Convexity of indifference curve implies the marginal rate of substitution of X for Y decreases .The possibility of concavity cannot be ruled out in some exceptional cases.

Multichoice Questions

1. Marginal rate of substitution --- at the point of equilibrium.
   - (a) Increases
   - (b) Decreases
   - (c) Remain constant

2. Farthest is the indifference curve from the origin, the---is the total utility.
   - (a) Greater
   - (b) Lesser

3. Higher indifference curve gives higher satisfaction and are--- expensive.
   - (a) Less
   - (b) More

4. The objective of optimal combination is to--- that is compatible with our budget constraint.
   - (a) Reach the highest IC
   - (b) Reach the lowest IC
   - (c) Neither the above

5. Satisfaction is maximum when the marginal rate of substitution of X for Y is ---to the price of X to the price of Y.?
   - (a) Equal
   - (b) Increases
   - (c) Decreases

Submit

Further Readings

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2. Stonier & Hague--Economics
3. Samulson- Principles of Economics
4.H.L. Ahjuja- Principle of Economics

Work in progress, expect frequent changes. **Help and feedback is welcome**. See discussion page.

Category: Work in progress

PRICE EFFECT

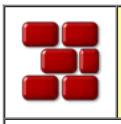
MICROECONOMICS

PRICE EFFECT

Introduction

At the market place a consumer faces market conditions that change constantly. Some times there is increase in the price of a good or there is decrease in the price. As a policy change new taxes are imposed on goods or the goods are subsidized. These situations lead the consumer to change her/his consumption, in order to maximize the utility of spendable income. The analysis of price changes on consumption, therefore, is an important part of the theory of consumer's behavior.

In term of indifference curves analysis,as explained in the section on CONSUMER'S EQUILIBRIUM, we have seen how the optimal consumption combination, the one that maximizes the utility of consumer's spendable income, is determined at a point where budget constraint is tangent to an indifference curve. The **price effect** on the other hand measures consumer's movement from one optimal consumption combination to another, on her/his indifference map, as a result of change in the price of a good. Hick's price effect, discussed in this section, explains the logic and process of decision making by the consumer to arrive at optimal decision, as a response to price changes.



Learning Objectives

After reading this chapter, you are expected to be able to:

1. Understand how does a consumer arrives at the optimal consumption combination in response to change in the price of a good.

2. Comprehend consumer's responses to a price change for different types of goods such as normal, inferior and neutral goods.

3. Get familiar with positive, negative and zero price effects.

4. Realize the impact of a tax or subsidy on a good on consumer's consumption.

Price Effect

The **price effect** represents change in consumer's optimal consumption combination on account of change in the price of a good and thereby changes in quantity purchased, price of another good and consumer's income remaining unchanged. The consumer is better-off when optimal consumption combination is located on a higher indifference curve and vice versa. In the words of ***Lipsey***," The price effect shows how much satisfaction of the consumer varies due to the change in the consumption of two goods, as the price of one changes, the price of the other and money income remains constant." [ ]

Understand that a consumer's responses to a price change differ depending upon the nature of a good, viz. a normal good, inferior good or a neutral good. Accordingly we have different types of price effects such as positive, negative and zero price effects. These types of price effect corresponding to consumer's responses for different nature of goods are summarized in chart.1:

CHART.1 TYPE OF PRICE EFFECTS

Impact of fall in price of good X on its quantity demanded		
Type of Price Effect	**Nature of Good X**	**Quantity Demanded of Good X**
Positive	Normal	↑
Negative	Inferior (including Giffen Goods)	↓
Zero	Neutral	No Change in Quantity Demanded

Thus, a price effect is positive in case of normal goods. There is an inverse relationship between price and quantity demanded. It is negative in case of inferior goods (including Giffen goods) where we find a direct relationship between price and quantity demanded. Finally, price effect is zero in case of neutral goods where consumer's quantity demanded is fixed.

Solve the following activity. We then move on to understand positive, negative and zero price effects with the help of indifference curves.

Activity

1.1

a. There are two types of normal goods. Identify them from the list given below-

i. Basic goods ii. Fixed consumption goods iii. Luxury goods iv. Giffen goods

b. Given below is the list of goods. The list includes two inferior goods. Identify them.

Rice, Carrot, low quality bread, Watch, Milk, Salt, Mobile Phone, Shirt, low quality Wheat and Medicine.

c. Classify the following goods into normal, inferior and neutral goods.

d. Complete the table given below -

Initial Price of Good X (₹)	New Price of Good X (₹)	Initial Quantity Demanded of Good X (Units)	New Quantity Demanded of Good X (Units)	Nature of relationship between the price and quantity demanded of Good X	Nature of Good X
8	12	15	6	?	Normal
5	7	20	?	Direct relationship	?
10	?	5	5	No relationship	?

e. Complete the following -

MRS_{XY}=?

In the following subsections we discuss positive, negative and zero price effects with the help of indifference curves.

Feedback

Next

INCOME EFFECT

University of Mumbai

MICROECONOMICS

INCOME EFFECT

Introduction

Similar to price, income is yet another factor determining buyers quantity purchased. Changes in the level of income lead the consumer to change her/his consumption, in order to maximize the utility of spendable income. Income rise on account of situations such as professional advancement, tax cuts, bonus, windfall financial gains etc. or fall in income caused by loss of job, imposition of new taxes, financial loss etc. influence consumer's consumption decisions. The analysis of income changes on consumption, therefore, is an important part of the theory of consumer's behavior.

In term of indifference curves analysis,just as the price effect, an **income effect** measures consumer's movement from one optimal consumption combination to another, on her/his indifference map, as a result of change in the income. Hick's income effect, discussed in this section, explains the logic and process of decision making by the consumer to arrive at optimal decision, as a response to income changes.

Learning Objectives

After reading this chapter, you are expected to be able to:

understand

1. Understand how does a consumer arrives at the optimal consumption combination in response to change in the level of income.
2. Comprehend consumer's responses to income change for different types of goods such as normal, inferior and neutral goods.
3. Get familiar with positive, negative and zero income effects.
4. Realize the impact of an income tax on consumer's demand.

Income Effect

The **income effect** (IE) measures changes in consumer's optimal consumption combinations caused by changes in her/his income and thereby changes in quantity purchased, prices of goods remaining unchanged. The consumer is better-off when optimal consumption combination is located on a higher indifference curve and vice versa.

Understand that like price effect, a consumer's responses to income changes also differ depending upon the nature of the good, viz. a normal good, inferior good or a neutral good. These are summarized in chart.1:

CHART.1 TYPE OF INCOME EFFECTS

Impact of increase in income on quantity demanded of good X		
Type of Income Effect	**Nature of Good X**	**Quantity Demanded of Good X**
Positive	Normal	↑
Negative	Inferior (including Giffen Goods)	↓
Zero	Neutral	No Change in Quantity Demanded

Thus, an income effect is positive in case of normal goods. There is direct relationship between income and quantity demanded. IE is negative in case of inferior goods (including Giffen goods) where we find inverse relationship between income and quantity demanded. Finally, IE is zero in case of neutral goods where consumer's quantity demanded is fixed.

Positive, negative and zero price effects are discussed with the help of indifference curves in the following subsections.

Positive Income Effect

The positive income effect measures changes in consumer's optimal consumption combination caused by changes in her/his income, prices of goods X and Y, which are normal goods, remaining unchanged.

Assumptions:

1. Consumer's preference for combinations of goods X and Y is given as represented by the indifference map.

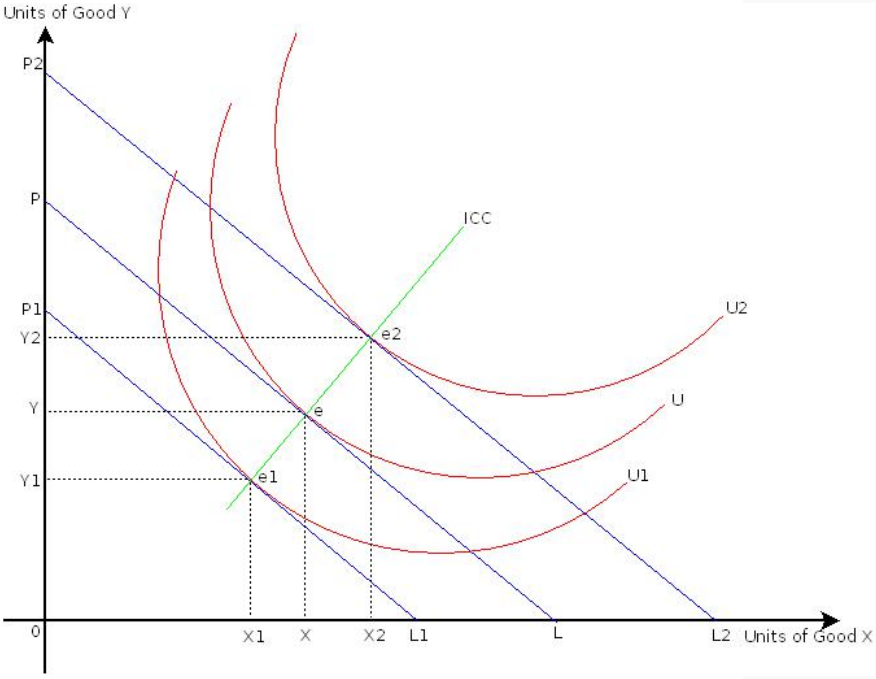
2. Goods X and Y are normal goods.

3. Prices of goods X (Px) and Y (Py) are given and constant.

4. Initial income is given.

Figure.1 starts with the initial optimal consumption combination attained at point **e** at which **OX** units of good X and **OY** units of good Y are purchased.

Figure.1: Positive Income Effect



Whenever income of the consumer change, the entire budget constraint shifts outwards or inwards. In other words it is always a parallel shift. With decrease in income the entire budget constraint shifts inwards and it is parallel to the initial price line. Similarly, when income increases then entire budget constraint shifts outwards and it is parallel to the initial price line.

When consumer's income decreases, the budget constraint moves inwards. This is shown by the budget constraint $\mathbf{P_1L_1}$ in Figure.1. The optimal consumption is located at point $\mathbf{e_1}$ at which the consumer buys $\mathbf{OX_1}$ units of good X and $\mathbf{OY_1}$ units of good Y . Consumer's total utility decreases as the optimal consumption combination is located on a lower indifference curve $\mathbf{U_1}$.

Similarly, when consumer's income increases, the budget constraint moves outwards. This is shown by budget constraint $\mathbf{P_2L_2}$. The optimal consumption is now located at point $\mathbf{e_2}$, at which the consumer buys $\mathbf{OX_2}$ units of good X and $\mathbf{OY_2}$ units of good Y. Consumer's total utility increases as the optimal consumption combination is now located on a higher indifference curve $\mathbf{U_2}$. Chart.2 presents a summary of Figure.1.

CHART.2 Positive Income Effect: Sum Up

	Price Line	Indifference Curve	Optimal Consumption Combination	Units of Good X demanded	Units of Good Y demanded
Initial condition	PL	U	e	OX	OY
Decrease in income	P_1L_1	U_1	e_1	OX_1	OY_1
Increase in income	PL_2	U_2	e_2	OX_2	OY_2

The curve obtained by joining optimal consumption combinations such as $\mathbf{e_1}$, **e** and $\mathbf{e_2}$ is called the **income consumption curve** (ICC). The ICC is a locus of a point that passes through optimal consumption combinations at various levels of income. The ICC in Figure.1 is rising upwards to the right. It shows that the consumer successively moves on a higher indifference curve and becomes better off, with increase in her/his income and she/he also increases consumption of of goods X and Y. Here income effect is positive for goods X as it is a normal good.

Next

SUBSTITUTION EFFECT

University of Mumbai

MICROECONOMICS

SUBSTITUTION EFFECT

Introduction

Similar to price and income, change in relative prices is yet another factor that influences buyer's quantity purchased. Changes in relative prices lead the consumer to change her/his consumption, in order to maximize the utility of spendable income. Consumer's preference for relatively cheaper goods is called the '**sunstitution effect**'. The analysis of relative price changes on consumer's responses is an important part of the theory of consumer's behavior.

In term of indifference curves analysis, the **substitution effect** measures consumer's movement from one optimal consumption combination to another, on her/his indifference map, as a result of change in relative prices. The substitution effect, discussed in this section, explains the logic and process of decision making by the consumer to arrive at optimal decision, as a response to change in relative prices.

In this section we discuss Hicksian and Slutsky's substitution effect. There is a small variation in their approaches. It is important to understand the differences in the approach and their applications in microeconomic analysis.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. Know how a consumer arrives at optimal consumption in response to change in relative prices.

2 Understand the difference between consumer's responses to changes in price of a good and change in the relative price of a good.

3 Appreciate how policy decision are taken in the matters of money compensation for consumer's well being.

Substitution Effect: Related Concepts

The **substituion effect** measures how the optimal consumption combination of a consumer changes as a result of change in the **relative price** alone, **real income** of the consumer remaining unchanged.

We need to understand here the meaning of **relative price change** and **real income** remaining unchanged.

In relative price change, comparison is between prices of two goods. For example, between goods

X and Y, good X becoms relatively cheaper (costlier) when price of good X (P_x)decreases (increases)with price of good Y remaining unchanged.

The real income on the other hand shows purchasing power of the money income. For the given money income, whenever price of a good changes then the purchasing power of consumer's money income increases and so also her/his real income. For example suppose a consumer is spending her/his money income on good X. When the price of the good X decreases, the consumer's purchasing power increases and with same money income she/he is able to purchase more of good X.

Now, a **substitution effect** shows change in the consumer's optimal consumption combination on account of change in the relative price alone and thereby changes in her/his quantity purchased of goods X and Y, real income of the consumer remaining unchanged.

Note that consumer's real income changes whenever there is a relative price change. Then, how do we study substitution effect which shows changes in consumer's purchases on account of relative price changes, consumer's real income remaining unchanged?

A *compensatory variation in money income* method is used to neutralize the real income change that takes place on account of the relative price change. The consumer's money income is sufficiently adjusted to compensate her/him for real income changes on account of change in the price of a good.

Solve the following activity to gain adequate clarity on the concepts just discussed, before we move on to understanding substitution effect with the help of indifference curves.

Activity

1.1

Select the correct answer from the options given-

a. Smita's income is Rs. 1, 000/-. She wants to spend entire income on good X. Price of one unit of good X is Rs. 20. What is the purchasing power of Smita's income?

i.Rs. 50 ii.50 units of good X iii.Rs. 1000/-

b. Smita's income is same Rs. 1, 000/- which she wants to spend only on good X. Price of one unit of good X is now Rs. 50. What is change in the purchasing power of her income now?

i.Purchasing Power of the income has increased ii.Purchasing Power of the income has decreased iii.Purchasing Power of the income has remained Unchanged

c. Amman's income is Rs. 1, 000/-. He wants to spend entire income on good Y. Price of one unit of good Y is Rs. 25. What is Amman's real income?

i.Rs. 40 ii.40 units of good X iii.Rs. 1000/-

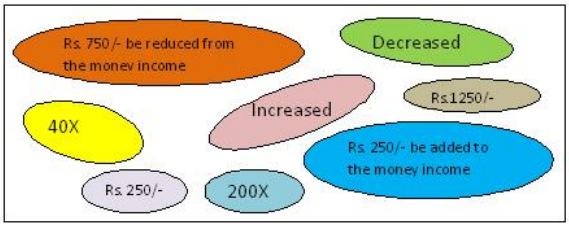
d. Amman's income is Rs. 5, 000/- He now wants to spend his income on two goods X and Y. Price of one unit of X is Rs.20 and Price of one unit of Y is Rs. 25. What is Amman's real income?

i.Rs. 5, 000/- ii. 100X + 120Y iii. 200 Y

d. The following table stats with Zoya's initial income Rs. 1, 000/-, price of good X (P_X), Zoya's real income expressed in terms of good X. Complete the table given below by filling in correct options from the answer box given below -

Money Income	Price of Good X (Rs. P_X)	Real Income in terms of good X	Change in Real Income	Compensatory Variation in Money Income to keep the real income unchanged after change in the price of good X (P_X)	Total income after adjustments in Compensatory Variation in Money Income
1, 000/-	20	50X	-	-	-
1, 000/-	50	20X	Decreased	Rs. 1, 500/- be added to the money income	Rs. 2, 500/-
1, 000/-	25	?	?	?	?
1, 000/-	10	100X	Increased	Rs.500/-be reduced from the money income	Rs 500/-
1, 000/-	5	?	?	?	?

ANSWER BOX



Next

BREAK UP

University of Mumbai

MICROECONOMICS

DECOMPOSITION OF PRICE EFFECT

Introduction

In the section on price effect we have discussed how a consumer rearranges her/his optimal consumption combination, to once again maximize utility of her/his spendable income, as a response to change in the price of a good. We have also seen consumer's responses to a price change in case of different types of goods.

Learning Objectives

After reading this chapter, you are expected to be able to:

understand

1.

2.

1. Meaning of Decomposition of Price Effect

The price effect is viewed as a combination of income and substitution effects. The substitution effect always works in one direction. A consumer is always induced to buy more units of a cheaper good. Income effect on the other hand could be positive, negative or zero in case of normal, inferior (including Giffen goods) or neutral goods respectively. Refer chart.1 of the section on income effect.

Therefore, the price effect, as the final outcome of the substitution and income effects, depends on their relative direction and magnitude. This is summarized in Chart.1.

CHART.1 DECOMPOSITION OF PRICE EFFECT

Impact of a fall in the price of good X				
Nature of Good X	**Substitution Effect** (Direction of Change)	**Income Effect** (Direction of Change)	**Substitution & Income Effects** (Magnitude of Change)	**Price Effect**
Normal Good	Increase in quantity demanded of Good X	Increase in quantity demanded of Good X	-	Positive
Inferior Good	Increase in quantity demanded of Good X	Decrease in quantity demanded of Good X	SE > IE	Positive
Giffen Good	Increase in quantity demanded of Good X	Decrease in quantity demanded of Good X	SE< IE	Negative

The substitution and income effects work in the same direction when good X is a normal good. The final price effect is then positive. The consumer tends to increase consumption of Good X with fall in its price.

When good X is an inferior good, then the substitution and income effects work in opposite directions. When price of good X (P_X)falls, the consumer tends to increase consumption of good X as a result of substitution effect. However, income effect here is negative. The price effect then depends on relative magnitude of the two effects. The final price effect is positive for inferior goods, as change in the consumption of good X as a result of the substitution effect is greater than the income effect.

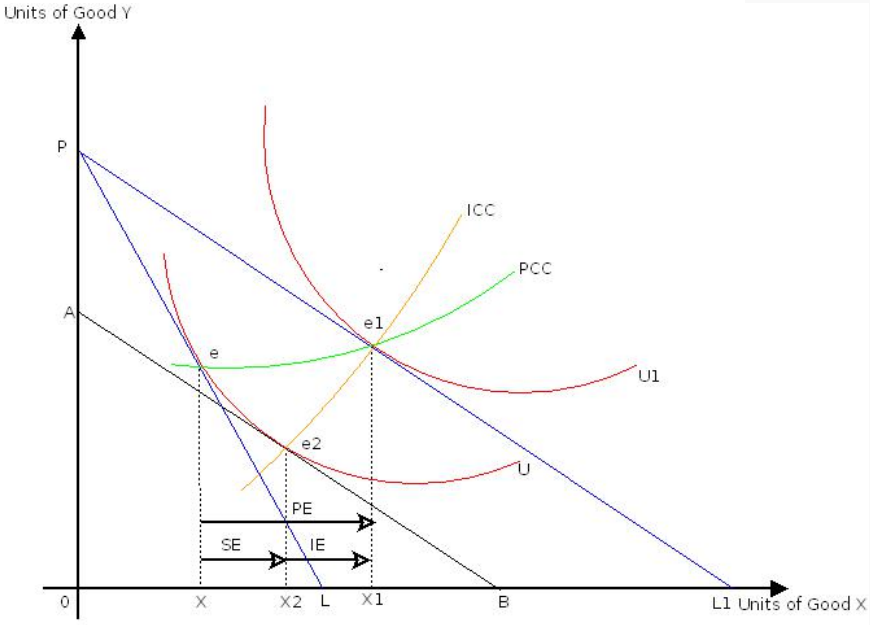
When good X is a Giffen good then also substitution and income effects work in opposite directions. When price of good X (P_X)falls, the consumer tends to increase consumption of good X as a result of substitution effect. However, income effect here is negative. Further, the magnitude of change in units of good X on account of the substitution effect is less than the income effect. The price effect, the final outcome, is therefore negative.

We are now going to study decomposition of the price effect into income and substitution effects with the help of indifference curves.

2. Decomposition of Price Effect: Normal Goods

We use the method of compensatory variation in money income in order to decompose the price effect into the income and substitution effects. This is shown in Figure.1. It starts with the initial optimal consumption combination attained at point e

Figure.1 Decomposition of Price Effect: Normal Goods



IE = Income Effect = OX2 to OX1
SE = Substitution Effect = OX to OX2
PE = Price Effect = OX to OX1

When the price of good X falls, the consumer buys OX_1 units of good X at the optimal consumption combination e_1 on the budget constraint PL_1 and a higher indifference curve U_1. The price consumption curve (PCC) obtained by joining points e and e_1 rises upwards.

This price effect can be decomposed into the substitution and income effects. This is done by

using the method of compensatory variation in consumer's money income. Suppose, we reduce consumer's money income at optimal consumption combination e_1 by the amount that is just sufficient to bring her/him back on the initial indifference curve U. This will lead to a downward shift in the budget constraint as shown by budget constraint AB which is parallel to budget constraint PL_1. Commodity X is relatively cheaper on budget constraint AB than on PL. e_2 is the optimal consumption combination at which the consumer is buying OX_2 units of good X. It shows consumer's preference for cheaper good X even after reduction in her/his money income.

Suppose the consumer is given back the money income that was reduced under compensatory variation in her/his money income. The consumer then shifts to optimal consumption combination e_1. Thus movement from e_2 to e_1 represents income effect. Income effect here is positive as good X is a normal good.

Thus, price effect is the net total of substitution effect and income effect. Consumer's movement from optimal consumption combination e to e_1, as a result of price effect, can be decomposed into two effects. First the substitution effect, i.e., consumer's movement from e to e_2 and then the income effect, i.e., consumer's movement from optimal consumption combination e_2 to e_1. Thus,

Price Effect = Substitution Effect + Income Effect

In terms of optimal consumption combination:

e to e_1 = e to e_2 + e_2 e_1

In terms of units of good X purchased:

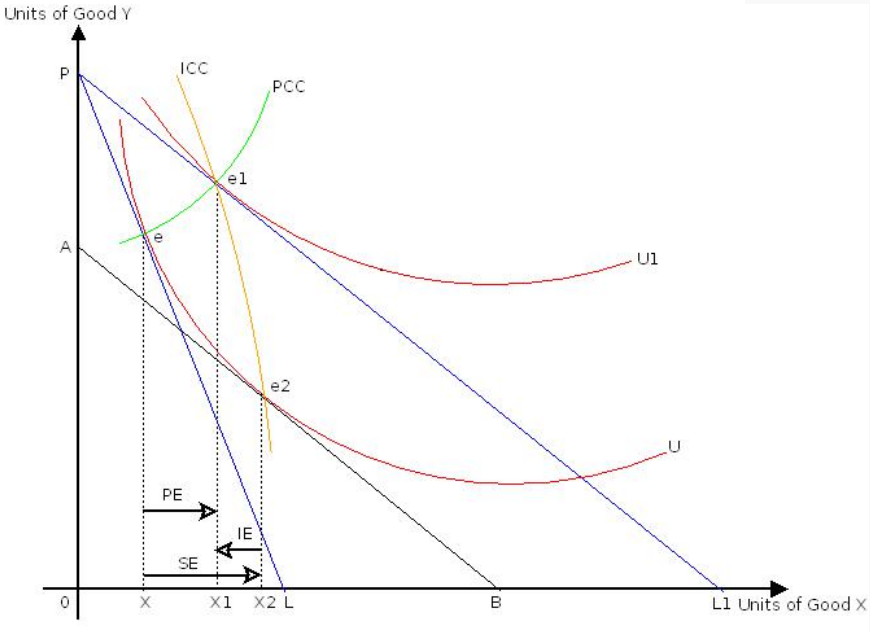
$XX_1 = XX_2 + X_2 X_1$

Here, as shown in chart.1, the substitution and income effects are working in same direction. Good X becomes relatively cheaper with fall in its price and the consumer tends to increase its consumption. The income effect is also positive. The consumer tends to increase consumption of good as it is a normal good. This is shown by the Income Consumption Curve (ICC) which is rising upwards The final price effect is, therefore, positive. The consumer finally tends to increase consumption of good X from OX to OX_1 with a fall in its price (P_x).

3. Decomposition of Price Effect: Inferior Goods

Decomposition of the price effect into substitution and income effects in case of an inferior good is shown in Figure.2 in which good X is an inferior good. It starts with the initial optimal consumption combination attained at point e

Figure.2 Decomposition of Price Effect: Inferior Goods



IE = Income Effect = OX2 to OX1
SE = Substitution Effect = OX to OX2
PE = Price Effect = OX to OX1

When the price of good X falls, the consumer buys OX_1 units of good X at the optimal consumption combination e_1 on the budget constraint PL_1 and a higher indifference curve U_1. The price consumption curve (PCC) obtained by joining points e and e_1 rises upwards. It shows positive price effect. When price of good X falls the consumer increases consumption of good X from OX to OX_1.

Same as section 2, this price effect can be decomposed into the substitution and income effects by using the method of compensatory variation in consumer's money income. Suppose, we

reduce consumer's money income at optimal consumption combination point e_1 by the amount that is just sufficient to bring her/him back on the initial indifference curve U. This will lead to a downward shift in the budget constraint as shown by budget constraint AB which is parallel to budget constraint PL_1. Commodity X is relatively cheaper on budget constraint AB than on PL. e_2 is the optimal consumption combination at which the consumer is buying OX_2 units of good X. It shows consumer's preference for cheaper good X even after reduction in her/his money income.

Suppose the consumer is given back the money income that was reduced under compensatory variation in her/his money income. The consumer then shifts to optimal consumption combination e_1. Thus movement from e_2 to e_1 represents income effect. Income effect here is negative as good X is an inferior good.

Thus, price effect is the net total of substitution effect and income effect. Consumer's movement from optimal consumption combination e to e_1, as a result of price effect, can be decomposed into two effects. First the substitution effect, i.e., consumer's movement from e to e_2 and then the income effect, i.e., consumer's movement from optimal consumption combination e_2 to e_1. Thus,

Price Effect = Substitution Effect + Income Effect

In terms of optimal consumption combination:

e to e_1 = e to e_2 + e_2 e_1

In terms of units of good X purchased:

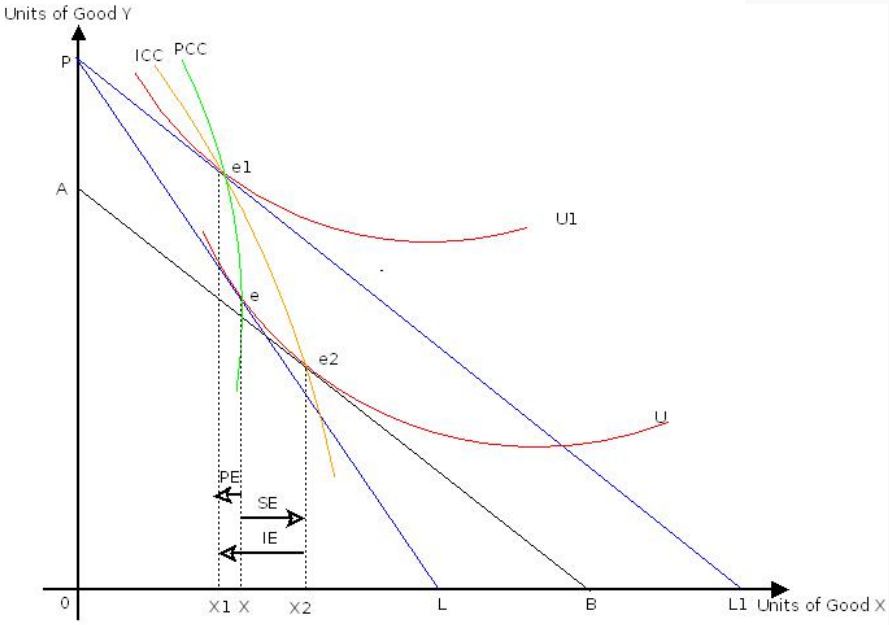
$XX_1 = XX_2 + X_2 X_1$

Here, as shown in chart.1, the substitution and income effects are working in opposite direction. Good X becomes relatively cheaper with fall in its price and the consumer tends to increase its consumption. However the income effect is negative. The consumer tends to reduce consumption of good X as it is an inferior good. This is shown by the Income Consumption Curve (ICC) which is rising upwards but bending backwards. The final price effect is, however, positive as the magnitude of substitution effect is greater than the income effect. The consumer finally tends to increase consumption of good X from OX to OX_1 with a fall in its price (P_x).

4. Decomposition of Price Effect: Giffen Goods

Decomposition of the price effect into substitution and income effects in case of a Giffen good is shown in Figure.3 in which good X is a Giffen good. It starts with the initial optimal consumption combination attained at point e

Figure.3 Decomposition of Price Effect: Giffen Goods



IE = Income Effect = OX2 to OX1
SE = Substitution Effect = OX to OX2
PE = Price Effect = OX to OX1

When the price of good X falls, the consumer buys OX_1 units of good X at the optimal consumption combination e_1 on the budget constraint PL_1 and a higher indifference curve U_1. The price consumption curve (PCC) obtained by joining points e and e_1 rises upwards but bending backwards towards Y-axis. It shows negative price effect. When price of good X falls the consumer also reduces consumption of good X from OX to OX_1.

Same as above, this price effect can be decomposed into the substitution and income effects by using the method of compensatory variation in consumer's money income. Suppose, we reduce consumer's money income at optimal consumption combination point e_1 by the amount that is just sufficient to bring her/him back on the initial indifference curve U. This will lead to a downward shift

in the budget constraint as shown by budget constraint AB which is parallel to budget constraint PL_1. Commodity X is relatively cheaper on budget constraint AB than on PL. e_2 is the optimal consumption combination at which the consumer is buying OX_2 units of good X. It shows consumer's preference for cheaper good X even after reduction in her/his money income.

Suppose the consumer is given back the money income that was reduced under compensatory variation in her/his money income. The consumer then shifts to optimal consumption combination e_1. Thus movement from e_2 to e_1 represents income effect. Income effect here is negative as good X is a Giffen good.

Thus, price effect is the net total of substitution effect and income effect. Consumer's movement from optimal consumption combination e to e_1, as a result of price effect, can be decomposed into two effects. First the substitution effect, i.e., consumer's movement from e to e_2 and then the income effect, i.e., consumer's movement from optimal consumption combination e_2 to e_1. Thus,

Price Effect = Substitution Effect + Income Effect

In terms of optimal consumption combination:

e to e_1 = e to e_2 + e_2 e_1

In terms of units of good X purchased:

$XX_1 = XX_2 + X_2 X_1$

Here, as shown in chart.1, the substitution and income effects are working in opposite direction. Good X becomes relatively cheaper with fall in its price and the consumer tends to increase its consumption. However the income effect is negative. The consumer tends to reduce consumption of good X as it is an inferior good. This is shown by the Income Consumption Curve (ICC) which is rising upwards but bending backwards. The final price effect is also negative as the magnitude of substitution effect is less than the income effect. The consumer finally tends to reduce consumption of good X from OX to OX_1 with a fall in its price (P_x).

DEMAND

University of Mumbai

MICROECONOMICS

DERIVATION OF THE CONSUMER'S DEMAND CURVE

Introduction

r,,gtv

Learning Objectives

After reading this chapter, you are expected to be able to:

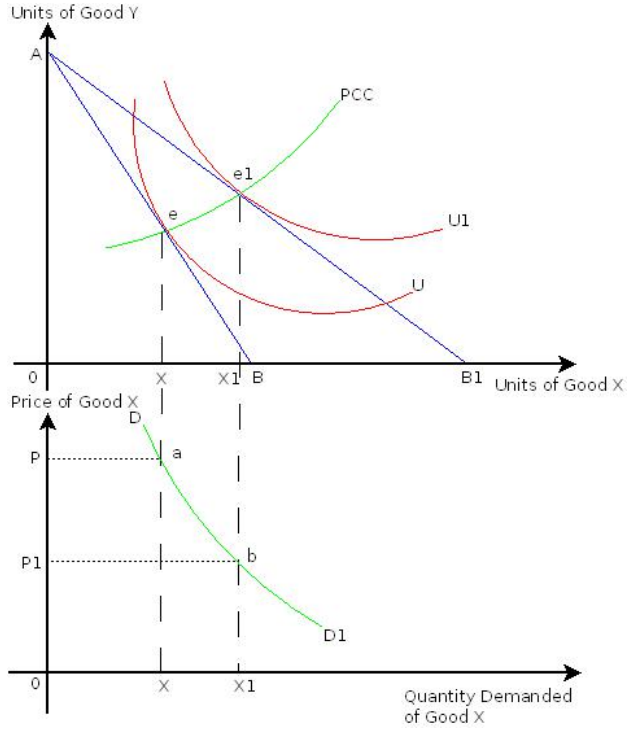
understand

1. 2.

Derivation of the Consumer's Demand Curve: Normal Goods

We have already seen how the price consumption curve traces the effect of a change in price of a good on its quantity demanded. However, it does not directly show the relationship between the price of a good and its corresponding quantity demanded. It is the demand curve that shows relationship between price of a good and its quantity demanded. In this section we are going to derive the consumer's demand curve from the price consumption curve . Figure.1 shows derivation of the consumer's demand curve from the price consumption curve where good X is a normal good.

FIGURE.1 Derivation of the Demand Curve: Normal Goods



The upper panel of Figure.1 shows price effect where good X is a normal good. AB is the initial price line. Suppose the initial price of good X (P_x) is OP. e is the initial optimal consumption combination on indifference curve U. The consumer buys OX units of good X. When price of X (P_x)falls, to say OP_1, the budget constraint shift to AB_1. The optimal consumption combination is e_1 on indifference curve U_1. The consumer now increases consumption of good X from OX to OX_1 units. The Price Consumption Curve (PCC) is rising upwards.

Chart.1 shows the demand relationship derived form the price consumption curve.

Chart.1

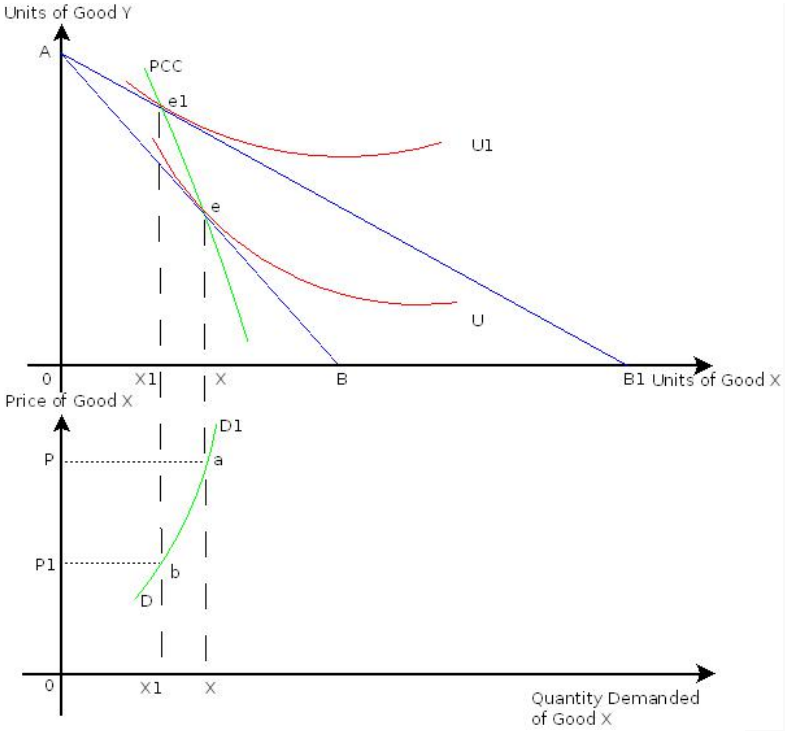
	Price of Good X	Quantity Demanded of Good X
Initial Price & Quantity of Good X	OP	OX
Fall in price & corresponding Quantity Demanded	OP_1	OX_1

The lower panel of Figure.1 shows this price and corresponding quantity demanded of good X as shown in Chart.1. At initial price OP, quantity demanded of good X is OX. This is shown by point a. At a lower price OP_1, quantity demanded increases to OX_1. This is shown by point b. DD_1 is the demand curve obtained by joining points a and b. The demand curve is downward sloping showing inverse relationship between price and quantity demanded as good X is a normal good.

Derivation of the Consumer's Demand Curve: Giffen Goods

In this section we are going to derive the consumer's demand curve from the price consumption curve in the case of inferior goods. Figure.2 shows derivation of the consumer's demand curve from the price consumption curve where good X is an inferior good.

FIGURE.2 Derivation of the Demand Curve: Inferior Goods



The upper panel of Figure.2 shows price effect where good X is an inferior good. AB is the initial price line. Suppose the initial price of good X (P_x)is OP. e is the initial optimal consumption combination on indifference curve U. The consumer buys OX units of good X. When price of X P_x) falls, to say OP_1, the budget constraint shift to AB_1. The optimal consumption combination is e_1 on indifference curve U_1. The consumer now reduces consumption of good X from OX to OX_1 units as good x is inferior. The Price Consumption Curve (PCC) is rising upwards and bending backwards towards the Y-axis.

Chart.1 shows the demand relationship derived form the price consumption curve.

Chart.2

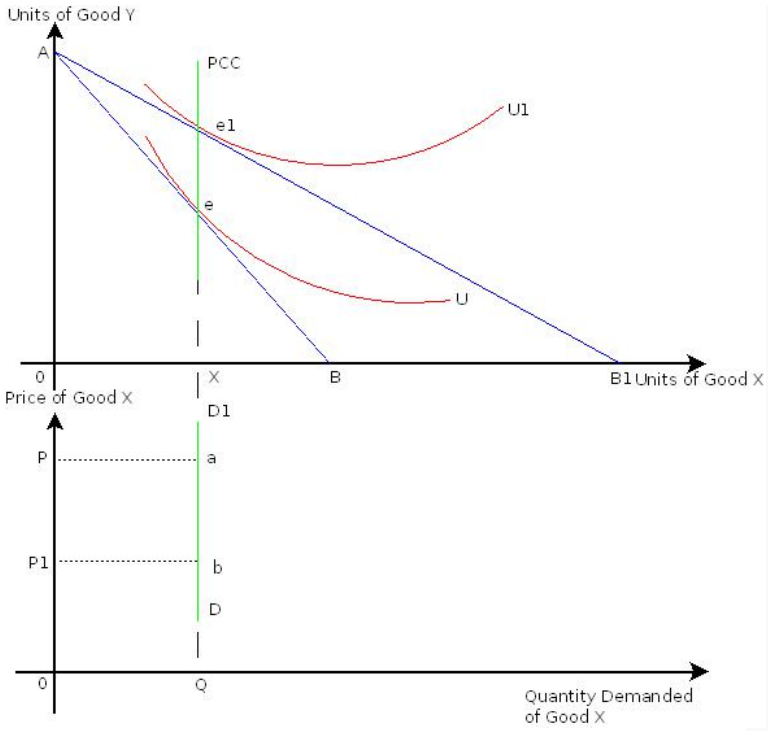
	Price of Good X	Quantity Demanded of Good X
Initial Price & Quantity of Good X	OP	OX
Fall in price & corresponding Quantity Demanded	OP_1	OX_1

The lower panel of Figure.2 shows this price and corresponding quantity demanded of good X as shown in Chart.2. At initial price OP, quantity demanded of good X is OX. This is shown by point a. At a lower price OP_1, quantity demanded decreases to OX_1. This is shown by point b. DD_1 is the demand curve obtained by joining points a and b. The demand curve is upward sloping showing direct relationship between price and quantity demanded as good X is an inferior good.

Derivation of the Consumer's Demand Curve: Neutral Goods

In this section we are going to derive the consumer's demand curve from the price consumption curve in the case of neutral goods. Figure.3 shows derivation of the consumer's demand curve from the price consumption curve where good X is a neutral good.

FIGURE.3 Derivation of the Demand Curve: Neutral Goods



The upper panel of Figure.3 shows price effect where good X is a neutral good. AB is the initial price line. Suppose the initial price of good X (P_X) is OP. e is the initial optimal consumption combination on indifference curve U. The consumer buys OX units of good X. When price of X (P_X)falls, to say OP_1, the budget constraint shift to AB_1. The optimal consumption combination is e_1 on indifference curve U_1 at which the consumer buys same OX units of good X as it is a neutral good. The Price Consumption Curve (PCC) is a vertical straight line.

Chart.3 shows the demand relationship derived form the price consumption curve.

Chart.3

	Price of Good X	Quantity Demanded of Good X
Initial Price & Quantity of Good X	OP	OX
Fall in price & corresponding Quantity Demanded	OP_1	OX_1

The lower panel of Figure.3 shows this price and corresponding quantity demanded of good X as shown in Chart.3. At initial price OP, quantity demanded of good X is OX. This is shown by point a. At a lower price OP_1, quantity demanded remains fixed at OX. This is shown by point b. DD_1 is the demand curve obtained by joining points a and b. The demand curve is a vertical straight line showing that the consumption of good X is fixed as good X is a neutral good.

GIFFEN'S PARADOX

MICROECONOMICS

GIFFEN'S PARADOX

Introduction

Sir Robert Giffen(22 July 1837 – 12 April 1910), was a

Scottish statistician and economist.

Giffen goods are the inferior goods that are tied in the mind of individuals to hard times.These inferior goods are known as Giffen goods named after Sir Robert Giffen. Marshall introduced the Giffen's paradox as an exception to the law of demand in the third edition of his book Principles of Economics (l895) as, ' There are however some exceptions. For instance, as Mr Giffen has pointed out, a rise in the price of bread makes so large a drain on the resources of the poorer labouring families and raises so much the marginal utility of money to them, that they are forced to curtail their consumption of meat and the more expensive farinaceous foods: and, bread being still the cheapest food which they can get and will take, they consume more, and not less of it. But such cases are rare; when they are met with they must be treated separately (p. 208).'

Learning Objectives

After reading this chapter, you are expected to be able to:

OBSERVE: When income changes how the consumers' respond in the form of changes in demand towards different types of commodities.

Concept of Giffen's Paradox

In case of Giffen goods quantity demanded will vary directly with price. Again an increase in income will generally cause the consumption of most goods to increase. But there are a few goods for which the pattern is reversed. It means an increase in income causes a decrease in consumption. Here for a good to be Gi□en, the income e□ect must dominate the substitution e□ect.

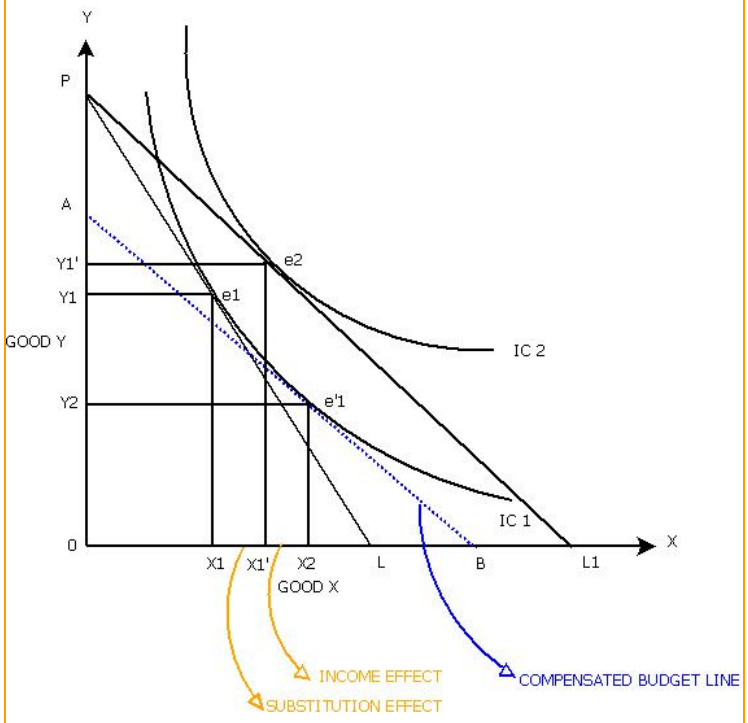
According to J.R. Hicks, for a good to be a Giffen good, following three conditions are essential:

1. The good must be inferior with strong negative income effect.

2. The substitution effect must be small.

3. The proportion of income spent for the inferior good must be very large.

Diagrammatic Representation of Giffen Goods:



Explanation of the Diagram:

Most students find it very frustrating to illustrate the case of a Giffen good using indifference curves and budget lines because rarely does a diagram come out right the first time. There are two goods, X and Y, and we want to show that X is a Giffen good, i.e., a decrease in its price would cause its consumption to fall. The Substitution Effect occurs when with fall in price, the quantity increases; with adjusting income in such a way that the real purchasing power of the consumer remains the same as before.It is called as 'Compensatory variation in income'.It isolates substitution effect. In the above diagram, AB price line depicts the compensated budget line.AB price line is tangent to the IC1 at point e'1.When Income effect is positive and very strong then there is exception to the law of demand;that is the case of Giffen goods.

For advanced students, the reason why this would work can be given. Recall the Slutsky equation.(Refer: Decomposition of Price Effect: Giffen Goods by Dr Rekha Mahadeshwar Break Up) where the income effect (which is responsible for the perverse effect) is proportional to the budget share of the good. By locating e1 very close to the horizontal axis, we make this share large and, hence, increase the likelihood that the good would come out Giffen.

Refer: Tran Huu Dung, Wright State University[[1]]

Case Study

Do such goods ever exist?

1.Legend describes the Irish potato famine as a possible example of Giffen Goods. In the apocryphal example of the Irish famine, the rising price of potatoes so squeezed family incomes that they had to give up nicer but less essential foods and buy more essentials, a dietary staple - namely potatoes.

2. A new study by Robert Jensen and Nolan Miller, economists at Harvard's Kennedy School, answers this question in the affirmative: 'we conducted a field experiment in which for five months, randomly selected households were given vouchers that subsidized their purchases of their primary dietary staple. Building on the insights of our earlier analysis, we studied province of China: Hunan in the south, where rice is the staple good. Using consumption surveys gathered before, during and after the subsidy was imposed, we find strong evidence that poor households in Hunan exhibit Giffen behavior with respect to rice. That is, lowering the price of rice via the experimental subsidy caused households to reduce their demand for rice, and removing the subsidy had the opposite effect.'

Activity

Try this QUIZ

{{SLMexample)) Example:The classic example given by Marshall is of inferior quality staple foods, whose demand is driven by poverty that makes their purchasers unable to afford superior foodstuffs. As the price of the cheap staple rises, they can no longer afford to supplement their diet with better foods, and must consume more of the staple food.}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

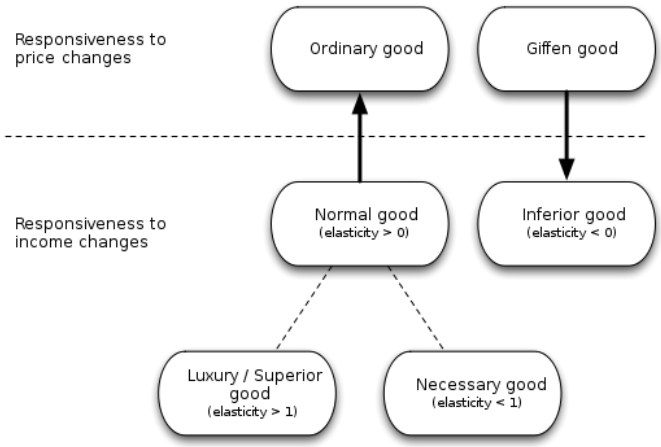
Let's Sum Up

In case of Giffen goods,both Price Effect and Income Effect are negative.

The negative Income Effect is stronger to outweigh the Positive substitution Effect.

Giffen goods are exception to the Law of Demand.

Key Terms



Source:Wikipidia

Extension exercise

Enter your text here

References and Bibliography

Further Readings

Limitations to Indifference Curve Analysis

MICROECONOMICS

Limitations to Indifference Curve Analysis

The indifference curve analysis has been widely accepted by the Modern economists and is helpful in the explanation of many economic phenomena. Hicks, Allen & others claim that the indifference curve analysis is superior to the Marginal Utility analysis as it is not based on the unrealistic assumption that consumers can measure the satisfaction they get from each unit they buy.Replacing the assumption of Cardinal mesurement of utility by ordinal measurement is a definite improvement. Howevever in that case, Marginal Utility becomes non-measurable.As per George J. Stigler, "the indifference curve analysis assumes only that the consumer is able to decide

Learning Objectives

After reading this chapter, you are expected to be able to:

Learning Goal 1: Demonstrate an understanding and significance of the concept of Revealed Preference.

Learning Goal 2: to establish the law of demand without the use of indifference curves on the basis of revealed preference axioms.

Assumptions

Case Study

Enter your text here

Activity

Write your activity here

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Let's Sum Up

Key Terms

Extension exercise

Enter your text here

Further Readings

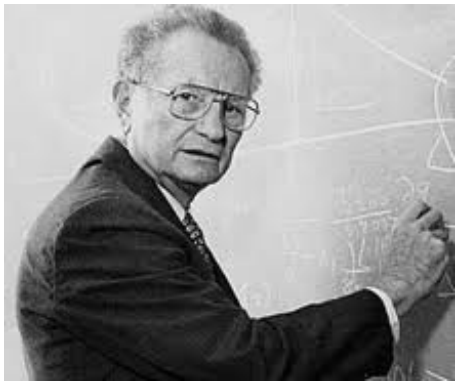
Source: P.A. Samuelson,'A note on the Pure Theory of Consumers' Behaviour', Econometrica NS.5(1938) Varian, H. (1992) Microeconomic Analysis, Third edition, New York: Norton, Section 8.7

Revealed Preference Theory

MICROECONOMICS

Revealed Preference Theory

Introduction



Paul Anthony Samuelson (May 15, 1915 – December 13, 2009)

Paul Samuelson has a long list of accomplishments -- A John Bates Clark Medal, a Nobel Prize.Most importantly he is responsible for popularizing Keynesian economics in Post-Second World War.Revealed preference theory was introduced by Nobel Laureate Paul Samuelson in 1938 in the article entitled 'consumption Theory in terms of Revealed Preference'.

As per the theory it is possible to discern consumer behaviour On the basis of variable prices and income. In other words, it has made possible to establish the law of demand without the use of indifference curves on the basis of revealed preference axioms.

According to Samuelson, a consumer with a given income will buy a mixture of products; as his income changes, the mixture of goods and services will also change. It is assumed that the consumer will never select a combination which is more expensive than that which was previously chosen. An economic theory of consumption behavior which asserts that the best way to measure consumer preferences is to observe their purchasing behavior. Revealed preference theory works on the assumption that consumers have considered a set of alternatives before making a purchasing decision. Thus, given that a consumer chooses one option out of the set, this option must be the preferred option.

Learning Objectives

After reading this chapter, you are expected to be able to:

Learning Goal 1: Demonstrate an understanding and significance of the concept of Revealed Preference.

Learning Goal 2: to establish the law of demand without the use of indifference curves on the basis of revealed preference axioms.

Assumptions

The assumption implies that preferences are transitive.

In other words, if we have bundles A, B, C, ..., Z, and A is revealed preferred to B, which is in turn revealed preferred to C and so on, then it follows that A is revealed preferred to C through Z. Under these hypotheses, economists are able to chart indifference curves which are employed in many models of consumer theory.

{{{Subsection}}}

The theory is especially useful in providing a method for analyzing consumer choice empirically. Revealed preference theory deliberately ignores measures of utility and indifference. An empirical utility theory, it superseded cardinal utility in consumer theory.The revealed preference theory is 'behaviourist', while the indifference curve approach is 'introspective'.

Case Study

Enter your text here

Activity

Write your activity here

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Let's Sum Up

1.If one bundle is chosen when another could have been chosen, we say that the first bundle is revealed preferred to second.

2.if the consumer is always choosing the most prefered bundles he or she can afford, this means that the chosen bundles must be preferred to the bundles that were affordable but weren't chosen.

3. Observing the choices of consumers can allow us to "recover" or estimate the preferences that lie behind those choices. The more choices we observe,the more precisely we can estimate the underline preferences that generated those choices.

4. The Weak & Strong Axioms of Revealed Preference are necessary conditions that consumer choices have to obey if they are to be considered with the economic model of optimising choice.

Hal R. Varian, Intermediate Microeconomics, Fourth Edition

Key Terms

Extension exercise

Enter your text here

Further Readings

Source: P.A. Samuelson,'A note on the Pure Theory of Consumers' Behaviour', Econometrica NS.5(1938) Varian, H. (1992) Microeconomic Analysis, Third edition, New York: Norton, Section 8.7

PRODUCTION FUNCTION

(Redirected from Microeconomics)

University of Mumbai

Production Function

Introduction

Units on demand, elasticity of demand or consumer behaviour dealt with demand side of the market. Firms are the ones which supply the goods and services to the market. In order to have an understanding of the market, it is essential to learn about the behaviour of the firms. There are strong similarities between the optimising decisions made by firms and those made by consumers. The theory of firm describes how firms can make cost-minimising decisions, if they want to increase production, whether they should hire more labour or construct new plants or go for both.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. Understand different types of ownership of a firm
2. Define short-run and long-run production function
3. Understand the relationship between inputs and output in the short run with the help of law of variable proportions
4. Understand the relationship between inputs and output in the long run with the help of law of returns to scale
5. Define Cobb-Douglas production function
6. Clarify all these concepts with the help of a case study

Types of Firm

There are different types of firms that operate in the market. A road-side milk supplier is different from the other milk supplying firms Mother Dairy, Nestle, Gokul, etc. There are different types of firms. A quick review of the types of ownership of firms would be useful at this stage.

1.***Individual Proprietorship***– It refers to any business that is owned by a single owner or a single business family. A small provisional stores or a laundry shop is an individual proprietorship. Here the proprietor is responsible for anything good or bad happens to the business. Such firms may be registered or unregistered ones.

2. ***Partnership*** – Here there are groups of people who own the business. All of them are co-owners. There may be unlimited liability or each partner is totally liable for all what happens to the firm. That means if some payments are to be made and the other partners can not make, then one of them is fully liable to make the payments.

3. ***Corporations***– In this form of a firm ownership, anyone can become a share-holder of a firm

and have limited liability equal to his ownership share in the company. That means if Mr. X holds 20% of the company's share, he is responsible for 20% of outstanding payments of that company. MTNL, Reliance Industries, Tata Motors, etc are the examples of corporations.

Basic concepts related to the Theory of Firm

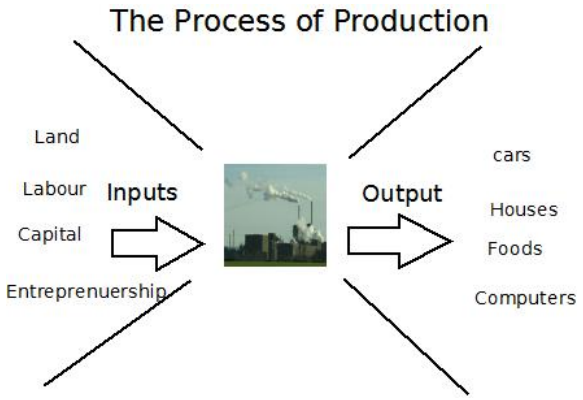
Objectives of Firm

Like the rational consumers aim at maximising their satisfaction or utility, the firms aim at maximising their profits. Apart from profit maximisation, firms may aim at sales maximisation, revenue maximisation, good will among the consumers. Depending upon the type of ownership of a firm, the nature of objectives may change. For example, it is argued that, under corporation as a form of firm's ownership, the objective of profit maximisation is replaced by the objective of sales maximisation. This is because, in big corporations, ownership of firm is separated from its management.

With this background information about the firm, its ownership structure and its objectives, let us begin with the analysis of the concept of production. A story of production and firm's behaviour will be easier to follow once we take a note of following concepts:-

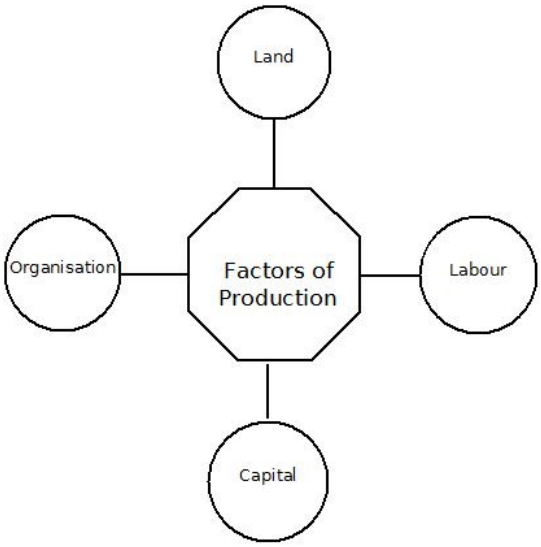
1.**Prodution process**

It is process by which the inputs or factors of production are transformed into output. In a cement factory, inputs include labour of its workers, raw materials such as limestone, sand, clay, and capital invested in equipment required to produce cement. Output of cement industry would be different varieties of cement.



2.**Inputs or factors of production**

There are four factors of production, land, labour, capital and organisation. All these are brought together in the process of production to form a final output. Land represents natural resources like land plots, minerals, water, oil, etc. Labour is considered to be an integral part of the process of production. Both skilled and unskilled labour is required by the firm. Capital represents physical capital in the form of machinery, equipment, plants, factory and other physical assets. Finally, organisation/entrepreneur brings all these factors of production together to transform them into a finished product.



3.**Short run and the long run period**

In the theory of production, short run is a period during which some of the factors of production mentioned above are constant. For example, in the short run, firm can not buy a new machine. So capital may remain constant in the short run. If it has to increase production in the short run, it may do so by hiring more contract labour to work on the same stock of machines or equipment. Long run, on the other hand, is a period, during which all the factors of production can vary. A firm can not only hire more/less labour but also can increase/reduce size of plant, buy more/sale existing

stock of capital, and so on. One should keep in mind, **the short-run and long-run period in production theory, is not time specific.** For a poultry firm, for example, long run will be a period, till it increases its capacity by adding poultry stock (which may take say 2 weeks). But for a cement factory, it may take 2 years to increase its capacity by constructing a new plant. So long run for cement factory may be 2 years.

Concept of Production Function

As seen earlier, production involves a transformation of inputs into output. The technical relationship between inputs and output which gives maximum output is called production function. Production function gives different combinations inputs that produce maximum level of output. A production function is written as $Q = f(I_1....I_n)$ where, Q is output, f is a functional relationship and I_1 to I_n are quantities of different inputs. To keep the things as simple as possible, at this stage, we will define production function as follows

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

Where

Q is output

L is labour used in process of production

K is capital used in the process of production

That means, firm's output depends upon the labour employed and units of capital services used up in the production. Now, suppose a firm requires to increase its output, it cannot change the quantities of labour and capital at the same speed. Generally labour units can be employed at a short notice but it takes more time to install machinery or equipment i.e. capital. In the short run, one of the inputs may remain fixed say capital. Other inputs that may remain fixed in the short run may be supply of skilled labour, land plot, etc. But some inputs like unskilled labour units can be easily changed even in the short run.

So we can further define production function using the short-run and long-run period.

Short run production function Q = f (L,K) where L is variable and K is fixed factor of production.

Long run production function Q = f (L,K) where both L and K are variable factors of production.

Types of Production Function

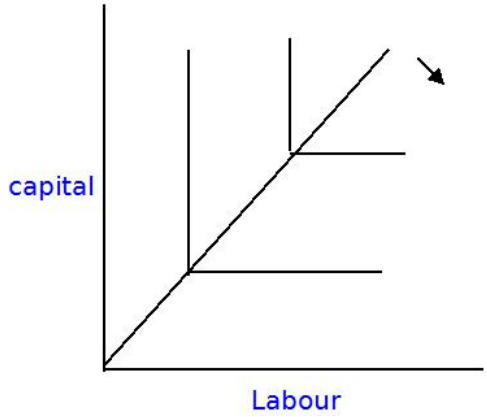
There are two distinct types of production function that show possible range of substitution inputs in the production process.

1. Fixed proportion Production function

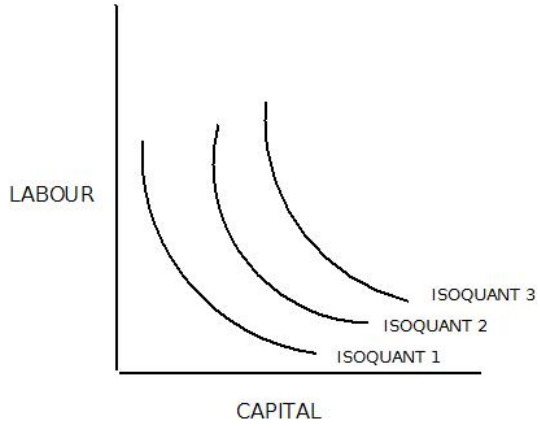
2. Variable proportions production function

These two types are based on the technical coefficient of production. The technical co-efficient is the amount of input required to produce a unit of output. For example, if 50 workers are required to produce 200 units of output, then 0.25 is the technical co-efficient of labour for production.

When 0.25 units of labour are required to produce every unit of output, it is called fixed proportion production function. Here, doubling of quantities of capital and labour in a required ratio will double the output. Fixed proportion production function can be illustrated with the help of isoquants. In this type of production function, the two factors of production, say labour and capital, should be used in a fixed proportion. The isoquants of such function are right angled as shown in the following diagram.



On the other hand, when the technical co-efficient to produce different units of output is varying or changing, it is called as the variable proportions production function. In such a type of production function, given amount of output can be produced with several alternative compbinations of labour and capital. Many commodities in real world are produced with variable proportion production function. For example, certain amount of wheat may be produced using more labour and less capital in India and more capital and less labour in USA. Variable proportion production function is illustrated in the following diagram.



The short run analysis of production function is done with one input variable (L) and the other input constant (K). The variation in the output resulting from different amounts labour applied to a fixed amount of capital is explained with the help of **Law of Diminishing Returns or Law of Variable Proportions**

The long run analysis of production function is done with both the inputs(L,K) variable. The variation in the output resulting from different amounts of labour and capital employed is explained with the help of **Law of Returns to Scale**

Case Study

Crops can be produced using different methods. Food grown on large farms in countries like Canada and the United States is usually produced with a capital intensive technology which involves substantial investment in capital, such as buildings and equipment, and relatively less input of labour. However, food can also be produced using very little capital (say a plough) and a lot of labour (several people) as is done in several parts of the developing countries. One way to describe the agricultural production process is to show one isoquant that describes the combination of inputs which generates a given level of output. The description that follows comes from a production function for wheat that is estimated using figures.

Following diagram shows one isoquant associated with the production function, corresponding to an some level output of per year. The farmer can use this isoquant to decide whether it is profitable to hire more labour or to use more machinery. The decision about how many labourers to hire and how much machinery to employ, will depend upon the cost of each input.[1]

Cobb-Douglas Production Function

Many studies have been undertaken to empirically study and statistically calculate the relationship between physical inputs and physical output. One of such empirical production functions is **Cobb Douglas Production Function**. It is intermediate between a linear and a fixed proportion production function. It is given by a formula ------

$Q = AL^{\alpha}K^{\beta}$

Where Q is total output,

L stands for quantity of labour,

K is quantity of capital,

A, α and β are positive constants.

Empirically it was found that, 75% increase in output can be attributed to increase in labour input and the remaining 25% was due to capital input. It was also found that the sum of exponents of Cobb-Douglas production function is equal to one. That is α + β is equal to one. This implies that it is a linearly homogenous production function.

Following are important features of Cobb-Douglas Production Function

1. Average Product of factors of production used up in this function depends upon the ratio in which the factors are combined for the production of commodity under consideration

2. Marginal Product of factors of production used up in this function also depends upon the ratio in which the factors are combined for the production of commodity under consideration

3. Cobb-Douglas production function is used in obtaining marginal rate of technical substitution (the rate at which one input can be substituted for the other to produce same level of output) between two inputs.

4. As seen earlier, the sum of exponents of Cobb Douglas production function is equal to one. (α + β = 1). This is a measure of returns to scale. When α + β = 1, it is constant returns to scale, α + β > 1, it indicates, increasing returns to scale and when α + β < 1, it indicates diminishing returns to scale.

Activity

http://www.youtube.com/watch?v=GbBQ3i1K2DE

http://www.youtube.com/watch?v=JNS_mtqUcM
http://www.youtube.com/watch?v=bSfe20lkGRs
http://thinkwell.mindbites.com/lesson/7635-economics-the-production-function-and-growth

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Can You solve this quiz?

Points added for a correct answer: 1
Points for a wrong answer: 0
Ignore the questions' coefficients:

Shuffle questions

1. 1. A graph showing all the combinations of capital and labour that can be used to produce a given amount of output is ?

- An isoquant
- An indifference curve
- A production function
- An isocost line

2. The rate at which a firm can substitute capital for labour and hold output constant is the

- Marginal rate of substitution
- Marginal rate of Technical substitution
- Law of diminishing marginal returns

3. A graph showing all the combinations of capital and labour available for a given total cost is

- Isoquant
- Isocost line
- Budget constraint
- Expenditure set

4. Right-angled isoquants show

- Fixed proportion production function
- Cobb-Douglas production function
- variable proportion production function
- none of above

5. Laws of Returns to scale are applicatble to

- short-run production function
- long run production function
- variable proportion production funtion
- all of above

6. Law of diminishing marginal returns is applicatble to

- short-run production function
- long run production function
- variable proportion production funtion
- all of above

Submit

Let's Sum Up

In this part we have elaborately discussed the concept of production function, We have also examined different types of production function and with the help of isoquant technique, we have differentiated between these types of production function. We have also seen the important features of one of the empirical production function, Cobb-Douglas Production Function.

Key Terms

Factors of Production - *There are four factors of production that are used up in the process of production. These include - land, labour, capital and organisation*

Process of Production -It is a process by which the factors of production are transformed into the final output.

Production Function -It is a technical relationship between inputs and given level of output.

Technical coeffcient of production- the amount of inputs required to produce a unit of output.

Fixed Proportion Production Function -It is a production function where technical coefficient of production is contant.

Variable Proportion Production Function -It is a production fucntion where technical co-efficient of production is variable.

Further Readings

<reference>Pindyck, Rubinfeld and Mehta - Microeconomics, 7th edition</reference>

Law of variable proportions

MICROECONOMICS

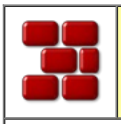
Law Of Variable Proportions

Introduction

Let us start the Law of Variable Propotions .

If you have your favourite ice-cream and start eating during a sunny day, first bite may bring you to knees while groaning “hai, hai, hai”.The next bite too brings good but different effect.By the time yu are halfway thorough gallon, you may be feeling totally different.With each chance, your stomach may become full, but mind has a new experience and the point of diminishing returns shifts. This what we are going to discuss here in the name of Law of Variable Propotions.

The law of variable proportion is the most important law in economics. **Economists like Alfred Marshall, Benham,Samulson contributed maximium to this law**.This law is based on short run production function.



Learning Objectives

After reading this chapter, you are expected to be able to:

{{{3}}}

1. understand short run production Function.

2. Effect of continuous increase of variable factors on Fixed Factors and on output in the short run.

3 How this Law operates in each and every stage of life?

Nature of the Law

Let us start with the concept of a standard short run production function.

Q= f[L, $\bar{K}$, $\bar{T}$]

Q→Output

f→ function of

L→Labour as the variable factor

→ Capital as the constant factor

→ constant technology.

Definition of Law

The Law of Variable Proportions which is the new name of the famous ***Law of Diminishing Returns.***

→According to Stigler” "As equal increments of one input are added, the inputs of

other productive services being held constant, beyond a certain point, the resulting increments of produce will decrease i.e., the marginal product will diminish".

→According to Paul Samulson "An increase in some inputs relative to other fixed inputs will in a given state of technology cause output to increase, but after a point, the extra output resulting from the same addition of extra inputs will become less".

The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline. This means that upto the use of a certain amount of variable factor, marginal product of the factor may increase and after a certain stage it starts diminishing. When the variable factor becomes relatively abundant, the marginal product may become negative.

Assumptions of Law.

→Constant technology--- This law assumes that technology does not change throughout the operation of the law.

→Fixed amount of some factors.—One factor of production has to be fixed for this law.

→ Possibility of varying factor proportions—This law assumes that variable factors can be --changed in the short run.

KEY WORDS

1,Total Product→ It is the total of output, resulting from efforts of all factors of production.

TP= P*Q

2Average Product→It is the total product per unit of the variable factor.

AP=TP/N

3.MarginalProduct→**It is addition made to the Total Product as a result of production of one more unit of**

output.

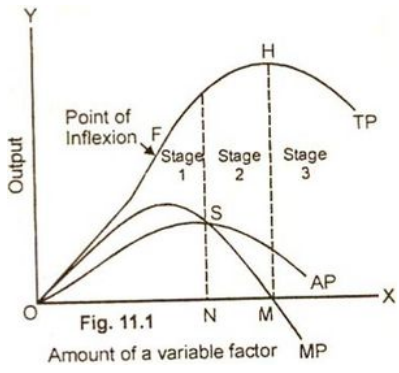
Diagramatic Representation

Following table explains the working of law.

Schedule:

	Variable Resource (labor)	Total Produce (TP Quintals)	Marginal Product (MP Quintals)		Average Product (AP Quintals)
30	1	10	10	Increasing	10
30	2	25	15	marginal return	12.5
30	3	37	12	Diminishing	12.3
30	4	47	10	marginal	11.8
30	5	55	8	returns	11.0
30	6	60	5		10.0
30	7	63	3		9.0
30	8	63	0	Negative	7.9
30	9	62	-1	marginal returns	6.8

Diagrammatic Representation of Law.



- A farmer has 30 acres of land for cultivation.
- Land is the fixed factor.
- Investment in the form of tube well and machinery is also fixed .
- Only labour is the variable factor in this example.

Working of Law

This law has THREE stages

1.Increasing Returns .

2. Diminishing Returns.

3. Negative Returns.

Increasing Returns:

In this stage, Average Product increases, Marginal Product increases and also Total Product. TP increases at more proportionate rate . TP increases from 10 to 25 units. This stage is known as increasing returns. This stage of increasing output by increasing labour does not last for a long time. This continues upto 3^{rd}units. The point F onwards TP increases at a diminishing rate. In the first stage, marginal product curve of a variable factor rises in a part and then falls. The average product curve rises throughout and remains below the MP curve**.** MP reaches maximum in this stage.

Diminishing Returns:

s This is the most important stage in the production function. In stage 2, the total production continues to increase at a diminishing rate until it reaches its maximum point where the 2nd stage ends. In this stage both the marginal product (MP) and average product of the variable factor are diminishing but are positive. When TP reaches the maximum, MP is zero.MP intersects the X axis in this stage.

As more and more variable factors are used on fixed factor, marginal and average product begins to decrease. Factors of production are indivisible. Economically this is the most viable area of production.

3.**Negative Returns.**

In the 3rd stage, the TP decreases. The TP, curve slopes downward (From point H onward). The MP curve falls to zero at point L^2 and then is negative. When we increases the labour even after MP becomes zero, then MP becomes negative and it goes below the X axis.This is the most unviable region. In our table from 8^{th} unit onwards, this stage starts.

Any sensible producer will stop the production in the second stage where AP and MP begins to decrease, but MP has not become negative.The producer will employ the variable factor (say labor) up to the point where the marginal product of the labor equals to the wage rate.

Click here for video clip

ACtivity

1.Imagine you are studying to take an easy test. Let's assume that you can learn everything in about 10 hours of study. The first 10 hours of studying will have a much greater impact on your test score than your second 10 hours of studying. After a certain point, any extra studying will be a waste of time because you already knows the material.

2. Imagine now that you are going to clean your messy bedroom. The first hour of cleaning will make the most difference, the second hour should make less difference than the first hour, and eventually, if you continue cleaning your room, your extra time spent cleaning won't make much difference at all because your room will already be clean.

Recapitalisation

→ This law is based on short production function.

→The gist of law is that if quantity of variable factors is increased keeping constant, other factors, eventually AP and MP will decline.

→ This law is applicable in all industries, but more In agriculture.

→ Rationale producer prefers second stage where TP reaches maximum, MP become zero, not negative. and AP decreases.

→ Third stage is unfeasible because MP is negative, so no meaning in paying additional wages

to labours.

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ISO QUANT AND ISOCOST

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Work in progress, expect frequent changes. **Help and feedback is welcome**. See discussion page.

Isoquant and Isocost

Isoquant and Isocost

Introduction

The focus of this chapter is on the firm. The chapter examines the theory of production or how firms organize production i.e. how it combines resources or inputs to produce final commodities. Production theory is extended to deal with two variable inputs by the introduction of isoquants. From the theory of production where only one or two inputs are variable, we proceed to examine cases in which all inputs are variable.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. make the students understand the reasons for the existence of firms
2. analyse the production theory with two variable inputs
3. demonstrate the least cost factor combination

While going through this analysis students may feel it is a revision of the indifference curve and the budget line. Isocost and isoquants play the same role in producer's equilibrium as that played by the budget line and indifference curves in consumer's equilibrium. Isocost curve is a producer's budget line while isoquant is his indifference curve.

Definition

Isoquant is also called as equal product curve or production indifference curve or constant product curve. Isoquant indicates various combinations of two factors of production which give the same level of output per unit of time. The significance of factors of productive resources is that, any two factors are substitutable e.g. labour is substitutable for capital and vice versa. No two factors are perfect substitutes. This indicates that one factor can be used a little more and other factor a little less, without changing the level of output.

It is a graphical representation of various combinations of inputs say Labour(L) and capital (K) which give an equal level of output per unit of time. Output produced by different combinations of L and K is say, Q, then Q=f (L, K). Just as we demonstrate the MRSxy in respect of indifference curves through hypothetical data, we demonstrate the Marginal Rate of Technical Substitution of factor L for K (MRTS *L,K*)

Assumptions

1. There are two factor inputs labour and capital
2. The proportions of factor are variable.
3. Physical production conditions are given
4. The Scale of operation is variable
5. The state of technology remains constant

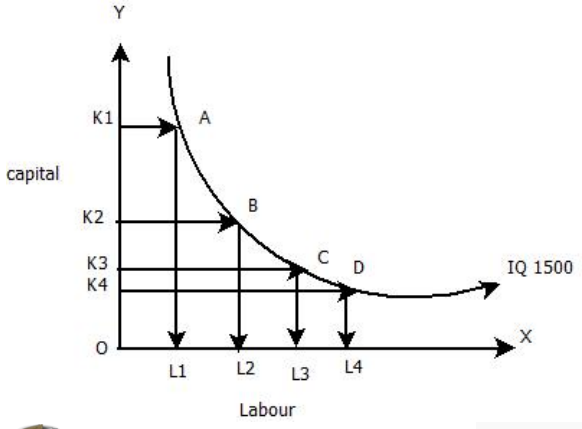
The shape of Isoquant

In this section we examine the characteristics of isoquants, define the economic region of production and consider the special cases where the commodities can only be produced with least cost factor combination.

We can see that the shape of isoquant plays an important a role in the production theory as the shape of indifference curve in the consumption theory. Iso quant map shows all the possible combinations of labour and capital that can produce different levels of output. The iso quant closer to the origin indicates a lower level of output. The slope of iso quant is indicated as $\frac{K}{L}$=MRSLk= $\frac{MPL}{MPk}$

Table indicating various combinations of Labour and Capital to produce 1500 Units of Output

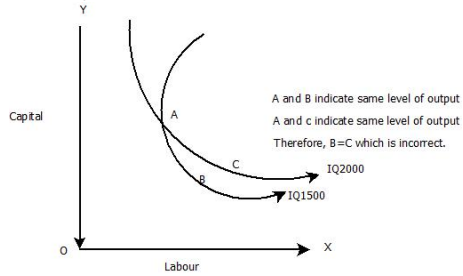
COMBINATIONS	UNITS OF CAPITAL	UNITS OF LABOUR	TOTAL OUTPUT
A	50(OK)	1 (OL1)	1500(IQ1)
B	45(OK2)	2(OL2)	1500(IQ1)
C	41(OK3)	3(OL3)	1500(IQ1)
D	38(OK4)	4(OL4)	1500(IQ1)



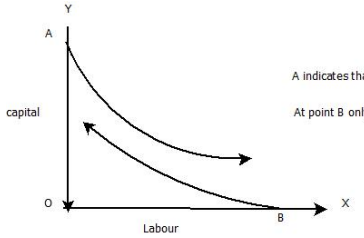
Properties/Characteristics of Isoquants

Isoquants, abbreviated as IQs, possess the same properties as those of the indifference curves. For the convenience of the students, we can state them as follows.

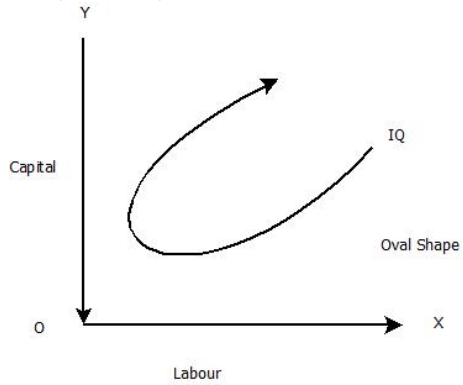
1. **Two isoquants do not intersect each other:**



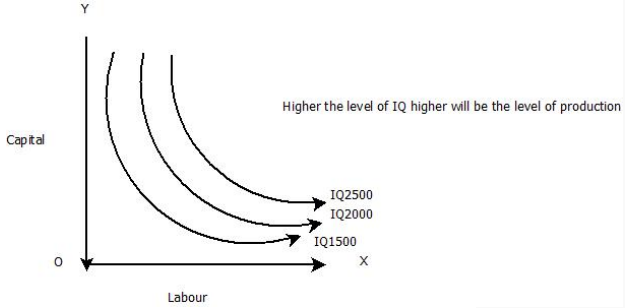
1. **No isoquant can touch either axis**



1. **Isoquant is oval in shape**



1. **A higher IQ implies a higher level of output**



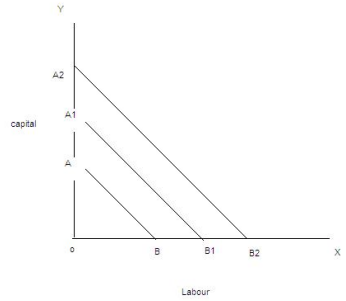
1. **IQs are never parallel to each other**. Interspacing between them is least at the ends and maximum in the middle.
2. **IQs are convex to the origin**: convex isoquants possess continuous substitutability of K and L over a stretch. Beyond this stretch, K and L are not substitutable foe each other.
3. **IQs may be linear when labour and capital are perfect substitute**. A linear isoquant implies that either factor can be used in proportion. If isoquant has several linear segments separated by kinks, the isoquant is called kinked isoquant or activity analysis isoquant or linear programming isoquant. Such isoquants are used in linear programming.
4. **If Land K are prefect complements to each other, the IQ is L-shaped**. Such isoquant is known a input-output isoquant or Leontief isoquant. There is only one combination of L and K available for production. It is the corner point of L-shaped isoquant.
5. If marginal product of one of the two factors is zero, IQ is parallel to the axis on which the factor with zero marginal products is represented.
6. If one of the two factors has negative marginal product the IQ slopes upwards from left to right.
7. If both the factors have negative marginal products, the IQ is concave to the origin.
8. If the producer has a preference for a factor of production, the IQ is quasi linear.
9. If the factors to be employed in whole numbers units only. The IQ is discontinuous.

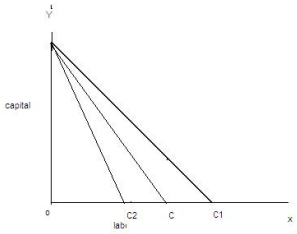
Isocost curves:

Isocost curve is the locus traced out by various combinations of L and K, each of which costs the producer the same amount of money (C) Differentiating equation with respect to L, we have *dK/dL = -w/r* This gives the slope of the producer's budget line (isocost curve). Iso cost line shows various combinations of labour and capital that the firm can buy for a given factor prices. The slope of iso cost line = PL/Pk. In this equation , PL is the price of labour and Pk is the price of capital. The slope of iso cost line indicates the ratio of the factor prices. A set of isocost lines can be drawn for different levels of factor prices, or different sums of money. The iso cost line will shift to the right when money spent on factors increases or firm could buy more as the factor prices are given.

Slope of iso cost line

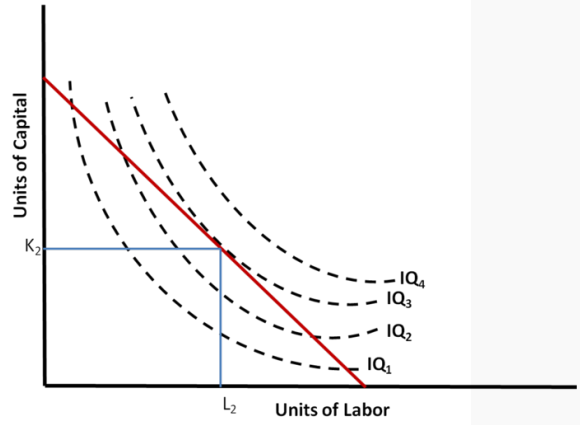
With the change in the factor prices the slope of iso cost lien will change. If the price of labour falls the firm could buy more of labour and the line will shift away from the origin. The slope depends on the prices of factors of production and the amount of money which the firm spends on the factors. When the amount of money spent by the firm changes, the isocost line may shift but its slope remains the same. A change in factor price makes changes in the slope of isocost lines as shown in the figure.





Least Cost Factor Combination or Producer's Equilibrium or Optimal Combination of Inputs

The firm can achieve maximum profits by choosing that combination of factors which will cost it the least. The choice is based on the prices of factors of production at a particular time. The firm can maximize its profits either by maximizing the level of output for a given cost or by minimizing the cost of producing a given output. In both cases the factors will have to be employed in optimal combination at which the cost of production will be minimum. The least cost factor combination can be determined by imposing the isoquant map on isocost line. The point of tangency between the isocost and an isoquant is an important but not a necessary condition for producer's equilibrium. The essential condition is that the slope of the isocost line must equal the slope of the isoquant. Thus at a point of equilibrium marginal physical productivities of the two factors must be equal the ratio of their prices. The marginal physical product per rupee of one factor must be equal to tht of the other factor. And isoquant must be convex to the origin. The marginal rate of technical substitution of labour for capital must be diminishing at the point of equilibrium.



The Economic region of production

The firm would not operate on the positively sloped portion of an isoquant because it could produce the same level of quantity with less capital and labour. Economic region of Production:

Ridge lines: separate the relevant (i.e. negatively sloped) from the irrelevant (or the positively sloped) portion of the isoquant.

Ridge lines joins points on the various isoquants where the isoquants have zero slope (and thus zero MRTSlk) .

Case Study

Enter your text here

Activity

Write your activity here

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Multichoice Questions

1. Iso quants are equal revenue lines
   - (a) True
   - (b) False
2. Iso quant is sloping downwardso when inputs are used in fixed proportion
   - (a) True
   - (b) False
3. Iso quant is also known as Production indifference curve
   - (a) True
   - (b) False
4. A higher isoquant represent lower level of output.
   - (a) True
   - (b) False
5. Least cost input is a combination where the slope of isoquant is equal to the slope of isocost
   - (a) True
   - (b) False

Submit

Let's Sum Up

An isoquant shows the various combination of two inputs that can be used to produce a specific level of output. From the isoquant map, we can generate the total product curve of each input by holding the quantity of the other input constant.

Isoquants are negatively sloped in the economically relevant range, convex to the origin and do not intersect. The absolute value of the slope of Isoquant is called the Marginal Rate of Technical Substitution. This equals the ratio of marginal productivity of two inputs.

As we move down along an isoquant the absolute value of its slope or Marginal Rate of Technical Substitution declines and the isoquant is convex. Ridge lines separate the relevant (i.e. the negatively sloped) from the irrelevant (or positively sloped) portion of the isoquant.

With right angled or L shaped, isoquant , inputs can only be combined in fixed proportion in production.

Key Terms

Iso Quant
Iso cost
Ridge Lines
Least Cost Combination
Producers Equilibrium
Marginal Rate of Technical Substitution

Extension exercise

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Further Readings

Category: Work in progress

Returns to Scale

University of Mumbai

Law of returns to scale

Introduction

The laws of returns to scale are often confused with 'returns to scale'. By "returns to scale" is meant the behaviour of production or returns when all productive factors are increased or decreased simultaneously and in the same ratio. When all inputs are changed in the same proportion, we call this as a change in scale of production. The way total output changes due to change in the scale of production is known as returns to scale. Thus, whereas in the short-run change in output is associated with the change in factor proportions, and change in output in the long-run is associated with change in the scale of production. Thus returns to scale is the long-run concept. A layman would perhaps expect that with doubling of all productive factors, the output will also double and with trebling of factors of production, production would also be trebled, and so on. But actually this is not so. In other words, when all inputs are increased in the same proportion, the total product may increase at an increasing rate, ar a constant rate or diminishing rate. Accordingly the returns to scale could be 'increasing, 'constant', or 'decreasing'.

Definition

The law of returns to scale describes the relationship between outputs and the scale of inputs in the long-run when all the inputs are increased in the same proportion.

According to the Roger Miller, the law of returns to scale refers "to the relationship between the changes in output and proportionate change in all factors of production". The firm increases its scale of production by using more space, more machines and labourers (as a input) in the factory, to meet a long-run change in demand.

Assumptions

1. **All factors (inputs) are variable but enterprise is fixed.**
2. **A worker works with given tools and implements.**
3. **Technological changes are absent.**
4. **There is perfect competition.**
5. **The product is measured in quantities.**

Three different cases

1. **Increasing returns to scale**
2. **Constant returns to scale and**
3. **Decreasing returns to scale.**

Increasing returns to Scale:

This situation occurs if a percentage increases in all inputs results in a greater percentage change in output. For e.g. a 10 % increase in all inputs causes a 20% increase in output.

By increasing its scale, the firm may be able to use new production methods that were infeasible at the smaller scale. For instance, the firm may utilize sophisticated, highly efficient, large-scale factories. It also may find it advantageous to exploit specialization of labour at the large scale. This is shown in the following example.

Inputs (Units)	Output (Units)
2 capital + 2 Labour	200
4 Capital + 4 Labour	500

The table shows that the input is increasing by 100%, on the other hamd the output is increased by 150%. This shows the increasing returns to scale. As changes in the output is more than the change in input.

- **Causes of Increasing Returns to scale**

1. **Indivisibilities**: According to economist like Kaldor, learner, knight and Joan Robinson, an important cause of indivisibility. Indivisibility means that certain factors are available only in some minimum sizes. Certain inputs particularly machinery, management etc. are available in large and lumpy units. Such inputs cannot be divided into small sizes to suit the small scale of production. For e.g. there cannot be half a machine, half a computer or half a manager. Such inputs have to be employed even if the scale of production is small. Therefore, as the scale of production increases, these indivisible factors are utilized better and more efficiently. This leads to increasing returns to scale.
1. **Greater Specialization**: As the scale of production increases, the efficiency of labour increases due to division of labour and specialization of labour. Similarly, when the scale of production increases, it becomes possible to use specilaised machines and the services of specialized and expert management.

This results in productivity of inputs leading to increasing returns to scale. According to Prof. Chamberlin returns to scale in the initial stages increases due to the fact that the firm can introduce the specialization of labour and machinery.

Constant returns to Scale

Constant returns to Scale: It occurs if a given percentage change in all inputs results in an equal percentage in output. For instance, if all inputs are doubled, output also doubles; a 10% increase in inputs would imply a 10% increase in output; and so on. Under constant returns, the firm's input are equally productive whether or smaller or larger levels of output are produced.

A common example of constant returns to scale occurs when a firm can easily replicate its production process.

For, instance a manufacturer of electrical company finds that it can double its output by replicating its current plant and labour force, that is, by building an identical palnt beside the old one.

Similarly, chain of dry cleaners can increase its volume of service by increasing its number of outlets (with designated number of workers per outlets). So long as all necessary inputs are readily available the firm can increase in proper proportion to inputs via replication, and constant returns to scale will hold. This can be explained in the following example.

Inputs (Units)	**Output (Units)**
2 capital + 2 Labour	**200**
4 Capital + 4 Labour	**400**

The above example shows that as the inputs (i.e. labour and capital) increased to 100%, output also increased to 100%.

- **Causes of constant Returns to scale**

1. **Limits of Economies of scale:** Increasing returns to Scale cannot go on indefinitely. There is a limit to these economies of scale When the economies of scale are exhausted and diseconomies are yet to start, there may be a briefs phase of constant returns to scale.
1. **Economies of Scale:** It refers to the situation which increases in the scale of production give rise to certain benefits to the producers.
1. **Divisibility of Inputs:** Constant returns to scale may occur in certain productive activities where the factors of production are perfectly divisible. For example, we may double the output by setting up two plants (factories) which use the same quantity and the same type of workers, machinary, raw materials and other inputs.

Decreasing Returns to scale:

It occurs if a given percentage increase in all inputs results in a smaller percentage increase in output. The most common explanation for decreasing Returns involves organization factors in very large firms. As the scale of firms increases, the difficulties in Coordinating and monitoring the many management functions. Coordinating production and distribution of 12 products manufactured in four separate plants typically means incurring additional costs tor management and information systems that would be unnecessary in a firm one-quarter size. As a result, proportional increases

in output require more than proportional increases in inputs. The following example will explain decreasing returns to scale.

Inputs (Units)	Output (Units)
2 capital + 2 Labour	200
4 capital + 4 Labour	300

The above shows, that inputs ate increases to 100% but the increase output is 50%, which shows that there is decreasing returns to scale.

- **Causes of Decreasing Returns to scale.**
  1. **Complexity of management:** Increase in the scale of production on beyond a point may create the problem of proper management, leading to a decrease in managerial efficiency. Large scale of production creates the problem of lack of proper, larger bureaucracy, red tapism, lengthy Chain of Communication and command between the top management and men on the production line. As a consequence of all these, the overall efficiency of management decreases.
  1. **Entrepreneur is a fixed factor:** According to some economist decreasing returns to scale arise because entrepreneur is a fixed and indivisible factor. An increase in scale may come to a point where the abilities and Skills of the entrepreneur may be fully utilised. An increase in the scale beyond this point may decrease the efficiency of the entrepreneur. This gives rise to diseconomies of scale.
  1. **Exhaustibility of Natural Resources:** Another factor responsible for the diminishing returns in some activities is the limitation of natural sources. For example, if we double the fishing fleet, the number of fish Catch will not double because the availability of fish may decrease when fishing is carried out on an increasing scale.

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Category: Pages with editorial comments

Introduction to Cost Concepts

University of Mumbai

MICROECONOMICS

Cost Concepts

Introduction

Let us understand that economic efficiency of any firm operating in the market is determined by the ability of the firm to minimize its costs and maximize its profits. WE also need to understand that cost is a function of Output. As the output of a firm changes the cost pattern of a firm also undergoes change. Study of cost and its behavior as production pattern changes in the short run and the long run, gives useful insight into issues like:

- How the cost pattern of a firm changes in case a firm is operating in the short run?
- How the cost changes along with the change in the scale of production?
- How the cost of operation can be minimized?
- What is the optimum level of operation of any firm (at optimum level the cost of the firm is generally reaches its minimum level)?

In this module various cost concepts are being explained in detail.

Learning Objectives

After reading this chapter, you are expected to be able to:

- Understand and Identify various cost concepts that are associated or related to various stages of business operations and market situations.

Various Cost Concepts

- *Opportunity Cost*
- *Money Cost and Real Cost*
- *Accounting Cost and Economic Cost*
- *Private Cost and Social Cost*
- *Fixed Cost, Variable Cost, Average Cost and Marginal Cost*

Opportunity Cost

The resources of any firm operating in the market are limited and investment options are many. The firm therefore has to decide or select only those investment opportunities/options which provide the firm with the best return or best income on investment. This means that if a firm can invest money/ resources only in one investment option then the firm will select that investment option which promises best return on investment to the firm. In other words while doing so the firm gives up/rejects the next best option for investing the funds. The opportunity cost of a company is thus this income/ return which the firm could have earned on the next best investment alternative.

This can also be understood by a simple example - Let us assume that an individual has two job offers in hand. One job offer is promising him a salary of Rs. 30, 000 per month while the other job offer will ensure salary of Rs. 25, 000 per month. If the job profile and other factors related to the job offers are more or less same then it can be easily expected that the individual will select the job offer which will provide him with higher salary that is salary of Rs. 30, 000 per month. Thus, in this case, the opportunity cost is the return involved in the next best alternative i.e; Salary of Rs. 25, 000 in the next best job offer.

Concept of opportunity cost is closely related to the concept of **Economic profit or Economic Rent**. A firm earns or makes Economic profit only when besides covering various costs of operation, a firm is also able to earn more than its opportunity cost (or its possible earnings under the next best investment alternative). Opportunity Cost is also termed as **Implicit Cost**.

Economic Profit is thus earned only when following is true for the Firm:

Income of a Firm > Various Costs of Operations + Opportunity Cost

OR ***Economic Profit = Earnings or Revenue of Firm - Ecomomic Costs***. Here Economic Cost is various expenses of the business plus the opportunity cost

Some simple examples of **Opportunity Cost and Economic Profit** are discussed in following three brief case studies.

Case Study

Understanding Opportunity Cost and Economic Profit

- *CASE 1: Mr. Subodh has two job opportunities in hand. First job opportunity can help him to earn Rs. 20, 000 per month and the second opportunity can get him Rs. 17, 000 per month. Under normal circumstances Mr. Subodh will opt for the job opportunity which can help him to earn Rs. 20, 000 per month. In the process Subodh rejects the other job opportunity which can help him to earn Rs. 17, 000 per month. In this case Opportunity cost of Mr. Subodh is Rs. 17, 000 per month as this is the income which the can be earn from the next best alternative.*

In above case Economic Profit or Economic Rent is Rs. 3, 000. This has been obtained after deducting Rs. 17, 000 (opportunity cost) from Rs. 20, 000

- *CASE 2: Miss. Kanta can invest her money under the following two investment options (a) Investment in Shares. Such Investment (investment made in the shares) is likely to provide Miss Kanta with return of 20% per annum. (b) Investment in Government Bonds which can provide Miss. Kanta with return of 10% per annum on the amount invested in the bonds. If it is assumed that risk involved in investing in the stocks/shares is very moderate then Miss. Kanta will most likely invest in shares (on account of higher return on investment in shares in comparison to the bonds. In this case the opportunity cost is the return of 10% per annum, which can be earned by Miss Kanta in the next best investment alternative*

- *CASE 3: A Company 'Venus Automobiles limited', involved in the production of two and three wheeler automobiles, is thinking of diversifying its business operations. There are two diversification options the company can choose between. One option is that the company can open company owned and opearted automobile service stations and the other option is that company can enter into the business of producing automobile spare parts. If it is expected that option of opening the company owned and operated service stations will generate an additional profit (post charging various expenses) of Rs. 9 million for the company while the option of production of spare parts will generate profit of Rs. 10 million for the company. As expected profit after charging various expenses is higher in the automobile spare part business, the company will choose to diversify in the spare part business. Thus, in this case, the opportunity cost will be the profit of Rs. 9 million, which the company is expected to earn in the nest best alternative that is starting company owned and operated service station business*

For the above case, let us assume, that the company actually earns accounting profit of Rs. 9.8 million on its business of producing and marketing automobile spare parts. The Economic Profit or Economic Rent then will be the amount of Rs. 0.8 million obtained after deducting Rs. 9 million (opportunity cost) from Rs. 9.8 million (profit earned)

Money Cost and Real Cost

Money Cost of production is the actual monetary expenditure made by company in the production process. Money cost thus includes all the business expenses which involve outlay of money to support business operations. For example the monetary expenditure on purchase of raw material, payment of wages and salaries, payment of rent and other charges of business etc can be termed as Money Cost.

Real Cost of production or business operation on the other hand includes all such expenses/costs of business which may or may not involve actual monetary expenditure. For

example if owner of a business venture uses his personal land and building for running the business venture and he/she does not charge any rent for the same then such head will not be considered/included while computing the Money Cost but this head will be part of Real Cost computation. Here the cost involved is the Opportunity Cost of the land and building. If the promoter of the company had not used the land and building for the business venture then the land and building could have been used elsewhere for some other enture and could have generated some income for the promoter. This income/rent which could have been earned under the next best investment option is the opportunity cost which needs to be considered while calculating the Real Cost for the firm.

Case Study

Understanding Money Cost and Real Cost

- *A company 'Arizona Textiles limited' is producing cotton textiles. Various business expenses on per annum basis are as follows: Power Charges - Rs. 5, 00, 00, Cost of Yarn - Rs. 10, 00, 000, Salaries and Wages - Rs. 8, 00, 000, Various Direct and Indirect Overhead Expenses - Rs. 10, 00, 000. The company is not paying any rent for the building from where it is operating as the building is owned by the promoter of the company. If this building had been rented out by the promoter in the market then it could have earned a rent of Rs. 2,00, 000 per annum.*

In the above case Money Cost is Rs. 33, 00, 000, obtained after adding the following: Power Charges, Cost of Yarn, Salaries and Wages, Various Direct and Indirect Overhead Expenses.

On the other hand Real Cost is Rs. 35, 00, 000, which has been obtained after adding the following: Money Cost plus the rent which the building belonging to the promoter could have earned in outside market

Accounting Cost and Economic Cost

Accounting Cost includes all such business expenses that are recorded in the book of accounts of a business firm as acceptable business expenses. Such expenses include expenses like Cost of Raw Material, Wages and Salaries, Various Direct and Indirect business Overheads, Depreciation, Taxes etc. When such business expenses or accounting expenses are deducted from the Sales income of any firm the accounting profit is obtained. Such Accounting/Business expenses or costs are also termed as **Explicit Costs**.

- **Accounting Cost: Various allowed business expenses. Such as Cost of Raw Material, Salaries and Wages, Electricity Bill, Telephone Charges, Various Administrative Expenses, Selling and Distribution Expenses, Production Overhead Expenses, Other Indirect Overhead Expenses etc.**
- **Accounting Profit = Sales Income - Accounting Cost**

Economic Cost on the other hand includes all the accounting expenses as well as the Opportunity cost of a business firm. Economic Cost and Economic Profit is thus calculated as follows:

- **Economic Cost = Accounting Cost (Explicit Costs) + Opportunity Cost**
- **Economic Profit = Total Revenues - (Accounting Cost + Opportunity Cost)**

Private Cost and Social Cost

The actual expenses of individuals/ firms which are borne or paid out by the individual or a firm can be termed as **Private Cost**. Thus for a business firm this may include expenses like Cost of Raw Material, Salaries and Wages, Rent, Various Overhead Expenses etc.

On the other hand Private Cost for an individual will be his or her private expenses such as expense on food, rent of house, expenses on clothing, expenses on travel, expenses on entertainment etc.

Social Cost on the other hand includes Private Cost and also such costs which are not borne by the firm but by the society at large. For example the cost of damage or disutility caused by the operations of a firm in an economy may not be borne by the firm in question but it impacts the society at large and thus such cost is added to the Private Cost to find the Social Cost of producing the product. Such Cost (that is cost not borne or paid out by the firm) is also known as **External Cost**. Another example of external cost can be the cost of providing the basic infrastructure facilities like good roads, sewage system or network, street lights etc. Cost of such facilities is not borne by a business firm even though the firm is benefits from such facilities. Such costs (External Costs) are thus added to the Private Cost to find the Social Cost of producing a product or good.

Above can be understood by following example: If a Tannery firm (A firm processing animal skins) releases its toxic wastes in the river flowing nearby its factory premises then this act of the Tannery firm results in water pollution and environmental damage. The Cost of such damage/loss (also known as External Cost) is added to the private costs of the tannery firm to get fair idea of Social cost involved in the production of the product in question.

Social Cost of an individual will include his private cost and the cost of damage on account of his actions (that has resulted in doing harm/damage to the environment/society at large).

Case Study

Understanding Private Cost and Social Cost

- *A Company, 'Giga Dyes and Chemicals limited' is producing chemical dyes that are being used in various indudtrial activities. Various production expenses are as follows: Cost of Raw Material - 5, 00, 000, Salaries and Wages - Rs. 9, 00, 000, Various Direct and Indirect Overhead Expenses - Rs. 12, 00, 000, Selling and Distribution Expenses - Rs. 4, 00, 000. The by-product of the production process of chemical dyes produced by Giga Dye are certain toxic chemicals which are being released by 'Giga Dye and Chemicals' directly into a river flowing near the Dye manufacturing plant. This is polluting the river and killing the organic life thriving in as well as near the river. The cost of loss to the environment caused by Giga is estimated to be Rs. 20, 00, 000 per annum.*

In the above case, the Private Cost for 'Giga Dye and Chemicals Limited is Rs. 30,00, 000. This is sum total of various business expenses of Giga such as Cost of Raw Material, Salaries and Wages Overhead Expenses and Selling and Distribution Expenses.

On the other hand Social Cost is Rs. 50, 00, 000. This includes the cost of damage to the environment caused by the activities of the firm. Thus Social cost is Private Cost + External cost. In this case this is = 30, 00, 000 + 20, 00, 000

Fixed Cost, Variable Cost, Average Cost and Marginal Cost

Fixed Cost is that cost which does not change (that is either goes up or goes down) irrespective of whether the firm is operating or not. For example on account of Strike on account of Lockout in Maruti-Suzuki's Manesar plant the production process stands still. Even when the plant is not operating the Firm still has to bear such expenses which are indirect in nature. For Example Rent of the factory premises, Wages of administrative employees etc. In other Fixed cost is not related direct production/manufacturing expenses.

Variable Cost on the Other hand is directly proportional to the production operations. As the size of production at any business grows, along with that grow the variable expenses. As the name suggests, the variable expenses vary with the business operations. When the firm is not operating on account of Strike/Lockout etc, then the variable cost of the firm is Zero

Average Cost is the cost that is obtained after dividing Total Cost with the number of units produced.

- **Total Cost = Fixed Cost + Variable Cost**
- **Average Cost = Total Cost / Units of Good produced**

Marginal Cost is the change in the Total cost when an additional unit of good is produced. In other words Marginal Cost is difference between total Cost of producing 'N + 1' units of good and 'N' units of good.

- **Marginal Cost = TC (n+1) - TC(n)**

Following table can help in understanding the cost concepts like Total Cost (TC), Average Cost (AC), Marginal Cost (MC) etc

Understanding Fixed, Variable, Total, Average and Marginal Cost

Number of Units Produced	Fixed Cost	Variable Cost	Total Cost	Average Cost	Marginal Cost
1	10	5	15	15	15
2	10	10	20	10	5
3	10	17	27	9	7
4	10	30	40	10	13
5	10	45	55	11	15

In the above table, it is clearly visible that Fixed cost (which is 10) remains same irrespective of the number of units of the good being produced. On the other hand the Variable Cost is increasing as the number of units of good being produced is increasing. Thus, Variable Cost is going up from 5 to 10 and from 10 to 17 etc as the number of units of good being produced is increasing. Again it can be seen from the above table that Total Cost is the sum total of Fixed Cost and Variable Cost. Thus Total Cost is 15 for the first unit (where 10 is Fixed Cost and 5 is Variable Cost). Again for producing 2 units, the Total Cost is 20 (where 10 is Fixed Cost and remaining 10 is the Variable Cost). Above Table also clearly indicates that the Average Cost is being obtained by dividing Total Cost with the number of units of good being produced. Thus for the first unit of good being produced it is 15. This value has been obtained by dividing Total Cost (15) with the number of units of good produced (1). Similarly, the Average Cost of producing two units is 10, which is obtained by dividing Total Cost (20) with number of units produced (2). On the other hand Marginal Cost is the

change in the total cost when an additional unit of good is being produced. Thus for the first unit of good being produced, it is 15. This value is obtained by deducting from the Total Cost of producing 'One' unit of good (15) the Total Cost of producing 'Zero' units of good. For producing the second unit, the marginal cost is 5. This is obtained by deducting from the Total Cost of producing 'two' units of good (20) the Total Cost of producing 'one' unit of good (15)

Let's Sum Up

Summary of Cost Concepts

Various cost concepts help in understanding the business operations and cost involved in business operation of the firms better. For example opportunity cost is the return involved in the next best alternative. Social cost is the cost of damage caused by a business firm/individual to society at large. Private cost are the varied business expenses which a firm/individual has to bear on account of its business/personal operations pertaining to the business of the firm.

Points to Remember are as follows:

- The opportunity cost of a company is thus this income/ return which the firm can earn on the next best investment alternative.
- Money Cost of production is the actual monetary expenditure made by company in the production process. Money cost thus includes all the business expenses which involve outlay of money to support business operations.
- Real Cost of production or business operation includes all such expenses/costs of business which may or may not involve actual monetary expenditure. Economic cost includes all the accounting expenses and the Opportunity cost or implicit cost of the business.
- The actual expenses of individuals/ firms in the market can be termed as private cost. Thus for a business firm this may include expenses like Cost of raw material, salaries and Wages, Rent, Various overhead expenses etc. For an individual his/her private expenses can be expenses on food, rent of house, expenses on clothing, expenses on travel, expenses on entertainment etc can be considered as Private Costs.
- Social Cost on the other hand includes the private costs of individuals and firms and also the cost of damage/disutility caused by the operations of individuals and the business firms. For example is a Tannery releases its toxic wastes in the river flowing nearby then such act results in water pollution and environmental damage. Such damage/loss/cost is added to the private costs to get fair idea of Social cost.
- Fixed Cost: Fixed Cost is that cost which does not change (that is either goes up or goes down) irrespective of whether the firm is operating or not.
- Variable Cost on the Other hand is directly proportional to the production operations. As the size of production at any business grows, along with that grow the variable expenses. As the name suggests, the variable expenses vary with the business operations. When the firm is not operating on account of Strike/Lockout etc, then the variable cost of the firm is Zero
- Average Cost on the other hand is the cost that is obtained after dividing Total Cost with the number of units produced.
- Marginal Cost is the change in the Total cost when an additional unit of good is produced. In other words Marginal Cost is difference between total Cost of producing 'N + 1' units of good and 'N' units of good.

Self Assessment Questions on Cost Concepts

True or False Quiz

1. Explicit Cost is
   - Cost borne or paid out by a firm
   - Cost of loss or damage to the environment on account of activities of a firm
2. External Cost is
   - Cost of loss or damage to the environment on account of activities of a firm or cost of any such facility which a firm is enjoying but is not paying for
   - It is the Opportunity Cost of a Firm
3. Real Cost is
   - Monetary cost (that is paid out) of operations of a firm
   - Actual Paid Out Cost plus Implicit Cost of a Firm

Activity

Attempt doing following:

- Try to collect details of various household expenses which your family is incurring per month. Try and divide such expenses under Two heads - Fixed Expenses and the Variable Expenses
- On basis of internet search make an estimation of Social Cost of Union Carbide Firm which was operating in Bhopal
- Interact with the adults in your family to assess the opportunity cost of employment/work

they are engaged in

For Attempting Quiz on Cost Concepts Click Here

Further Readings

- **Micronomics** by Robert S. Pindyck, Daniel L. Rubinfeld and Prem L. Mehta, Pearson Publication
- **Modern Microeconomics** by A. Koutsoyiannis, ELBS Publication
- **Managerial Economics** by D.N. Dwivedi, Vikas Publication
- **Managerial Economics** by Petersen and Lewis, Prentice-Hall Publication

Short run cost theory

University of Mumbai

MICROECONOMICS

Short Run Cost Analysis

Learning Objectives

After reading this chapter, you are expected to be able to:

- Understand the concept of Short Run Cost function
- Understand various types of short run cost functions (Linear, quadratic, cubic cost function etc)
- Understand the pattern of change in Average Fixed Cost and the Variable cost as the Output of a firm increases
- Understand the pattern of change in the Marginal cost as the output of a firm changes
- Understand the relationship between Average Cost and Marginal cost in the short run

Introduction

Cost of production of a good or service determines the profit that will be earned by a company involved in production process or creation of service. In economic theory there are various cost concepts which are discussed and observed. The important cost concepts related to production are following: Fixed cost, Variable cost, Average cost and Marginal cost. The control of a firm over its cost of production and the identification of least cost production point/quantity ensures higher profits for a firm. In this module the pattern of changes short run costs on account of change in the output being generated by a firm is discussed in detail.

Let's Revise Important Cost Concepts

We already know that following are the important cost concepts related to the production process of a firm:

- Fixed Cost
- Varibale Cost
- Average Cost
- Marginal Cost

please refer to following page Introduction to Cost Concepts to understand various cost concepts in detail. Here we will briefly state again the meaning of above stated cost concepts for better understanding of the module on short run cost analysis.

Fixed Cost is that cost which does not change (that is either goes up or goes down) irrespective of whether the firm is operating or not. For example on account of strike or account of Lockout in Maruti-Suzuki's Manesar plant the production process stands still. Even when the plant is not operating the Firm still has to bear such expenses which are indirect in nature. For Example Rent of the factory premises, Wages of administrative employees etc. In other Fixed cost is not related direct production/manufacturing expenses.

Variable Cost on the Other hand is directly proportional to the production operations. As the size of production at any business grows, along with that grow the variable expenses. As the name suggests, the variable expenses vary with the business operations. When the firm is not operating on account of Strike/Lockout etc, then the variable cost of the firm is Zero

Average Cost is the cost that is obtained after dividing Total Cost with the number of units produced.

- **Total Cost = Fixed Cost + Variable Cost**
- **Average Cost = Total Cost / Units of Good produced**

Marginal Cost is the change in the Total cost when an additional unit of good is produced. In other words Marginal Cost is difference between total Cost of producing 'N + 1' units of good and 'N' units of good.

- **Marginal Cost =** $TC_n - TC_{n-1}$

Short Run and Long Run in Economic Theory

Understanding Short Run and Long Run Concept in Economic Theory

A famous statement made by celebrated economist J.M. Keynes states that "In the Long Run we are all dead". Thus, while undergoing any learning on microeconomic theory it becomes important for us to know that what is meant by the terms **Short Run** and the **Long Run** in economic theory.

'Short Run' is the time period in which if a firm wishes to increase its output it can do so by changing only certain variable inputs or factors of production like Labour, Raw material etc while certain other nputs or factors of production like Capital.

Short run is the time period during which if a firm wishes to increase its output then it can do so only by changing the variable factors (like Labor). Other factors (like capital) remain fixed in the short run or in other words cannot be varied on account of time limitation applicable on the company.

For example let us assume that a company like Maruti-Suzuki in India suddenly experiences spurt or upward movement in the demand of certain category of cars in its product line. The company will therefore try to produce more cars in order to cater to the increased market demand. In the short run the company will be able to increase the amount of production only by varying inputs like labor, raw material etc but the company will not be able to alter the plant size in order to enhance its production facility as such change in production facility may require some time in terms of implementation of such change.

On the other hand in the 'Long Run' everything is variable. Thus if a company wishes to enhance its output it can do so by varying all the factors like labor, raw material, plant size, important machinery and other facilities. In other words in the long run all factors of production or inputs are variable for the company. As per the above example of Maruti-Suzuki in the long run the company will also be in position to increase its plant size or will be in position to start new production facility in order to produce more.

Types of Short Run Cost Functions

Short run cost function of a Company can be of any of the following types:

- Linear Cost Function
- Quadratic Cost Function
- Cubic Cost Function

Linear Cost Function

Linear Cost Function

In case, for a firm or a company, its variable cost changes in the same proportion as the output of the firm, then a straight line or linear relationship is observed between the output generated by the firm and the cost involved in the producing the same. It is possible for us to express this relationship by using the mathematical equation of a straight line. This can be as follows:

$$TC = a + bQ$$

For the above equation following terms mean as follows: TC = Total Cost, a **and** b **are constant.** Q **is the Quantity Produced.**

Here, the constant 'a' indicates the value of total cost when the output of the firm is zero. This value of total cost will be equal to the fixed cost of the firm as at this point the variable cost of the firm will be zero as the output of the firm is zero. On the other hand

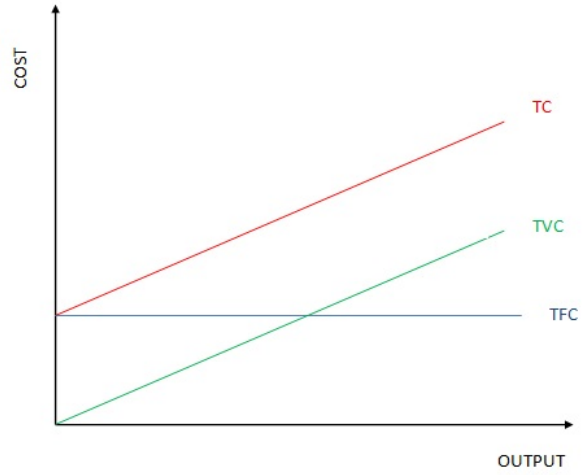
constant 'b' indicates the slope of straight line curve depicting the relationship between the cost and the output.

The linear relationship existing between Cost and Output is exprssed in the following table:

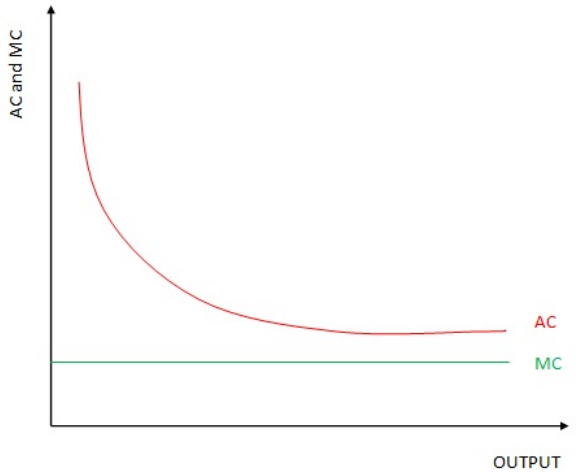
Quantity'Q'	FC	VC	TC=FC+VC	AFC=FC/Q	AVC=VC/Q	ATC=TC/Q	$MC = TC_n - TC_{n-1}$
0	10	0	0	0	0	0	0
1	10	2	12	10.0	2	12.0	2
2	10	4	14	5.0	2	7.0	2
3	10	6	16	3.33	2	5.33	2
4	10	8	18	2.5	2	4.5	2
5	10	10	20	2.0	2	4.0	2
6	10	12	22	1.67	2	3.66	2
7	10	14	24	1.43	2	3.42	2
8	10	16	26	1.25	2	3.25	2
9	10	18	28	1.11	2	3.11	2
10	10	20	30	1	2	3.0	2

In the above table 'Q' is the quantity produced
FC is Fixed Cost
VC is Variable Cost
TC is Total Cost (Which is FC + VC)
AFC is Average Fixed Cost obtained by dividing FC with Q
AVC is Average Variable Cost obtained by dividing VC with Q
ATC is Average Total Cost obtained by dividing TC with Q and
MC is Marginal Cost obtained by subtracting the Total Cost of producing 'n' number of goods from the Total Cost of producing 'n = 1' number of goods

The diagrammatic representation of such a straight line cost curve will be as follows:



The diagrammatic representation of the Average Cost and the Marginal Cost for the Linear Cost function will be as follows:



Quadratic Cost Function

Quadratic Cost Function

A Quadratic Cost function can be mathematically depicted as follows:

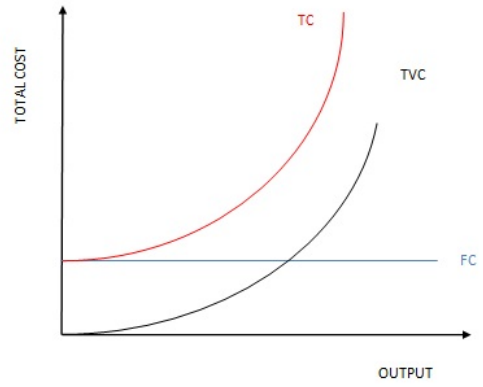
$$TC = a + bQ + cQ^2$$

In the above stated Quadratic equation *'a'* is constant indicating the value of total cost when the output of the firm is zero. The value of total cost in such a case will be equal to the fixed cost of the firm as at this point the variable cost of the firm will be zero. While, the constants *'b'* and *'c'*, indicate the slope of the quadratic cost function. A Quadratic Cost function can be expressed as follows:

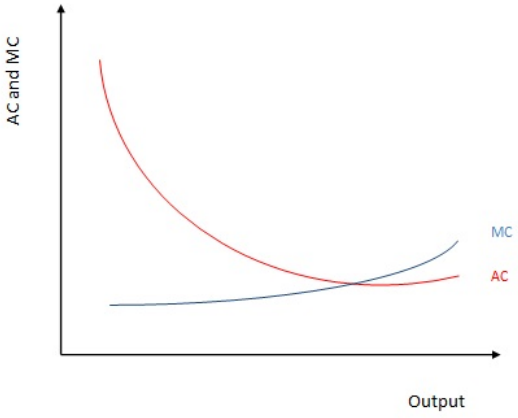
Quantity'Q'	FC	VC	TC=FC+VC	AFC=FC/Q	AVC=VC/Q	ATC=TC/Q	$MC = TC_n - TC_{n-1}$
0	10	0	0	0	0	0	0
1	10	4	14	10.0	4	14.0	4
2	10	10	20	5.0	5.0	10.0	6
3	10	17	27	3.33	5.66	9	7
4	10	26.4	36.4	2.5	6.6	9.1	9.4
5	10	37	47	2.0	7.4	9.4	10.6
6	10	50	60	1.67	8.33	10.0	13
7	10	67	77	1.43	9.57	11	17
8	10	92	102	1.25	11.5	12.75	25
9	10	132	142	1.11	14.66	15.77	40

In the above table 'Q' is the quantity produced
FC is Fixed Cost
VC is Variable Cost
TC is Total Cost (Which is FC + VC)
AFC is Average Fixed Cost obtained by dividing FC with Q
AVC is Average Variable Cost obtained by dividing VC with Q
ATC is Average Total Cost obtained by dividing TC with Q and
MC is Marginal Cost obtained by subtracting the Total Cost of producing 'n' number of goods from the Total Cost of producing 'n = 1' number of goods

The digramtic representation of Quadratic Cost function can be as follows:



The shape of Average cost curve and the Marginal cost curve under the Quadratic Cost function can be as follows:



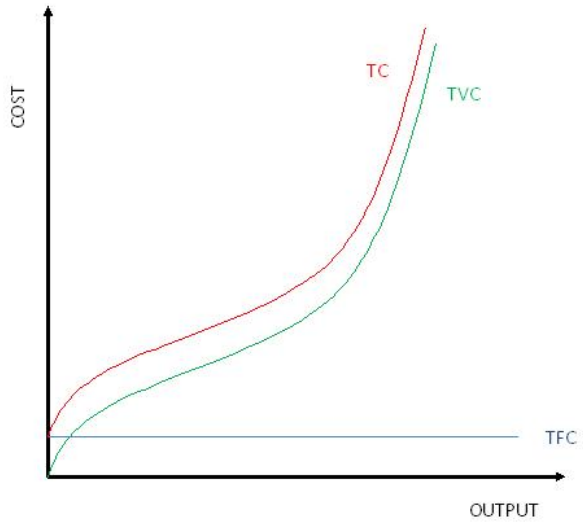
Cubic Cost Function

Cubic Cost Function

The Cubic Cost function can be mathematically depicted as follows:

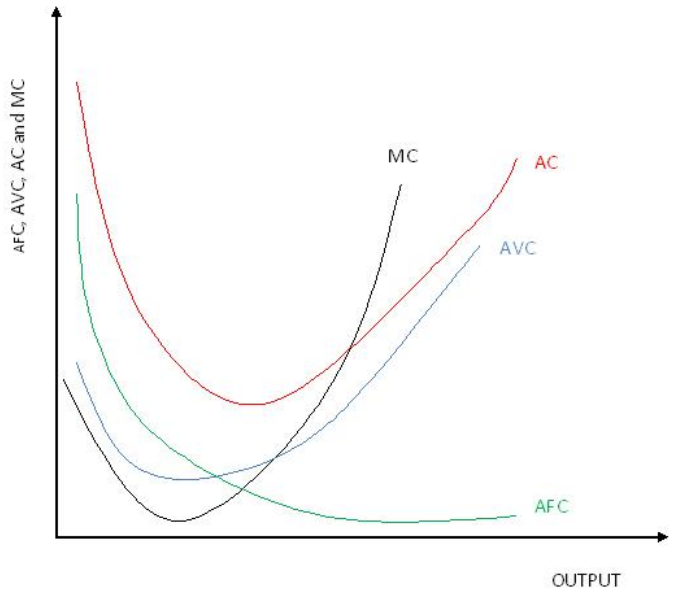
$$TC = a + bQ - cQ^2 + dQ^3$$

If the cost function is Cubic then following can be the shape of the TC (Total Cost), FC (Fixed Cost) and the TVC (Total Variable Cost) curves:



In the above diagram, the shape of the total variable cost curve is like inverse 'S'. This shape indicates that if more and more of the variable factor is applied to the fixed factor then the output of the firm initially increases at an increasing rate then at a constant rate and finally it starts to diminish. Please refer to the On account of the above the Average Variable cost initially decreases, reaches its minimum and finally it starts to increase again. This also results in the increase in the Total Variable Cost and the Total Cost at a diminishing rate initially, then at a constant rate at finally at an increasing rate

The shape of the ATC (Average Total Cost), MC (Marginal Cost) and AVC (Average Variable Cost) curves under the Cubic Cost function will be as follows:



The above depicted Cubic Cost Function can also be explained by using the following Cost values as stated in the following table:

Quantity'Q'	FC	VC	TC=FC+VC	AFC=FC/Q	AVC=VC/Q	ATC=TC/Q	$MC = TC_n - TC_{n-1}$
0	10	0	10	0	0	0	0
1	10	4	14	10	4	14	4
2	10	7	17	5	3.5	8.5	3
3	10	9	19	3.33	3	6.33	2
4	10	10	20	2.50	2.50	5	1
5	10	11	21	2	2.2	4.2	1
6	10	14	24	1.67	2.33	4.00	3

7	10	18	28	1.43	2.57	4.00	4
8	10	24	34	1.25	3.00	4.25	6
9	10	32	42	1.11	3.55	4.66	8
10	10	42	52	1.00	4.2	5.2	10

Again, in the above table 'Q' is the quantity produced
FC is Fixed Cost
VC is Variable Cost
TC is Total Cost (Which is FC + VC)
AFC is Average Fixed Cost obtained by dividing FC with Q
AVC is Average Variable Cost obtained by dividing VC with Q
ATC is Average Total Cost obtained by dividing TC with Q and
MC is Marginal Cost obtained by subtracting the Total Cost of producing 'n' number of goods from the Total Cost of producing 'n = 1' number of goods

Let's Sum Up

Summing Up What We Read

- **Short Run** is the time period in which if a firm wishes to increase its output it can do so by changing only certain variable inputs or factors of production like Labour, Raw material etc while certain other nputs or factors of production like Capital.
- In the long run everything is variable and thus, if a company wishes to enhance its output in the long run then it can do so by varying all the factors like labor, raw material, plant size, important machinery and other facilities. In other words in the long run all factors of production or inputs are variable for the company.
- Fixed Cost is that cost which does not change (that is either goes up or goes down) irrespective of whether the firm is operating or not.
- Variable Cost on the Other hand is directly proportional to the production operations. As the size of production at any business grows, along with that grow the variable expenses. As the name suggests, the variable expenses vary with the business operations. When the firm is not operating on account of Strike/Lockout etc, then the variable cost of the firm is Zero
- Average Cost is the cost that is obtained after dividing Total Cost with the number of units produced.
- Marginal Cost is the change in the Total cost when an additional unit of good is produced. In other words Marginal Cost is difference between total Cost of producing 'N + 1' units of good and 'N' units of good.
- The short run cost function can be of following types:Linear,Quadratic and Cubic.
- Depending upon the Cost function (that is whether it is Linear, Quadractic or Cubic)is the digramatic representation of the cost curves like AC, MC, AVC, ATC etc

Self-Assessment Questions (SAQs) {{{n}}}

Self Assessment Questions on Introduction to Microeconomics

=Some Objective Questions

Points added for a correct answer: 1
Points for a wrong answer: 0
Ignore the questions' coefficients:
Shuffle questions

1. Short Run is

- the time period in which if a firm wishes to increase its output it can do so by changing only certain variable inputs or factors of production like Labour, Raw material etc while certain other nputs or factors of production like Capital
- the time period which is veru short
- the time period in which the return on the factors of production is negative

2. Long Run is

- the time period which is very long
- the time period in which all the factors are variable
- the time taken by components like production, consumption, product pricing, demand to adjust themselves as per the market requirements

3. Linear Cost function is

- One which assumes that there is no relationship between the Cost and the Output produced by a Firm
- One which assumes straight line relationship between Cost and Output Produced by a FirmStudy of economic behavior of an individual firm, industry, household, consumers

etc in an economy

- under which there is fall in the valuation of a firm in the market

4. Marginal Cost is

- Cost of production borne by the Marginal Farmers
- Cost of Production of a firm when a firm undergoes Business Cycles

Marginal Cost is the change in the Total cost when an additional unit of good is produced.

- In other words Marginal Cost is difference between total Cost of producing 'N + 1' units of good and 'N' units of good.Understanding Consumer Behaviour
- All of the above

Submit

True or False Quiz

1. The shape of Average Total Cost curve under Cubic Cost function is
   - 'S' shaped, rising upward mildly from left to right
   - 'L' shaped, on account of sudden change in Cost
2. Average Fixed Cost
   - Decreases continously as the Output of the Firm increases
   - Increases continously as the Output of the Firm increases

Activity

Write your activity here

http://www.youtube.com/watch?v=LSBg7s_NtDo

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Key Terms

Extension exercise

Enter your text here

References and Bibliography

Further Readings

Economies of Scale & Economies of Scope

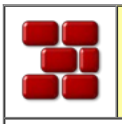
MICROECONOMICS

ECONOMIES OF SCALE

Structure

Introduction

Have you ever pondered why is that we can now buy a high-performance laptop for just a few thousand Rupees when a similar computer might have cost you over a lakh of Rupees over some years ago? Or why is the average price of mobile phones falling all the time whilst the functions and performance level are always on the rise? Further how you can transfer money from one account to another in a few seconds which was impossible at low cost in the past? The answer is in economies of scale. Economies of scale are a key advantage for a business that is able to grow. Most firms find that, as their production output increases, they can achieve lower costs per unit. Economies of scale are the cost advantages that a business can exploit by expanding their scale of production. The effect of economies of scale is to reduce the average (unit) costs of production. When more units of a good or a service can be produced on a larger scale, yet with (on average) less input costs, economies of scale are said to be achieved. Alternatively, this means that as a company grows and production units increase, a company will have a better chance to decrease its costs. A firm must identify the sources of its economies of scale so as to reap maximum advantages in production. Scale economies have brought down the unit costs of production and have fed through to lower prices for consumers.



Learning Objectives

After reading this chapter, you are expected to be able to:

how to

1. *Know a set of concepts relevant for production process*
2. *State clearly the measures for reducing cost of production*
3. *Identify the sources of from where cost advantages follow*
4. *Develop a theoretical base for analyzing practical situations*
5. *Facilitate a comparison between economies of scale and economies of scope*

Why Study Economies of Scale?

A firm has to expand the scale of output in order to achieve its objectives like minimization of cost, efficient use of resources etc. Economies of scale are the cost advantages that a business can exploit by expanding their scale of production. The effect of economies of scale is to reduce the average or per unit costs of production.

When more units of a good or a service can be produced on a larger scale, with less input costs per unit of output produced, economies of scale (ES) are said to be achieved. Alternatively, this means that as a company grows and production units increase, a company will have a better chance to decrease its costs.

While making production decisions a business firm has to consider two things; first is the productivity of inputs employed and second is the cost of output produced. A firm has to select the size of the plant in such a way that the productivity of the factors balances with the costs incurred on production.

The long run production (the period during which a firm can vary all its factor inputs employed) function states that a firm experiences returns to scale - increasing returns to scale, constant returns to scale and decreasing returns to scale. Under increasing returns to scale doubling of inputs more than doubles the output. Constant returns to scale are experienced when doubling of inputs exactly doubles the output. When doubling of factor inputs less than doubles the output it is a case of decreasing returns to scale. The long run cost (the period during which all costs are variable) behaviour indicates decreasing costs, constant costs and increasing costs. When the average cost decreases up to a certain rise in the level of output the firm is enjoying economies of scale. When an increase in output results in the same cost per unit of output produced there are constant returns to scale. Increasing average cost with increase in output indicates increasing cost conditions in production.

Decreasing costs are reciprocal of increasing returns to scale. Constant cost conditions are in proportion to the constant increase in the output. Increasing cost conditions are associated with more than proportionate fall in the output.

The study of returns to scale and the behaviour of long run average cost enable us to understand the economies of scale. Understanding economies of scale helps in striking the correct balance between output behaviour and cost behaviour. The changes in long run output and long run average cost are crucial in determining investment in plant capacity and size. Economies of scale depend on the size of the investment in fixed capital. Costs in the long run cannot be minimized if there are dis-economies of scale. Production and cost decisions with disregard to economies of scale are detrimental to the survival of the firm let alone maximizing profits.

Concept of Economies of Scale

Adam Smith identified the division of labor and specialization as the two key means to achieve a larger return on production. Through these two techniques, employees would not only be able to concentrate on a specific task, but with time, improve the skills necessary to perform their jobs. The tasks could then be performed better and faster. Hence, through such efficiency, time and money could be saved while production levels increased.

Just like there are economies of scale, diseconomies of scale (DS) also exist. This occurs when production is less than in proportion to inputs. What this means is that there are inefficiencies within the firm or industry resulting in rising average costs. The ***economies of large scale production*** are classified by **Marshall** into –

1. Internal Economies, and
2. External Economies

Internal Economies of Scale

Internal economies of scale are those economies which are internal to the firm. These arise within the firm as a result of increasing the scale of output of the firm. A firm secures these economies from the growth of the firm independently. The main internal economies are grouped under the following heads:

External Economies of Scale

}}

Economies of Scope

Case Study

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Activity

1. There are are increasing returns to scale if doubling of inputs leads to _____ than doubling of output
2. A firm experiences _____ to scale if doubling of inputs leads to doubling of output
3. If doubling of input leads to less than doubling of output then it is a case of _____
4. If the long run average cost of production falls with a per unit rise in the output, the firm is experiencing _____
5. There are _____ cost conditions if the increase in average cost of production is in same proportion as the increase in output
6. Increasing cost conditions are said to prevail when the proportionate increase in the unit cost of production is _____ than the proportionate increase in the output

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

a) Differentiate between the following:

i) Increasing returns and decreasing costs

ii) Constant returns and constant costs

iii)Decreasing returns and increasing costs

b) Distinguish between internal economies internal diseconomies

c) Distinguish between external economies and external dis-economies

d) Distinguish between scale economies and scope economies

Let's Sum Up

Key Terms

Further Readings

Moddle Link Quiz

Learning Curve Effect

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MICROECONOMICS

Learning Curve Effect

Introduction

Long Run Cost theory suggests that a firm observes fall in its average cost of production in the long run on account of the firm enjoying benefits of 'Economies of Scale' and 'Increasing Returns to Scale' in the long run. However, the factor of Economies of Scale cannot be the only reason for the fall in the average cost of production as output of a firm increases. There is another phenomenon which also contributes to the fall in the average cost of production as the output of a firm increases. This phenomenon can be termed as 'Learning Effect'. In this module the concept and application of Learning Curve Effect has been covered in detail.

Learning Objectives

After reading this chapter, you are expected to be able to:

- Understand the concept of **Learning Curve Effect**
- Understand and appreciate that why the cost per unit of output and labor hours required to produce a product goes down even if a firm may not be enjoing significant 'Economies of Scale'
- Understand and compare the difference between the positive impact of 'Economies of Scale' and 'Learning Effect' on a firm.

Understanding Learning Effect

Learning Curve Effect

Learning Curve measures the relation between increase in per worker productivity (leading to decrease in per unit labor cost at fixed prices) associated with an improvement in labor skills from on the job experience. [1]

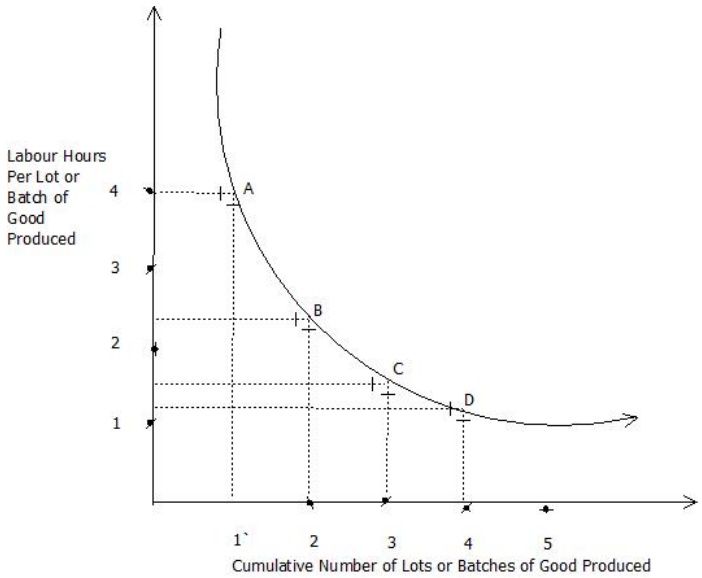
In other words, Learning Effect leads to fall in the cost of production per unit because with the increased involvement in the production process Labor and Managers become more and more familiar with the production process. This leads to improvement in their efficiency level. Here 'Efficiency' means greater amount of output generated per labor unit over the same amount of input of labor hours in the process of production. This happens on account of following factors:

- The labor units or the workers who are engaged in the production or manufacturing process become familiar with the process of production with the passage of time. Thus, they require less time or labor hours to generate same amount of output which they were earlier producing by using more labor hours.

- Managers who are involved in the management and scheduling of the production process also get familiar with the process and are thus in better position to use the resources at their disposal in better manner as well as scheduling the production process more efficiently thus leading to more output for the same amount of input.

Following Diagram is representation of the Learning Curve Effect:

Figure.1: Learning Curve



In the above diagram on the X axis, we have taken the number of lots or batches of Good produced and on the Y axis we are considering the labor hours required per lot of Good produced. It is clear from the diagram that the labor hours required to produce each lot is higher when the firm is producing the first or initial few lots or batches of good. The labor hours required per lot of production to produce the second lot or later lots on the other hand is lower. As per the above depicted diagram (figure 1) the labor hours required to produce the first lot is close to four hours. While the labor hours required for producing the second lot is close to two hours. The labor hour requirement per lot further goes down by the time company is producing the third and the fourth lot of the Good or Product. The Learning Curve effect can be further explained by using the following data table:

Understanding Learning Curve Effect

Labor Hours to Produce Good	Number of Batches Produced	Average Number of Labor Hours Required to a Batch	Average Cost of Labor (If Labor Cost is Rs. 500 per Labor Hour)
10	1	10	5000
18	2	9	4500
24	3	8	4000
28	4	7	3500
30	5	6	3000
36	6	6	3000

From the above table it is clear that the average number of hours required to produce a batch of particular good say 'X' is going down on account of Learning Curve Effect. If we assume that labor cost per hour is Rs. 500 and this labor cost per hour stays fixed, then the average cost of labor required to produce a batches of good 'X' is goes down on account of increased output from the same amount of labor hour input. Thus, as per the table, the Average Labor Cost per batch is going down from Rs. 5000 to Rs. 3000 by the time the company is producing sixth batch of Good X and this happens on account of Learning Curve Effect.

Case Study

Understanding Learning Effect

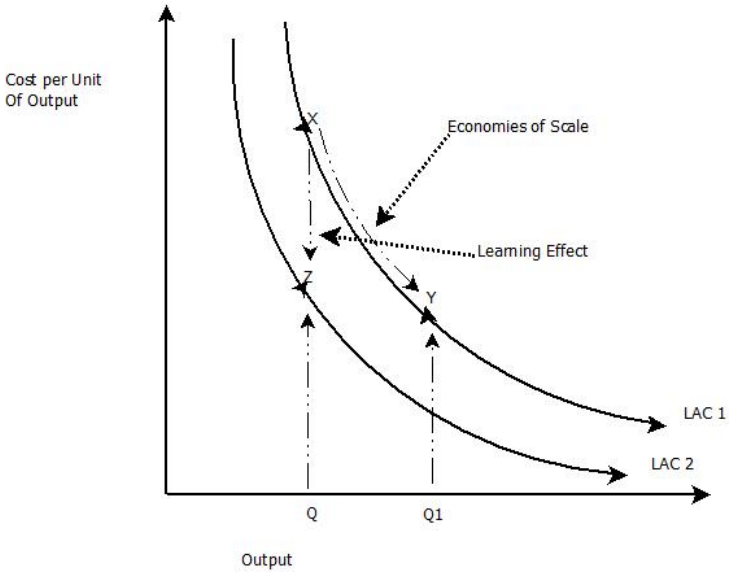
Aman and Asad are good friends. Aman is not very familiar with computers and is not used to typing documents with help of computer keyboard. However, his friend Asad is an experienced computer operator.Thus, the time taken by Aman to type a 500 word document on the personal computer is 1 hour while the time taken by Asad to type the same document of the personal computer is 10 minutes. The factor that has resulted in higher efficiency of Asad is the 'Learning Effect'. As, Asad is used to working on the personal computer and he is familiar with the use of keyboard, the time required by him to type the document is much less than that of Aman. If Aman starts using personal computers on more regular basis then the time required by him to type such 500 word document will also reduce on account of the 'Learning Curve Effect'.

Differance between Learning Curve Effect and Impact of Economies of scale on a Firm

Learning Curve Effect Vs Economies of Scale

Economies of Scale are outcome of long run production under which the scale of the operation of the firm increases. Economies of Scale lead to fall in long run average cost of production as the output of a firm increases. On the other hand 'Learning Effect' is possible both in the short run as well as the long run production. This is because the 'Learning Effect' is outcome of the increased familiarity of Labor or Manager with the production processes. The increased familiarity with the production process leads to improved efficiency or more output for the same amount of input in terms of labor hours required in the production process and similar other factors. The difference between 'Economies of Scale' and 'Learning Effect' can be understood with help of following diagram:

Figure.2: Economies of Scale Vs Learning Curve



Movement from X to Y indicates the impact of 'Economies of Scale' on the average cost of production. 'Economies of Scale' are leading to the fall in long run average cost of production, whereby, the per unit cost of production is declining as the firm increase its output from 'Q' to 'Q1'. The impact of 'Economies of Scale' on the Cost is leading to movement from point X to Y along the same long run average cost curve-'LAC 1'. On the other hand movement from the point X on 'LAC 1' to point Z on 'LAC 2' indicates 'Learning Effect'. Under the impact of learning curve effect the cost per unit registers a decline and leads to movement from 'LAC 1' to 'LAC 2' indicating that on account of 'Learning Effect' less cost per unit is required to produce same quantity that is 'Q' of the Good.

Measurement/Computation of Learning Curve Effect

One of the ways to measure learning curve effect can be by using the following equation:

$$Y_n = K_n^{log_2 b}$$

Where;

- Y_n is of equal to the number of Direct labour hours required to produce n^{th} number of unit of the Good under consideration
- K is the Direct number of labour hours required to produce first unit of Good
- n is the number of units of Good produced
- b is Learning Percentage

Let's Sum Up

- Learning Curve measures the relation between increase in per worker productivity (leading to decrease in per unit labor cost at fixed prices) associated with an improvement in labor skills from on the job experience.
- Learning Effect leads to fall in the cost of production per unit because with the increased involvement in the production process Labor and Managers become more and more familiar with the production process. This leads to improvement in their efficiency level. Here 'Efficiency' means greater amount of output generated per labor unit over the same amount of input of labor hours in the process of production.
- Differance between the Economies of Scale and Learning Curve Effect is as follows: Economies of Scale are outcome of long run production under which the scale of the operation of the firm increases. Economies of Scale lead to fall in long run average cost of production as the output of a firm increases. On the other hand 'Learning Effect' is possible both in the short run as well as the long run production.

Self Assessment Questions on Learning Curve Effect

Points added for a correct answer: 1

Points for a wrong answer: 0

Ignore the questions' coefficients:

Shuffle questions

1. Learning Curve Effect is outcome of

- On the job experience or familiarity which labor/workers attain while working on the job. This leads to more output for the same amount of input in terms of labor hours in the production process.
- fall in the fixed cost of production
- increase in the scale of production process

2. On account of Learning Curve effect , following happens

- the Labor hours required to produce a product or service goes down
- the cost associated with the production process goes up
- accounting Cost of a firm goes up

3. Economies of Scale lead to

- fall in the long average cost of production of a firm
- fall in the short run average cost of production
- fall in the valuation of a firm in the market

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True or False Quiz

1. The impact of 'Learning Curve' and 'Economies of Scale'
   - is same on the cost pattern and cost schedule of a firm. In other words a firm benefits from both (Learning Curve Effect and Economies of Scale) in a similar manner.
   - is different on the cost schedule of a firm. On account of 'Learning Curve Effect' less labor hours are required to produce the same amount of output while on the other hand, on account of the 'Economies of Scale', the average cost of production goes down as the scale of operation of a firm increases.
1. The impact of 'Learning Curve Effect' on the cost pattern of a firm is visible only if
   - The average labor cost per hour involved in the production process remains fixed or does not increase.
   - a firm is operating in the short run

[To Attempt Quiz on Learning Click Here]

Activity

Try doing following

- If you are not familiar with working in the kitchen then try to attempt and do following: Start helping your mother in rolling/making Chapati (Indian Bread) daily for ten days. Observe and record the time taken by you to roll or make chapatis on daily basis. On the tenth day do you observe any reduction in the time which you have taken to roll or make chapati in comparison to the time taken by you to do the same on the first day. Record the reason for reduction in the time taken to roll or make chapati and attempt to relate it with the concept of Learning Curve Effect.
- Observe and record the difference in the time taken by you and your mother to type and send five line regular SMS through mobile phone. Record who requires more time to type and send the SMS. In your view, what is the reason for the difference between the time taken by you and your mother to type and send the SMS. Can you relate this case with the 'Learning Curve Effect'

Further Readings

- **Micronomics** by Robert S. Pindyck, Daniel L. Rubinfeld and Prem L. Mehta, Pearson Publication
- **Modern Microeconomics** by A. Koutsoyiannis, ELBS Publication
- **Managerial Economics** by D.N. Dwivedi, Vikas Publication
- **Managerial Economics** by Petersen and Lewis, Prentice-Hall Publication

Revenue Concepts

Revenue Concepts

Introduction

Profit making is considered to be the most important objective of firm. Like the consumers aim at utility maximisation, the producers aim at the profit maximisation. Profit is a difference between total cost and total revenue.Profit can be increased either by reducing the cost of production or by increasing the revenue. In this unit, we are going to learn various concepts of total revenue, the behiour of revenue under different market conditions and the importance of concept of revenue.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. Define various concepts of revenue.
2. Using data, understand the calculation of different concepts of revenue.
3. Understand the relationship between different concepts of revenue under perfect competition.
4. Understand the relationship between different concepts of revcnue under imperfect competition.
5. Establish relationship between average revenue, marginal revenue and elasticity of demand.

Types of Revenue

Total Revenue

The total revenue of a firm is the total amount of money that the firm receives by selling a certain quantity of output. Symbolically,

TR = P x Q

Where,

P = Price

Q = Quantity

TR = Total Revenue

Example:

Calculate the total revenue for a firm which is selling 10 television sets at Rs. 21,000 each.

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TR = P X Q

= 21,000 x 100

= Rs. 2,10,000

Average Revenue

Revenue earned by a firm per unit of output is called average revenue. Average revenue is equal to price in both competitive and non-competitive markets. Symbolically,

AR = TR/Q

Where

AR = Average Revenue

TR = Total Revenue

Q = Units sold

Example:

What is the average revenue for a firm which is selling 25 units of commodity X and getting the total revenue of Rs. 2000?

AR = TR/Q

= 2000/25

= 80

Marginal Revenue

Revenue earned by selling additional unit of output is called as marginal revenue. In other words, change in the revenue resulting from a one unit increase in output is marginal revenue. Symbolically,

$MR = TR_n - TR_{n-1}$

Where

MR = Marginal Revenue

TR = Total Revenue

n = Unit sold

Example :

By selling 20 units, Firm ABC earned Rs. 200. After selling the 21st unit, firm's revenue increased to 218. What is the marginal revenue in this case?

$MR = TR_n - TR_{n-1}$

= Total revenue by selling 21(n) units - total revenue by selling 20(n-1) units

= 218 - 200 = 18

Basic concepts related to the Theory of Firm

Case Study

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Can You solve this quiz?

Points added for a correct answer: 1

Points for a wrong answer: 0

Ignore the questions' coefficients:

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Let's Sum Up

Key Terms

Further Readings

<reference>Pindyck, Rubinfeld and Mehta - Microeconomics, 7th edition</reference>

Revenue under Perfect and Imperfect Competition

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Revenue Concept

Introduction

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4. Understand the relationship between different concepts of revcnue under imperfect competition.
5. Establish relationship between average revenue, marginal revenue and elasticity of demand.

Types of Revenue

Basic concepts related to the Theory of Firm

Case Study

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Can You solve this quiz?

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Let's Sum Up

Key Terms

Further Readings

<reference>Pindyck, Rubinfeld and Mehta - Microeconomics, 7th edition</reference>

Equilibrium of a Firm

Varsha Malwade, Associate Professor in Economics, **Ramnarain Ruia College**, Matunga, Mumbai

EQUILIBRIUM OF A FIRM

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Break- Even Analysis

Varsha Malwade, Associate Professor in Economics, Ramnarain Ruia College, Matunga, Mumbai

BREAK- EVEN ANALYSIS

Introduction

Break- Even point is a very significant concept in Economics and business, especially in Cost Accounting. Break- Even point is a point where the cost of production and the revenue from sales are exactly equal to each other; which means that the firm has neither made profits nor has incurred any losses. The Break- Even Analysis is also known as the Cost- Volume- Profit Analysis and is used to study the relationship between total cost, total revenue, profits and losses. It also helps to determine that level of output which is required to cover the operating costs of a business.

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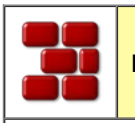


Learning Objectives

After reading this chapter, you are expected to be able to:

1) Understand the concept of 'Break- Even' in the business and cost accounting.

2) Describe the process of reaching the Break- Even point.

3) Understand the relevance of 'Break- Even' to the business.

Concept of Break- Even Analysis

Break- Even analysis is a concept used very widely in the production management and costing. It is an analytical tool which helps the firm to identify that level of sale where it will cover its cost of production. Any sale over and above the break- Even Point will accrue profits to the firm, while any sales less than it would put the firm into losses.The Break- Even Point shows the price at which the firm makes neither profit nor loss.

Symbolically, in the equation form, the break-even point (in terms of Unit Sales (X)) can be directly computed in terms of Total Revenue (TR) and Total Costs (TC) as:

TR = TC

P x X = TFC + V x X

P x X — V x X = TFC

(P — V) x X = TFC

X = TFC / P — V

where TFC is Total Fixed Costs, P is Unit Sale Price, and V is Unit Variable Cost. In other words, if we multiply Unit Sales (X) with the Unit Sale Price (P) we will get the sales revenue amount. The break-even sales can also be measured by dividing fixed costs by Contribution Margin Ratio, i. e.

X = TFC / C

where C is Contribution Margin Ratio. The Contribution Margin Ratio shows the contribution towards the recovery of fixed operating costs, i. e.

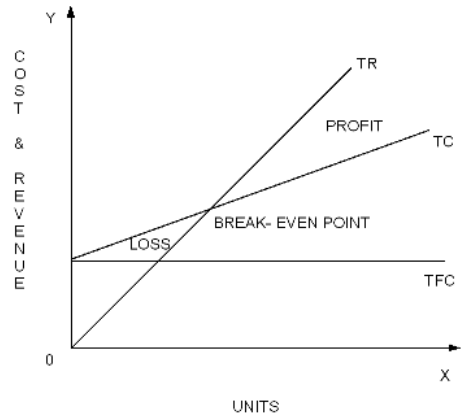
X = P — V / P x 100

SAQ

If a firm X has fixed operating cost of Rs. 5000, the per unit price of the commodity is Rs. 10 and if the unit variable cost of production is Rs. 5, what will be its break- even sales in units?

Graphical presentation of the concept

The Break- Even Point can be explained with the help of the following diagram:

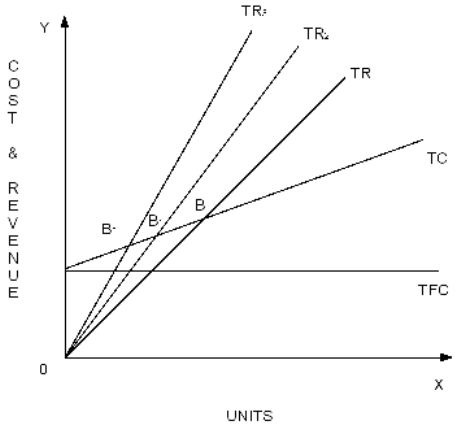


In the diagram given above, the break- even point is reached where TR equals TC. Prior to this stage, the TC is above TR and the firm is making losses. It starts earning profits after the break- even point.

Factors influencing Break- Even Point

1. Changes in Price

Changes in price affect the total revenue from sales and hence the break- even point. An increase in price will prepone the break- even point while a fall in price postpones it. This can be explained with the help of the following diagram:



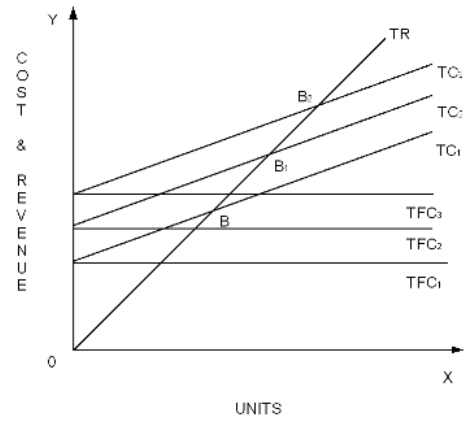
In this diagram, an increase in price has brought about a shift in the TR curve and has preponed the break even point. The converse is true in case of a fall in the price of the commodity.

SAQ

If a firm X in the example solved above finds a rise in price to Rs. 12 what will be its break- even sales and if the price falls to Rs. 6, what will the break- even sales be?

2. Changes in fixed cost

An increase in the fixed cost increases the break- even point while a fall in the fixed cost will reduce the break- even point.



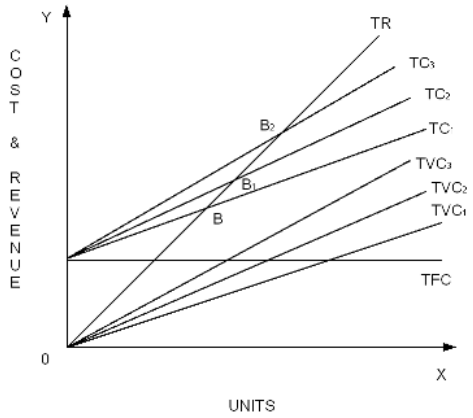
In this diagram, an increase in fixed cost has brought about a shift in the TC curve and has increased the break even point. The converse is true in case of a fall in the fixed cost.

SAQ

If a firm X in the example solved above finds a rise in the fixed cost to Rs. 7000 what will be its break- even sales and if the fixed cost falls to Rs. 3000, what will the break- even sales be?

3. Changes in variable cost per unit

An increase in the variable cost per unit increases the break- even point while a fall in the variable cost will reduce the break- even point.



In this diagram, an increase in variable cost has brought about a shift in the TC curve and has increased the break even point. The converse is true in case of a fall in the variable cost.

SAQ

If a firm X in the example solved above finds a rise in the variable cost per unit to Rs. 8 what will be its break- even sales and if the variable cost per unit falls to Rs. 3, what will the break- even sales be?

Limitations of Break- Even Analysis

1. For the break- even point to be counted, all costs need to be clearly categorized in fixed and variable costs, which may not be possible every time.
2. For the multiple- product or joint- product operations, it is difficult to apply the break- even analysis. on needs to ascertain the costs to each product> hence the analysis is applicable only for single product.
3. The computation of break- even point is based on the historical information. If this information is not relevant, the analysis can not be applied usefully.

Significance of Break- Even Analysis

The break- even analysis helps us to determine the levels of sales necessary to meet all the operating costs. With the estimates of revenue and costs, we can forecast the profits. One can also appraise the effects of change in price, fixed costs and variable cost on sales volume, total cost and total revenue and in turn, on the break- even point. One can compare the profit earning

capacities of different firms. It can also bring out the significance of capacity utilization for achieving economy.

Let's Sum Up

1. Break- Even point is a point where the cost of production and the revenue from sales are exactly equal to each other.

2. The firm has neither made profits nor has incurred any losses.

3. Break- Even analysis is a concept used very widely in the production management and costing.

4. An increase in price will prepone the break- even point while a fall in price postpones it.

5. An increase in the fixed cost increases the break- even point while a fall in the fixed cost will reduce the break- even point.

6. An increase in the variable cost per unit increases the break- even point while a fall in the variable cost will reduce the break- even point.

Key Terms

1. Cost of Production
2. Revenue
3. Contribution Margin Ratio

References and Bibliography

1. Pindyck, Rubinfeld and Mehta - Microeconomics, 7th edition
2. P.A. Samuelson,'A note on the Pure Theory of Consumers' Behaviour', Econometrica NS.5(1938)
3. Varian, H. (1992) Microeconomic Analysis, Third edition, New York: Norton, Section 8.7

Perfect competition

University of Mumbai

Dr.Mrs.Sadhana Phadnis. ICLEs' Motilal Jhunjhunwala College, Vashi Navi Mumbai

Work in progress, expect frequent changes. **Help and feedback is welcome**. See discussion page.

Perfect Competition

Perfect Competition

Introduction

After the discussions on the behaviour of consumers, demand analysis, cost and production, we have to study the market structure of an economy. Market refers to a place or location where a product, is exchanged for money between sellers and buyers. The market structure comprises of perfect competition, monopoly, monopolistic competition, oligopoly and duopoly. Depending on the type of the market a producer may be a price taker, price maker or price leader or follower. Let us discuss the meaning and the features of perfect competition.

Learning Objectives

After reading this chapter, you are expected to be able to:

Objectives:

1. Distinguish between types of the market, firm and industry
2. Analyse conditions prevail in reality
3. Comprehend the behaviour of buyers and sellers in the competitive market conditions
4. Understand price determination in the short run and long run

Definitions

A perfectly competitive market is one in which the number of buyers and sellers is very large, all engaged in buying and selling homogeneous product without any artificial restrictions and possessing perfect knowledge of market at a time. In the words of Joan Robinson," perfect competition prevails when the demand for the output of each producer is perfectly elastic. This entails, first that the number of seller is large so that the output of any one seller is negligibly small compared to total output of the commodity, and second, that buyers are alike in respect of their choice of rival sellers, so that the market is perfect." A market becomes perfectly competitive when following conditions are fulfilled.

For simplified version of perfect competition click here [[1]]

Characteristics

Perfect Competition

Pure Competition

1. A large number of buyers and sellers: both buyers and sellers are in a large number, so that individually neither buyer nor seller is in a position to influence the price. Influence of an individual buyer or seller is absolutely insignificant. They will have to accept the price established it the market. A single seller cannot increase the price. If he increases, he will have no buyers for the product. The buyers cannot bargain for a lower price, as there are enough buyers at the prevailing price.
2. Homogeneous commodity: A commodity sold in the market is homogeneous, that is, identical in quality and size. A difference of any type would provide an excuse for the seller to charge a higher price. When goods are homogeneous there is no possibility of charging a higher price by any seller under the pretext of qualitative or quantitative differences.
3. Free entry and exit: There is no restriction on any producer to produce a commodity and sell it in the market. The firms are free to enter or exit the market. New firms enter the industry when excess profits are earned by the industry. Some firms may leave when loss is sustained by the industry.

```
Fulfilling these three conditions make the competition pure and to make it perfect following conditions need to be fulfilled.
```

Perfect Competition

1. Complete market information: This condition implies close contact between buyers and sellers. Both of them possess complete knowledge about the prices at which goods are being bought and sold, and the prices at which others are prepared to buy or sell. They have perfect knowledge of the place where the transactions are being carried on. This condition forces the sellers to sell the product at the prevailing market price and buyers to buy at that price.
2. Perfect mobility of factors of production: goods are free to move to those places where they can fetch the highest price. Factors can also move from a low paid to a high paid industry. Factors are assumed to be freely mobile geographically and occupationally. It helps to adjust supply according to demand.
3. No transport cost: From the place of production to the market factors of production and goods are transported without any cost. This condition is essential for the existence of perfect competition which requires that a commodity must have the same price everywhere at any time. If transport costs are added to the price of the product, even a homogeneous commodity will have different prices depending upon transport costs from the place of supply.

Under the above conditions, for a particular commodity there can be only a uniform price throughout the market.

Perfect competition is often distinguished from pure competition, but they differ only in degree.

According to Chamberlin, pure competition means "competition allowed with monopoly elements," whereas perfect competition involves "perfections in many respects than in the absence of monopoly."

The practical importance of perfect competition is not much in the present times as few markets are perfectly competitive except those for staple food products and raw materials. The study of perfect competition helps us in understanding the working of the economy, where competitive behaviour leads to the best allocation of resources and the most efficient organisation of production.

Equilibrium of the firm and industry

Conditions of equilibrium of the firm:

```
A firm is in equilibrium when it has no tendency to change its level of output. It needs neither expansion nor contraction. It is earning maximum profits in equilibrium by equating its marginal cost with marginal revenue. For fulfilling the condition of maximum profits, another essential condition is that the marginal cost must be less than the marginal revenue before it equals the latter. And after the point of equality, the marginal cost must exceed the marginal revenue. Diagrammatically it means that the MC curve must cut the MR curve from below ad after the point of equilibrium it must be above the latter.  Under conditions of perfect competition, the MR curve of a firm coincides with its AR curve. The MR curve is horizontal to the X axis. Therefore, the firm is in equilibrium when MC=MR=AR (price)
```

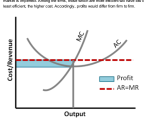
Conditions of equilibrium of the industry:

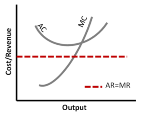
An industry is in equilibrium firstly when there is no tendency for the firms either to leave or enter the industry, and secondly, when each firm is also in equilibrium. The first condition implies that the average cost curves coincide with the average revenue curve of all the firms in the industry. They are earning only normal profits, which are supposed to be included in the average cost curves of the firms. The second condition implies the equality of MC and MR. Under a perfectly competitive industry these two conditions must be satisfied at the point of equilibrium, i.e. MC=MR and AC =AR since AR=MR, MC=AC=AR. Such a situation represents full equilibrium of the industry.

Short run equilibrium

(A) Short run equilibrium of Firm and Industry:

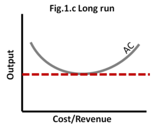
Equilibrium analysis under identical costs leads to a situation where at any given time all the firms will be in a particular position i.e. all the firms will be operating either with excess profits or normal profits or losses. When a firm incurs loss, again all the firms will have the same amount of loss. In reality the firms do not operate with identical cost. Each firm differs in its cost since the real factor market is imperfect. Among the firms, those which are more efficient will have low cost and the least efficient, the higher cost. Accordingly, profits would differ from firm to firm.





Long run equilibrium

Fig.1.c Long run



Economic region of production

Case Study

Enter your text here

Activity

Write your activity here

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

Self Assessment Questions on Perfect Competition

Points added for a correct answer: 1
Points for a wrong answer: 0
Ignore the questions' coefficients:
Shuffle questions

1. Which of the following is not the characteristic of the perfectly competitive market?
   - Free entry and exit of firms
   - Large number of buyers and sellers
   - Homogeneous products
   - Presence of high transportation cost
2. In which of the following types of market structure do firms produce homogeneous products?
   - Monopoly
   - Differentiated oligopoly
   - Perfect competition
   - Monopolistic competition
3. In which of the following types of market structures, are resources assumed to be mobile?
   - Monopoly
   - Oligopoly
   - Perfect competition
   - Monopolistic competition
4. Which of the following is true about perfect competition?
   - Firms can enter freely in the market, but it is difficult to exit from the market
   - Firms face difficulty in entering the market, but firms can freely exit from the market
   - Entry and exit in the market is highly restricted
   - Firms are free to enter and exit the market
5. In a perfectly competitive market, the demand curve is_____
   - Relatively inelastic
   - Unitary elastic
   - Infinitely elastic
   - Relatively elastic
6. In a perfectly competitive market, if MC is the marginal cost, MR is the marginal revenue, AR is the average cost and P represents the price, the first order condition for profit maximisation will be_____
   - MC<MR<AR<P
   - MC=MR=AR=P
   - MC>MR>AR>P
   - MC=MR>AR=P
7. In perfect competition, during the short run a firm maximises its profits when___
   - Average revenue is equal to average cost
   - Total revenue is equal to total cost
   - Marginal revenue is equal to marginal cost
   - Marginal revenue is equal to fixed cost

Submit

Let's Sum Up

Summary:

In perfect competition, there is large number of buyers and sellers, products are homogeneous, there are no barriers to enter and exit, buyers and sellers have perfect knowledge about the market conditions and there is perfect mobility of resources and there is absence of transportation cost.

Supply and demand forces determine the price of a commodity. Short run equilibrium of a firm is based on the total revenue and total cost as well as marginal revenue and marginal cost. Firms in an industry try to maximise their profits by adjusting the output to a level where MC=MR.

Long run equilibrium plays a crucial role in deciding the existence of the firm. Profits earned by the firms would attract others to enter the industry and with the entry of new firms there will be a shift in the short run industry supply curve to the right until it intersects with the market demand curve at the price at which all firms make zero economic profits. It is then that the industry will be in equilibrium.

Key Terms

Extension exercise

Enter your text here

References and Bibliography

Dominick Salvatore (Fifth Edition)

Further Readings

</quiz>

Click to view quiz

Category: Work in progress

MONOPOLY

University of Mumbai

MICROECONOMICS

MONOPOLY

Introduction

In this unit we examine how market structure influences market outcomes. Imperfect market may assume a variety of forms like monopoly, monopsony, duopsony,oligopoly and bilateral monopoly. In this chapter we study how a market controlled by just one firm –a monopoly. A study of these situation would help us in appreciating the reality around us, particularly the present status of monopoly regulation in the country. Pricing strategy plays an important role in many business decisions.

Learning Objectives

After reading this chapter, you are expected to be able to:

- 1. Identify a variety of market where small sellers dominate.
- 2. Appreciate the real world market situation in terms of an analytical framework.
- 3. Analyse the price output decision undertaken by a single seller.
- 4. Discover the situation of market disequilibrium in some cases.
- 5. Question the profit maximising principle and its relevance in practice.
- 6. Prepare yourself for discussing pricing practices and methods.

Features of Monopoly

- 1. **Single seller** –There is only one seller or firm in the market facing many buyers.
- 2. **No close substitutes available** – The entire market supply is controlled by a single producer in the market .there are no close substitutes for its product. Under monopoly firm and industry are identical.
- 3. **Price-maker**- Monopolist can change the price for his product. Monopolist can vary the price from buyer to buyer .There is a single ruling price which can be differentiated by the producer.
- 4. **There is no separate concept of firm and industry**- Monopolist faces downward sloping demand curve for its product .Monopolist can increase his sale by reducing price of his product.
- 5. **There are entry barriers** – Monopoly power to a firm with respect to natural resources, technical knowledge, exclusive ownership of raw-materials,business reputation etc may block the entry of new firms.
- 6. **Profit maximization** –The firm attempts to maximise his profit .Monopolist can fix the price

as well as quantity output to be sold in the market to get maximum revenue from his sales proceeds

Monopoly power

The essence of monopoly power is the ability to alter the price of a product. In case of perfect competition many firms were producing and selling the same good, each firm has to act as a price taker .Each producer could sell all it wanted at the prevailing price .It would lose all its customers if tried to charge a higher price. Monopolist can alter the price of their output without losing all their customers .Sales volume may reduce when price increases but cannot drop to zero .In other words ,a monopolist faces a downward sloping demand curve.

If perfect competition is one extreme of the market structure, the other end is characterised by monopoly. It exists when just one firm is the sole producer of a product which has no close substitutes. Just as perfect competition is rare, in less regulated market economies.

FIGURE NO-1

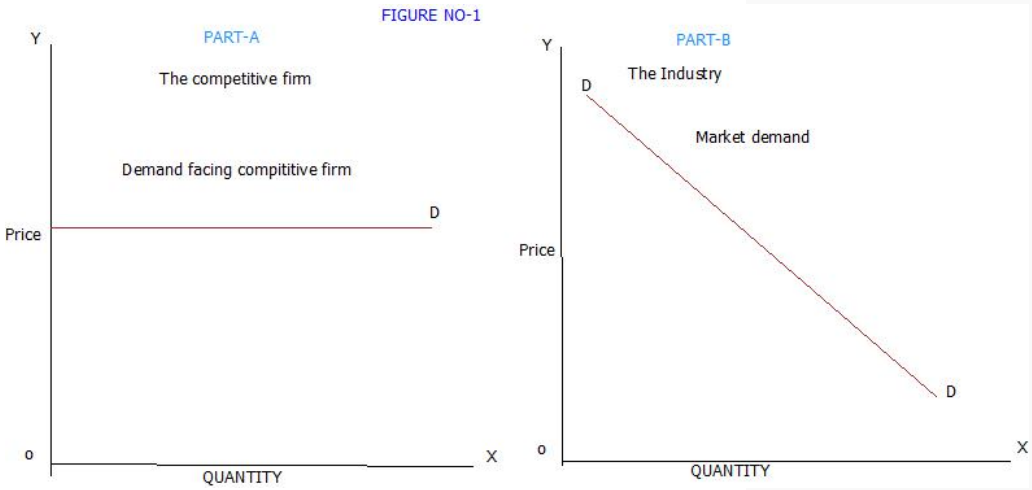


Fig no-1 illustrates the distinction between perfectly competitive and imperfectly competitive firm .A competitive can sell its entire output at the prevailing market price. Hence each individual firm effectively confronted a horizontal demand curve explain in part A of the fig 1. You also noted earlier that firms under perfect competition do not violate the law of demand .People are not willing to buy unlimited quantities at the prevailing market rate. To induce consumers to buy more of the same product, the market price must be reduced.

Contradiction between the law of demand and the situation of the competitive firm resolved in fig no -1 .There are two relevant demand curves. One on the left hand side of the fig no-1, which appears to contradict law of demand, refers to a single competitive seller in the market. Left hand side of the figure no -1 represent entire industry of which single firm is one very small part .The industry demand curve slope downward from left to right , even though individual competitive firms able to sell their own output at the prevailing market price .

It is important for us to understand the nature of demand curve facing a monopolist .The nature of demand curve of a perfectly competitive firm is horizontal strait line ,where as it is downward sloping for the whole competitive industry. A competitive firm constitute a tiny part of the whole industry cannot influence the ruling price of the product .It is a mere quantity adjuster and has no influence over price.

The nature of AR,MR and TR curves under monopoly

In monopoly market situation the firm is identical to the market demand curve for the product. The difference between firms under perfect competition and monopoly is from demand side only. In case of perfectly competitive firm marginal revenue is equal to price irrespective of level of output and sales. But in monopoly the demand for the product of the firm is constitutes the total market demand of the commodity.

Table no -1

TABLE NO :1 MONOPOLIST'S DEMAND SCHEDULE ,TR AND MR

COMBINATIONS	QUANTITY	PRICE(AR)	TOTAL REVENUE	MARGINAL REVENUE
A	1	50	50	50
B	2	45	90	40
C	3	40	120	30
D	4	35	140	20
E	5	30	150	10
F	6	25	150	0
G	7	20	140	-10
H	8	15	120	-20

I	9	10	90	-30
J	10	05	50	-40

A competitive firm can maximize profits by producing at that rate of output where the marginal cost is equals to the price. The demand curve facing a monopolist is downward sloping .A firm must lower its price to increase the sales of his output. Similarly he can raise the price if he is prepared to sacrifice some sales. In table no 1, firm wants to increase its sales from 1 to 2 units per day and hence reducing price from 50 rupees to 45 rupees .The marginal revenue of the second unit is therefore only 40 rupees. This implies that the if the monopolist wishes to sell more and more units of his commodity ,he must progressively lower down the price.

Table -1 shows that as price decreases quantity sales increases .Consequently total revenue increases. This process continues until the price falls to 30 rupees and the demand for the same amounts to 5 units .The total revenue will be equal to150 rupees .Further reduction in the price of the goods reduces the total revenue. When price falls to 10 rupees demand increases to 10units. However the total revenue declines to 50 rupees. So long as the demand curve is downward sloping, MR will be less than price.This implies that as long as total revenue increases the marginal revenue remain positive .When it reaches its maximum level, the marginal revenue falls to zero. When total revenue falls, the marginal revenue will be negative.

Fig -2

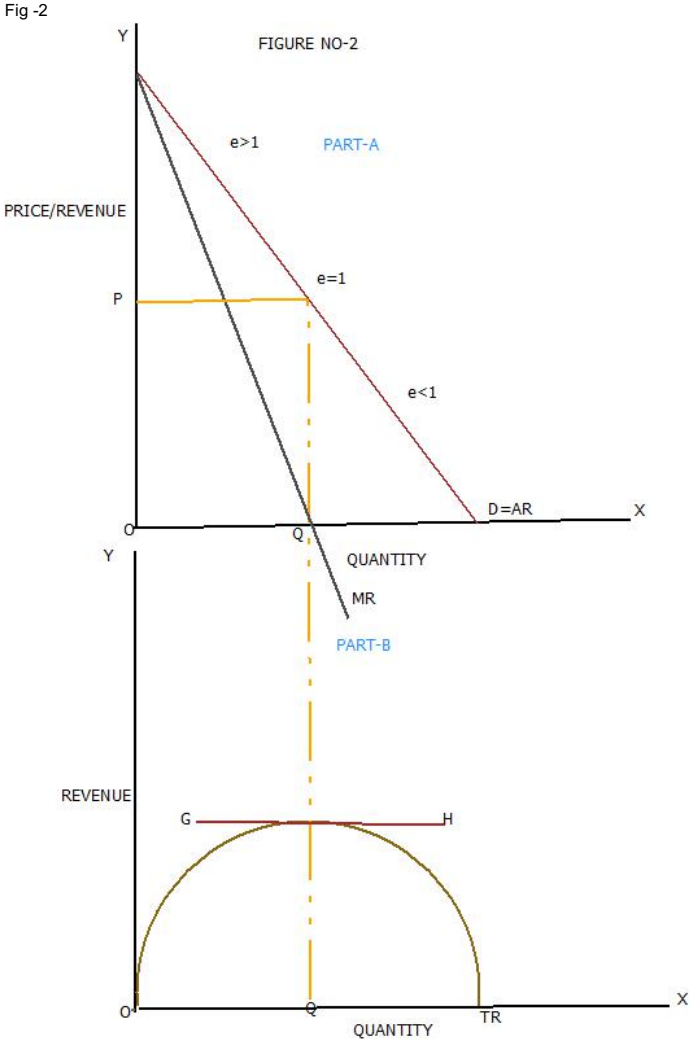


Fig -2 is divided in two parts .Marginal revenue curve sloping downward lying below average revenue curve at all levels of output. At price OP the monopolist's marginal revenue is zero. Part A of figure no-2 shows the downward sloping demand curve illustrates an inverse relationship between price and quantity demand. But profit maximising rule does not work for a monopolist .It is difficult to choose the price – quantity combination which yield him maximum possible profits. Demand curve facing the monopolist will be his average curve. Part-B of Figure -2 summarizes the calculation given in table no 1.The slope of the total revenue curve is zero which implies that the marginal revenue of the monopolist is zero.

The relationship between AR,MR and elasticity of demand under monopoly

The average and marginal revenue at a quantity are related to each other though elasticity.

In this connection we derive the following formula.

MR=AR(e-1/e) Where e stands for elasticity.

Since AR = Price

Therefore,**MR=Price (e-1/e)**

Or **Price=MR (e/e-1)**

The expression e-1/e will be less than unity. Hence MR will be less than price. The extent to which marginal revenue will be less than price depends upon the value of the fraction (e-1/e).

Short -run Monopoly Equilibrium

Short -run Monopoly Equilibrium: Marshall evolved three time period in the analysis of price output determination .A monopolist firm continuously adjust its output with respect to the current and expected sales and cost of production incurred on output .Then monopolist set his market price .Therefore monopolist generally does not distinguish between market period and short period . But the distinction is significant between short run and long run.In the short run monopolist will not be able to change his plant size . He can expand or contracts his output only by changing his variable factors.

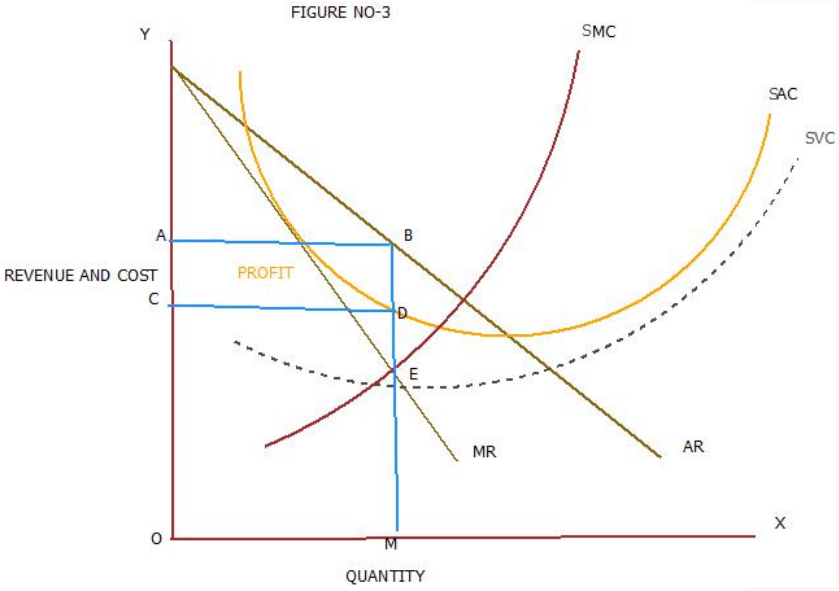
Conditions for the short run monopoly equilibrium:

1. 1. In monopoly market structure MC=MR at the point of equilibrium.
2. 2. The SMC curve cuts SMR from below.

Short-run equilibrium (with profit) under monopoly :

Profit maximisation is an important objective of monopoly. Monopoly equilibrium is illustrated in Fig no 3. The monopolist will go on producing additional units of output as long as marginal revenue exceeds marginal costs .Monopolist profit will be maximum and will attain equilibrium at the level of output at which marginal revenue is equal to marginal cost.

Fig no 3



The monopolist will never be in equilibrium at a point on demand curve at which elasticity of demand is less than one .In other words the monopolist will never set his level of output at which elasticity of demand or average revenue curve is less than one. It was derived from the relationship between AR,MR and elasticity that whenever elasticity is less than one marginal revenue is negative.

Monopoly equilibrium is given in Fig no 3 illustrates, the producer will go on producing output so long as marginal revenue exceeds marginal cost .This is because it is profitable to produce an additional unit gives more revenue than cost. In Fig.3, marginal revenue is equal to marginal cost at OM level of output. If monopolist increases his level of output beyond ON, marginal revenue will be less than marginal cost. Therefore monopolist will be incurring loss. In the above diagram equilibrium price is OA or MB. The total profit earned by monopolist is ABCD.Under monopoly the price can not be equal to marginal cost. As we know that :

Price = MR (e/e-1)

At the point of equilibrium,**MR=MC**

Therefore,**Price =MC (e/e-1)**

Since e/e-1 is more than one for a given value of elasticity, it is obvious that under monopoly:

Price>MC

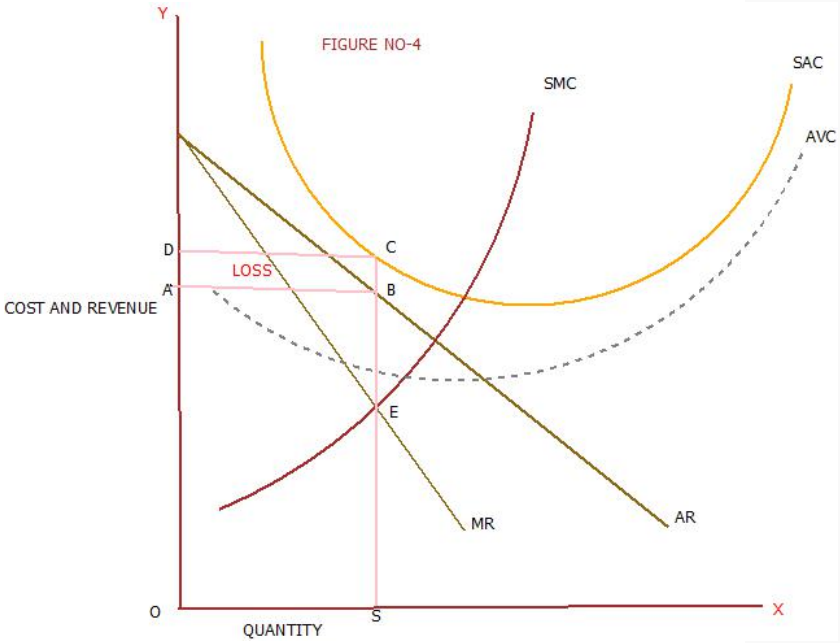
The extent to which price will be greater than marginal cost will be given by the expression **e/e-1**.Monpoly price is therefore a function of marginal cost and elasticity of demand. The difference between average revenue and average cost in figure 3 depicts super-normal profit earned per unit of output by monopolist. The total profit will be equal to ABCD .The producer will go on producing output so long as marginal revenue exceeds marginal cost .This is because it is profitable to produce an additional unit gives more revenue than cost. In Fig.3, marginal revenue is equal to marginal cost at ON level of output. If monopolist increases his level of output beyond OM, marginal revenue will be less than marginal cost .Therefore monopolist will be incurring loss. The equilibrium price is OA or MB. The total profit earned by monopolist is ABCD.

Marginal cost under perfect competition associate prices with quantity to be produced and supplied. But in case of monopoly price is higher than marginal cost and does not associate price and quantity to be produced .Thus the marginal cost cannot function as supply curve .Therefore no monopolist firm will produce on that portion of demand curve (e<1) which gives him negative marginal revenue so also reduces his total revenue. But production of marginal unit adds to his cost. Therefore it concludes that monopolist equilibrium lie somewhere above the middle point of the average revenue curve ,where **e>1**.

Short-run equilibrium (with losses) under monopoly:

It is generally believed that monopolist always earn profits .In the short-run, if the demand is not sufficient monopolist can make losses. At times of recession or depression or and kind of crises demand for goods decreases and monopolist has to suffer losses .But if the losses continued for a long time then the monopolist will shut down his present business in the long run .But in the short run he will continue in his present business so long as his price is greater than the average variable cost. When losses exceed total fixed costs and the monopolist will not be able to cover his variable cost fully, the monopolist would stop production in the short-run.

Figure-4



The monopolist is in equilibrium at OS level of output, where OP price is determined. This case price is greater than average cost therefore the monopolist is making losses is equal to the area of the rectangle ABCD.As price is higher than average variable cost ,the monopolist will continue his production in the short run. From the above discussion we can conclude that demand for the product plays an important role in determining whether the monopolist will get profit or make losses.

Monopoly equilibrium in case of zero marginal cost

We can take the case of some output where the cost of production of additional unit is zero .For instance mineral spring water or sands from the river bank, where the cost of production is either zero or is irrelevant to consider. In this case monopolist will establish equilibrium at the point where the elasticity of demand will be equal to one.This is for the simple reason that the monopolist has to adjust his output where the total revenue is maximum.

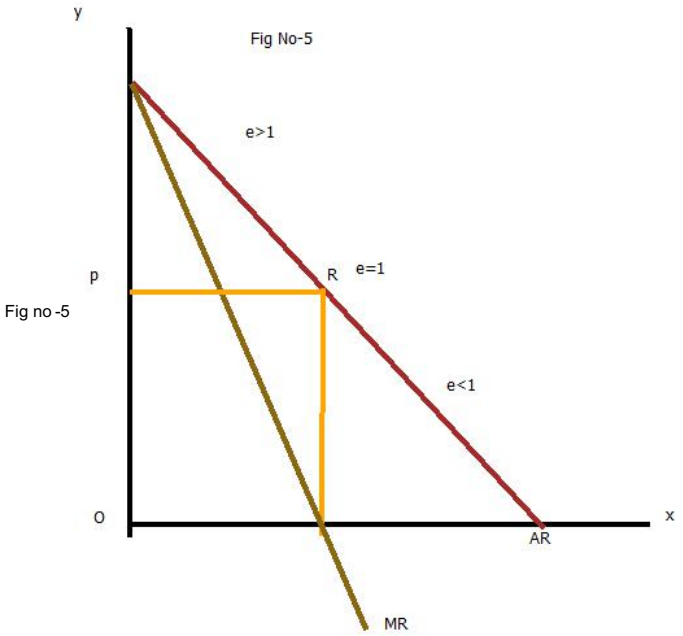


Fig no -5

In the above diagram monopolist equilibrium is established at point E at ON level of output at which marginal revenue is zero and OP price is determined. ON quantity of output will yield maximum total revenue and beyond this marginal revenue becomes negative which means total revenue start declining. Since cost of production is zero, the whole revenue will represent profits. As at ON level of output MR is zero and corresponding to zero marginal revenue, elasticity of the demand on the average revenue curve is equal to unity. If the marginal cost is positive ,monopolist will be in equilibrium at the point where the elasticity of demand is greater than one.

Let's Sum Up

COMPARISON

	Number of firms	Market power	Product differentiation	Excess profits	Profit maximization condition
Perfect Competition	Infinite	None	not existing	None	No
Monopoly	One	High	not existing	Absolute (across industries)	Yes

Key Terms

1.Single seller

2.No close substitutes available

3.Monopolist is a price-maker

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

1.Discuss the main features of Monopoly.

2.Show with diagrame, how does a firm achieve equilibrium in monopoly in the short run?

3.Discuss the monopoly power of a single firm.

4."A monopolist can always make profit,be it under rising costs or falling costs or constant costs."Draw a set of three diagrams to illustrate this statement.

5.In theory ,a monopolist should make profit, but in practice some monopolists(like the State Electricity Board or some other public sector units) are often found to incur huge losses.How would you explain this situation?

Multichoice Questions

1. Under monopoly there are --- sellers.
   - (a) Single
   - (b) Few
   - (c) Many
   - (d) All of the above

2. When monopoly charges a uniform price to all buyers is called---monopoly.
   - (a) Simple
   - (b) Discriminatory
   - (c) Public

3. When a monopolist charges different price to different buyers is called---discrimination.
   - (a) Product
   - (b) Price
   - (c) Realistic

4. Monopolist can make losses in the -------.
   - (a) Short-run
   - (b) Long-run
   - (c) Neither the above

5. A monopolist can always make profit , be it under -------.?
   - (a) Rising costs
   - (b) Falling costs
   - (c) Constant costs
   - (d) All of the above

Submit

Further Readings

1. A.Koutsoyiannis-Modern Microeconomics

2. Stonier & Hague--Economics

3. Samulson- Principles of Economics

4.H.L. Ahjuja- Principle of Economics

practice quiz

Pratice Quiz practice quiz

Work in progress, expect frequent changes. **Help and feedback is welcome**. See discussion page.

Category: Work in progress

Price Discrimination and Monopoly

University of Mumbai

MICROECONOMICS

MONOPOLY AND PRICE DISCRIMINATION

Learning Objectives

After reading this chapter, you are expected to be able to:

1.
2.

Introduction

Price discrimination refers to the practice of a seller of selling the same good at different prices to different buyers. A seller makes price discrimination between different buyers when it is both possible and profitable for him to do so. Price discrimination is not a very common phenomenon. It is very difficult to charge different prices for the identical good from different customers. Frequently, the product is slightly differentiated to successfully practice price discrimination.

In the words of Mrs. John Robinson “The act of selling the same article, produced under single control at different prices to different buyers is known as price discrimination”. Also Prof. Stigler defines Price discrimination as “the sales of technically similar products at prices which are not proportional to marginal cost” As per this definition, a seller is indulging in price discrimination when is charging different prices from different buyers for the different varieties of the same good if the differences in prices are not the same as or proportional to the differences in the cost of producing them. For Example, If the manufacturer of a mobile of a given variety sells at Rs. 10.000/- to one buyer and at Rs. 11,000/- to another buyer, (Specific Model) he is practicing price discrimination.

Price discrimination is not possible under perfect competition, even if the two markets could be kept separate. Since market demand in each market is perfectly elastic, every seller would try to sell in that market in which could get the highest price. Competition would make the price equal in both the markets. However, price discrimination is possible and profitable only when markets are imperfect.

TYPES OF PRICE DISCRIMINATION

Price discrimination is of various types. Some of them are as follows:

1. Personal price discrimination: It may be personal based on the income of the customer. For

example, Doctors and Lawyers charge different fees from different customers on the basis of their income. Higher fees are charged to rich persons and lower to the poor.

2. Geographical or Local discrimination: There is geographical price discrimination when a monopolist sells in one market at a higher price than in the other market. For example, in a posh locality, a beauty parlor may be charging more while charging lower rate for the same service in a common locality.
3. Discrimination on the basis of Nature of the Product: Different prices are charged when there is a difference in the quality of the product. For example, Unbranded products, like open tea, are sold at lower prices than branded tea like Brooke Bond or Tata tea.
4. Discrimination on the basis of Age, Sex and Status: Here different prices are charged on the basis of age, sex and status of consumers. For example, railways fare for children and senior citizens are different, various states in India there is no fees for girls in schools and in case of Toll tax all MLAs, MPs and Ministers are exempted.
5. Discrimination on the basis of Time: Different rates may be charged for a service depending upon time. For example, Telephone STD call rates at day time and night. Besides, advertising rates on TV based on prime time and non –prime time.
6. Discrimination on the basis of Use of product / Service: Prices differ according to the use to which the product is utilized. For example, electricity per Unit rates are different for users as domestic use, Farm use and industrial use.

Degree of Price Discrimination

Prof A. C. Pigou has distinguished between the three degrees of price discrimination.

1. Price discrimination of the First Degree
2. Price discrimination of the Second Degree
3. Price discrimination of the Third Degree.

1. **Price discrimination of the First Degree:** Price discrimination of the first degree is also known as perfect price discrimination.

WHEN IS PRICE DISCRIMINATION POSSIBLE ?

EQUILIBRIUM UNDER PRICE DISCRIMINATION:

PRICE DISCRIMINATION IN CASE OF DUMPING:

Dumping is a special type of International price discrimination. Heberler defines dumping as: “The sale of goods abroad at a price which is lower than the selling price of the same goods at the same time and the same circumstances at home, taking account of differences in transport costs”.

Generally imposition of import tariffs and other restrictions on the inflow of foreign goods, create monopoly in the home market for the national industries, while they have to face competition in the foreign markets. The national industry, which enjoys monopoly of the home market, can fix a higher price for home consumers while disposing of the surplus produce in the competitive foreign markets at a lower price for the same good and seek to enjoy the advantages of the economies of scale. This type of price discrimination is called “Dumping”

CAUSES OF DUMPING:

Dumping takes place due to following reasons:-

1. To Maximize Profits: The main objective of the discriminating monopolist is to increase profits. At the beginning he earns higher Marginal revenue for his product when he sell in the domestic market will be much lower than marginal revenue from the international market and hence to maximize to profit.
2. To Enjoy Economies of scale: There is the possibility that as the producer goes on producing more units, he enjoys economies of scale which would help him in lowering the average cost. To minimize cost and optimize output he will produce up to the point where AC is minimum.
3. To Penetrate the International Markets: The producer wants to enter in the international market and sells his product their at a relatively lower price.
4. To Capture International Market: The producer may not just want to enter the international market but even try to tap the international market.
5. To create employment in domestic market: When unemployment rate remains at higher level government promote dumpling policy for reduction in unemployment rate of the economy.

6. To control on Overproduction: Some time producers decisions and expectations goes wrong and certain goods and services over produced, that time dumping policy very much useful as a measure on overproduction.

Diagrammatic Representation of Price – Output determination under Dumping

Dumping is international price discrimination. Dumping occur when a producer sells a commodity in a foreign country at a price that is lower than the price which he charges in the domestic market. Price discrimination of the dumping type is possible because domestic and foreign markets are separated from each other because of large geographical distances, tariffs, quota and so on. We shall explain a simple case of dumping type of price discrimination when a producer is selling in the foreign market where he faces perfect competition, while in the domestic he has a monopoly. Accordingly, the demand curve for the product will be perfectly elastic for him in the foreign market in which he faces perfect competition, while the demand curve will be slopping downward in the domestic market in which he enjoys monopoly position.

DIAGRAM

Equilibrium in this situation is depicted in the above diagram. In the domestic market in which producer has the monopoly, demand curve or the average revenue curve AR(D) is sloping downward. So does the marginal revenue curve MR(D).In the foreign market in which he faces perfect competition. The average revenue curve AR(F) of the producer in the foreign market is horizontal straight line and marginal revenue curve MR(F) coincides with it. MC is the marginal cost curve of output. Total marginal revenue curve is the composite curve BFED which is the lateral summation of MR(D) and MR(F). The marginal cost curve MC intersects the total marginal revenue curve BFED at point E and equilibrium output OM is determined.

The total output Om is to be distributed between the home market and the foreign market in such a way that marginal revenue in each market is equal to each other to the marginal cost ME. From the diagram, it is clear that out of total output OM, quantity OR will be sold in the domestic market and remaining quantity RM will be sold in foreign market at price O-P(D) and O- P(F) respectively. Price in the foreign market OP(F) is lower than the price OP(D) in the home market.

In the domestic market elasticity of demand is less and therefore price charged is higher as compared to the foreign market where elasticity of demand is high, the price is lower.

There are two types of dumping. First type of dumping is called persistent dumping. This persistent dumping is the most usual one and arises when a monopolist pursuing the objective of profit maximization perceives that there exist differences in elasticity of demand in the domestic and foreign market. Therefore, the monopolist maximize profits by charging higher price in the domestic market and lower price in the foreign market due to the elasticity is usually higher in the foreign market because there is stiff competition among various countries and also a relatively larger number of substitutes are available.

Second type of dumping is known as Predatory Dumping. It represents unfair method of competition because under it a producer deliberatively sells his product in a foreign country at a lower price in order to eradicate competitors and benefit control of the foreign market for a short run. If monopolist succeeds in his motive, then he exploits foreign customers by imposing higher price of his commodity, and maximizes his long- run profits.

CONCLUSION:

REFERENCES:

Monopolistic competition

MICROECONOMICS

Monopolistic Competition

Introduction

I hope all of you are familiar with Perfect Competition and Monopoly market structures. But if I ask you, to identify market forms that your mother or you are visiting everyday such as vegetable market or grocery market, then you will be finding it difficult to identify that markets under perfect competition and monopoly' s real examples, why because markets such as **Perfect competition and Pure onopoly donot exist in the world.**

Perfect Competition is the market structure where there are millions of buyers and sellers and product are homogeneous or same.

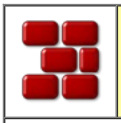
Pure Monopoly is the market where single seller is controlling entire supply and many buyers are existing to buy that product.

But these two are imaginary market structures which are developed for building base of economic theory. Perfect competition and monopoly are polar opposite market forms.

Mr .Chamberlin is the economist who popularised the concept of Monopolistic Competition. This market structure is the most realistic market in the world.

Which bathing soap are you using? Lux, Hamam, Sandur, Pears, Why you prefer only LUX? That answers are clear at the end of this lesson.

[1]



Learning Objectives

After reading this chapter, you are expected to be able to:

- **Understanding the clear difference between perfect competition, monopoly and monopolistic competition.**
- **Distinguishing features of Monopolistic competition.**
- **At the end of session, you should be able to identify various market structures that you happen to come across everyday.**
- **Understanding what makes this market more realistic in its nature.**

Main features

- **Large no of sellers and Large no of buyers.**
- **Differentiated Products.**
- **Freedom of entry and exit.**
- **Independent decision making.**
- **Concept of group.**
- **Imperfect knowledge of market**
- **Selling cost.**

A.Large no of Selllers.

In monopolistic competition[MC], no of sellers are large, But number is not as large as perfect competition. **Generally as a thump rule, it is less than 100**.

But then how it is different from Perfect Competition and monopoly?

Let us take the case of market for soaps and detergents. This is the classical example of monopolistic competition. Suppose there are 51 soap producers in the market, all are selling soaps only, but each product's product is different from each other ,as a result, every producer is competing with each other, but remember products are similar,but not same. This makes this market different from perfect competition. In soap market, all are selling soaps under different names like Lux, Hamam, Santoor, Pears, Lifeboy, Dettol etc. so products are not homogeneous.

Since there are many sellers, this market is different from monopoly. But like monopoly, every seller each fix his own price in monopolistic competition. **Thus in M.C. each seller is a price maker.**

B. Product Differentiation.

This is the most distinct feature of M.C. In this market, all the producers are selling similar, but not the same products. The Soaps are available under different brand name, colours, size, smell. Packing etc. For eg, Lux, Hemam, Pears, Dettol, Santoor etc.

Product differentiation gives rise to an element of monopoly to each producer under M.C. Thus according to Chamberlin,M.C. is a blend of monopoly and perfect competition.

Friends, I like only Lux because of its special colour, smell or its name. Any other soap cannot substitute Lux for me.

It is clear that products in M.C, are not identical[same] as in Perfect Competition, neither are they are remote substitutes as monopoly. Real qualitative differences between the products may not be very strong in this market, but imaginary differences through colour, packing, brand name are more strong in this market.

C. Freedom of entry and exit.

This market allows freedom of entry and exit. It means any one can enter the market when they feel like and any one can go out of the market when they feel. There are no barriers of entry as in the monopoly.

Many are waiting in the market to enter with their unique[Special] product so as to attract consumers. At the time, many wants to leave the market so as to reduce the loss. Thus no sunk cost or exit cost in this market.

D.Independent decision making.

Each firm in M.C. sets its independent policy relating to price and output. Each firm feels free to set its own price and they want to become monopolists and not oligopolists. This is the main element which makes it different from Perfect competition.

E.The concept of Group.

Mr.Chamberlin has introduced the concept of Group in Monopolistic Competition. This is peculiar to M.C. Generally we use the term industry in Perfect Competition .

Group means number of producers who are producing goods which are fairly close substitutes. All are selling similar not the same products. Eg Group of producers who are producing similar soaps but not the same soaps .

F.Imperfect Knowledge about the market.

Underlying fact in M.C. is that market knowledge of buyer is limited. This is the advantage for seller. Even seller does not have detailed knowledge about market demand and supply.

G.Selling Cost:

This is most distinguishing feature of this market. This makes this market more attractive than others. Due to product differentiation, every producer has to incur some additional expenditure in the form of selling cost. According to Chamerlin, it includes:

- **Expenditure on advertising and promotional activities.**
- **Salaries of salesman and commissions.**
- **Margins, dealer's discount etc**
- **Window display and free distribution of samples.**

As you are aware, advertisement expenditure is the most important form selling cost.

You may be thinking why Tata salt is spending lakhs of rupees on advertisement when this product is a basic necessary item and less expensive, This because this advertisement has capacity of capturing demand and increasing sales. Through advertisement, each firm tries to convince the buyers that their product is better than their competitor or rival producer.

Thus basic purpose of advertisement is to attract customers attraction and to create an permanent picture in the mind of consumer for their product.

Eg. How a small product like NIRMA[washing powder] became a stiff competitior to SURF—a product of big multinational like Unilever.

Two types of Advertisements are in market :

- **Informative advertisement.**
- **Manipulative**
- Informative advertisements are those which gives correct information about the product to customers such as price, quality, specification etc. In modern times it is really difficult to see such advts large in number.

Eg- Laptop, Personal computers , automobiles etc.

- Manipulative Advertisement:- This doesnot give proper information about the product, but tries to change mind set of consumers by way of songs, colours, roadshows etc. Most of our daily use products belongs to this group.

Eg- tooth paste, soaps, electronic goods etc.

As you are aware there are four curves which are used in any market structure for finding out equilibrium:

- Average Revenue[AR]
- Marginal Revenue[MR]
- Average Cost[AC]
- Marginal Cost[MC]

SHORT RUN EQUILIBRIUM

TWO EQUILIBRIUM CONDITIONS

MC=MR

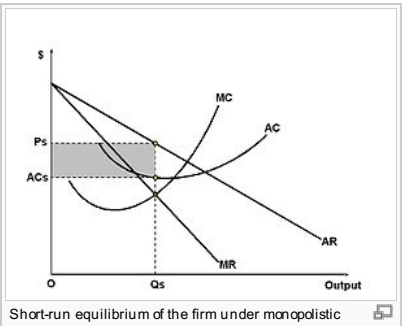
MC should intersect MR from below.

- AR and MR under this market are also downward sloping like Monopoly. since each producer enjoys the element of monoploy over his products, he will try to reduce the price to sell more.

we should remeber the fact that there is not freedom of entry and exit in the short run.

A firm under M.C, `has to face various problems which are absent in Perfect Competition. In P.C, the firm can sell any amount of goods at the market price. But in M.C, individual's sale and market share depends upon :

- 1, Price of the product
- 2.Nature of product
- 3.advertising outlay[Expend]



Short-run equilibrium of the firm under monopolistic competition. The firm maximizes its profits and produces a quantity where the firm's marginal revenue (MR) is equal to its marginal cost (MC). The firm is able to collect a price based on the average revenue (AR) curve. The difference between the firms average revenue and average cost, multiplied by the quantity sold (Qs), gives the total profit.

When a firm decides the equilibrium it has to consider all the above factors.

The demand curve under M.C. is downward sloping. We are assuming that all substitutes and its price are held constant,demand curve for the product is given.

In the diagrame, the producer is earning **supernormal profits**. This beacause AR> AC in the diagrame. The shaded area shows supernormal profit.

LONG RUN EQUILIBRIUM

Long run the producer gets sufficient time to adjust the output and price. All factors are variable and there is freedom of entry and exit. AS a result, when there is supernormal profit, in the long run other firms get a chance to enter. This will increase the competition. As a result, supernormal profit will disappear and price will come down and firms start earning only Normal Profit which is shown in the given diagrame. The lossmaking units will not continue in the longrun, as they quit by themselves.

1.In the long run equilibrium under M.C.is established at less than Optimum size.

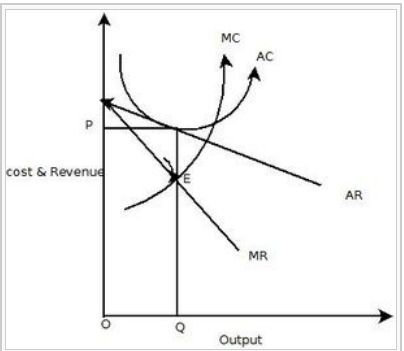
It means, in Perfect competition, firm reaches quilibrium at the mimimum of AC. But in M.C, eqilibrium is reached at a point LAC is falling, but not reached the minimum.

2.The price under M.C. is higher than that of P.C.

This because in M.C. each firm enjoys a degree of Monopoly. But in P.C. each firm is a price taker.

But remember though price is higher in M.C., the firms can make only normal profit like P.C.

3. There is a lot of waste under M.C.



Firm gets Normal Profit because AR is equal to AC.

Combined Cost

This includes Average Production Cost [APC] and Selling Cost[SC]. This gives clear picture of cost to the firm.

Combined Cost= APC + SC.

Waste under Monopolistic Competition

There are lot of waste under this market which is not existing in Perfect Competiton.

1 Huge Expenditure on Advertisement .

2. Excess xcapacity.

3. Existence of inefficient firms.

4. Lack of standardised products.

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

1,Discuss the main features of Monopolistic Competiton.

2,Show with diagrame, how does a firm achieve equilibrium in M.C. in the short run?

3. Discuss the waste undr M.C.

Let's Sum Up

COMPARISON

	Number of firms	Market power	Product differentiation	Excess profits	Profit maximization condition
Perfect Competition	Infinite	None	not existing	None	No
Monopolistic competition	Many	Low	most important (long run)		
Monopoly	One	High	not existing	Absolute (across industries)	Yes

Key Terms

1.Group.

2.Selling cost

3.Product differentiation.

Extension exercise

Pratice Quiz

Further Readings

Oligopoly

University of Mumbai

Work in progress, expect frequent changes. **Help and feedback is welcome**. See discussion page.

MICROECONOMICS

Oligopoly

Introduction

This is a market situation where there are more than 2 producers of a product.When there are two producers, it is called duopoly, which is also an imperfect market situation and so a special case of oligopoly. The number of producers in oligopoly are lesser than that of perfect competition and monopolistic competition. We will be studying the nature of this market and examining the features with case studies.You have already studied the other market structures like perfect competition and monopoly as well as monopolistic competition.Oligopoly is an actual market situation. When you do a study of the detailed features we can relate to the real life market structures.It is an imperfect market with few sellers of similar or differentiated products. The few firms in oligopoly enjoy a high degree of market power. The market power depends on the number of sellers, barriers to entry and availability of substitutes.Based on these criteria oligopoly enjoys substantial market power.in this market condition, a few firms dominate. When you think of soft drinks industry example, which names come to your mind? Pepsi, Coca-Cola . Tyre manufacturers- Dunlop, firestone, dominate. Other examples of oligopoly are mobile service providers, breakfast cereal makers.Take the case of electricity distribution in Mumbai. You must be aware that electricity distribution is in the hands of Tata Power and Reliance Energy.This means that these two big players have a lot of market power in deciding the price.

Learning Objectives

After reading this chapter, you are expected to be able to:

1. Comprehend the nature of imperfect markets and specially real market situations like oligopoly
2. Study the nature of competition among the producers
3. Understand the nature of the demand curve which is different from other markets
4. Understand the behaviour and reactions of producers due to price changes or non- price behaviour

Characteristics of Oligopoly

1.Number of producers

There are very few producers in an oligopoly market. Foe example- Tyre manufacturers or the aviation industry.The market is shared among a few producers. The producers may sell homogeneous products or differentiated products. Example of homogeneous products - steel, coal, copper. Products may be differentiated as in the case of automobiles, soft drinks, mobile phone handsets. The producers of these products compete on the basis of differences in product like- different packaging,colour, flavour.

2.Huge Investments to Start Oligopoly Industries

Oligopoly markets are dominated by a few large producers and there are substantial barriers to the entry of new producers, though there is freedom of entry.The investments required to start oligopoly industries is very high. For instance there is scope for new entrants in the aviation industry in India. But it is not easy to survive in the face of stiff competition. The established companies discourage the new entrants in various ways. The existing firms may have a number of advantages like access to inputs or processes, cost advantage, exclusive dealerships and arrangements to get inputs at lower prices. Moreover,the new firms will take time to establish their brand in the market. The barriers may take the form of technology patents.Even the Governments may put up barriers such as limits to the number of licenses issued. In these ways entry for new producers become difficult.

3.Product Differentiation

The producers in an oligopoly market compete on the basis of product differentiation, which is a distinguishing feature of oligopoly.The products sold by the competing producers may be substitutes. However, one can easily recognize the product by its brand name, packaging and so on. Product differentiation helps to create a barrier for other potential producers to enter in industries like liquor, toothpaste etc.

4.Advertising

In oligopoly market situation, the producers are forced to advertise their product . Aggressive advertising measures are undertaken with a view to capture the market share. In fact, the producers compete on these lines rather than resorting to price cutting to attract buyers.Example- If Pepsi Foods sponsors a beauty pageant, Coca Cola will have to do something to attract more buyers.Aggressive advertising campaign may help a company to shift consumer preferences. The rival firms will be forced to adopt a similar strategy and they may adopt defensive advertising, as is clear from the example of Pepsi and Coke. According to William J.Baumol, advertising can become a life and death matter and the firms who fail to engage in advertising will lose its customers.

5. Group Behaviour and interdependence

Since the number of firms is few, the action of even one will have some effect on the other firms in the group. In oligopoly, the firms in a group may not be guided by a common goal. The group may or may not have a formal or informal organization bound by certain rules of conduct. The group may have a dominant leader, though the other firms may not follow him in all respects.

Example- Let us take the case o mobile handset industry as a hypothetical example. To start with let us assume that the market price of a handset is Rs. 1000 and 20,000 handsets are sold per month.The market share of three sellers Nokia, Samsung and L.G. is given below.

Producer	Output	Market share
Nokia	8000	40%
Samsung	6500	32.5%
L.G.	5500	27.5%

All the companies wish to capture the market. The industry, with three players is making 20000x3000=6million sets. If Nokia tries to take away the customers from the others,their market share and profits will fall. Thus, any attempt by Nokia to increase sale will lead to a reaction from the other two rivals.They may strengthen their marketing efforts or cut the prices.

6. The oligopolist faces an indeterminate demand curve

There is a lot of interdependence among the oligopoly producers. The decisions of producers depend on the decisions and strategies followed by other competitors. This interdependence makes it makes it difficult to draw a definite demand curve like that of perfect competition and monopoly. For example, an oligopoly firm lowers the price of its product. It not sure how the competitors will react. They may reduce the price to the same extent or even lower to capture the market. Thus demand curve is indeterminate.

Kinked Demand Curve

The Kinked Demand Curve The demand curve under oligopoly is indeterminate. This is due to the interdependence of the oligopoly producers. Let us examine what happens if a producer under oligopoly reduces the price. In an oligopoly situation, an oligopolist can expect three kinds of reactions if the price is lowered

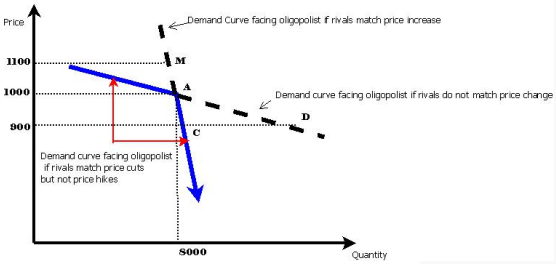
Responses to reduction in price

1. If the prices are cut by a producer, others may not react. This may lead to an increase in demand

2. When an oligopolist reduces price, others follow suit

3. When an oligopolist reduces the price, others may cut their prices even lower.

Now let us revert to the earlier example of Nokia having a market share of 40 %, selling 8000 handsets a month at a price of Rs.1000 each. Point A represents this output.



Suppose Nokia reduces its price to Rs. 900. This may increase the sales, depending on the response of the oligopolists. If nobody responds, the oligopolist can go to point D. What happens point D? At this point Nokia will be able to sell more hand sets. What will happen to the other companies, Samsung and L.G.? Their share is now taken away by Nokia. Will the others ignore this? Now the other producers Samsung and L.G. may cut the prices to Rs. 900 to maintain their sales. As a result, Nokia sales will increase slightly to Point C and not D. Thus, the increased sales due to price cut will have to be shared among all producers. Responses to Price increase Let us suppose that Nokia raises the price to Rs.1100. Others will not follow suit. Nokia's sales will drop. Nokia's sales will reduce from A to B at the increased price. So when anyone increases the price, others will not increase their prices. But if the prices are reduced it leads to similar reactions from rival forms. This brings out the fact that managing an oligopoly firm is not an easy task. Various factors have to be considered by a producer , when he goes ahead with the decisions to reduce price,spend money on advertising his product or taking investment decisions. The firms are involved in strategy making and they have to be alert to the actions of the other competing firms.

Case Study

The General Motors Versus Ford The General Motors introduced zero interest financing or price rebates in the sale of its automobiles. Ford, and other car manufacturers also followed suit and started offering attractive schemes to consolidate their position. Usually the oligopolists avoid price cutting methods to compete since it can lead to ruinous price wars and will mean losses for everyone. Therefore, advertising other sales promotional measures and product differentiation are the methods used to capture new markets . If G.M. Motors launches a major advertising campaign, Ford and Chrysler will surely be forced to react to this and do something to promote their products.

Case Study

Super Market Price Wars

Super market chains like Walmart, Spencers try to attract buyers from other stores by advertising or sometimes even by lowering the prices of certain selected food items. Though it looks like a price competition, it is not so. The super markets want to attract more buyers to the store and there will be a rang of products for which prices have not been reduced. The customers will make their purchases of these products also.But if the competing firms also cut their prices, the profit margins willr Fordeduce. However, the super markets end up better off as a result of such strategies,

Case Study

The Aviation Industry

The aviation industry in India used to be exclusively managed by Air India and Indian Airlines an the flying rates used top be high . With the entry of new private airlines like Jet, Kingfisher and Indigo into he aviation industry more competition was infused into the airline industry. They started offering various schemes like no frill flights, discount on advance booking, concessions for frequent fliers which attracted many people to opt for the services offered by these airlines. This made Air India also to offer similar types of concession and facilities to the customers. In this case , we see that the competition was based on both price wars to some extend and improved services in such way that flying became affordable to a ;larger section of people.

Activity

Write your activity here

Example:

{{{Example}}}

Self-Assessment Questions (SAQs) {{{n}}}

{{{SAQ}}}

Solve the Quiz on Oligopoly

[1]

Let's Sum Up

Key Terms

Extension exercise

Enter your text here

References and Bibliography

Further Readings

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Category: Work in progress