LOVELY PROFESSIONAL UNIVERSITY

MICRO ECONOMICS

Edited By

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SYLLABUS

Micro Economics

Objectives: To expand the students' knowledge in the field of microeconomics and to make them ready to analyze real economic situations.

Sr. No.	Topics
1.	**Basic concepts and principles:** Definitions and scope; types of economic analysis; managerial economics; economic principles relevant to managerial decision.
2.	**Demand and Supply Analysis:** Introduction; Demand: Law of demand; shift and movement; exceptions of the law of demand, Law of supply: shift and movements. Market Equilibrium, Elasticity of demand: introduction; price, income and cross elasticity.
3.	**Consumer preference and choice:** Utility Analysis; Indifference curve analysis; consumer's equilibrium: Cardinal & Ordinal; consumer surplus, income, Price & Substitution effect.
4.	**Production Theory:** Types of input; production function; Isocost lines; producer's equilibrium; expansion path.
5.	**Cost concepts:** Introduction, kinds of cost, short & long run cost; Linkage between cost, revenue and output through optimization, Economies of Scale; internal and external
6.	**Market structure:** Perfect competition: Introduction, features, short run & long run equilibrium. Perfect competition: Existence in Real World
7.	**Monopoly:** Introduction, types; price and output determination in short run & long run. Economic inefficiency of monopoly.
8.	**Monopolist Competition:** Introduction, features, short run & long run equilibrium, monopolistic competition and advertising.
9.	**Oligopoly:** Features, Types, Kinked demand curve.
10.	**Pricing Decisions:** Cost based pricing; pricing based on firm's objective; competition based pricing.

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Unit 1: Basic Concepts of Economics

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Objectives

After studying this unit, you will be able to:

- Define economics
- Discuss the scope of economics
- Describe the types of economics and use in managerial decision
- State the three central problems of an economy

Introduction

We all use economics in our day-to-day life. For example, all of us have to make certain choices with the limited money at our disposal. You may spend your money on things like food, house rent, electricity bills and medicines, and somebody else may spend the same amount of money on buying clothes, watching movies and other allied activities. Both spend the same amount of money, but in a different manner. Making such choices is just one activity related to Economics.

Then what is Economics? Different people may define economics in varied manners, but in all likeliness they all would only be partly right. In this unit, you will get introduced to Economics as a field of study and its fundamentals. The fundamental nature of economics is trying to understand how both individuals and nations behave in response to certain material constraints.

1.1 Definition of Economics

Now let's go through the various definitions of economics as given by various economists and other sources.

Simply defined, "Economics is the social science that examines how people make a choice for using their limited or scarce resources in order to satisfy their unlimited wants."

Notes

Did u know? One of the earliest and most famous definitions of Economics was that of Thomas Carlyle, who in the early 19th century termed it the "dismal science." Carlyle believed that population would always grow faster than food and due to this, people will have to face severe poverty and hardship. Carlyle argued that slavery was actually morally superior to the market forces of supply and demand promoted by economists, since, in his view, the freeing up of the labor market by the liberation of slaves had actually led to a moral and economic decline in the lives of the former slaves themselves.

Another early definition, one which is perhaps more useful, is that of English economist W. Stanley Jevons who, in the late 19th century, wrote that economics was "the mechanics of utility and self interest." One can think of economics as the social science that explores the results of people acting on the basis of self-interest. Psychology, Sociology, Anthropology, and Political Science – attempt to tell us about those other dimensions of man. The assumption of self-interest, that a person tries to do the best for himself with what he has, underlies virtually all of economic theory.

At the turn of the century, Alfred Marshall's Principles of Economics was the most influential textbook in Economics. Marshall defined Economics as "a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing. Thus it is on one side a study of wealth; and on the other, and more important side, a part of the study of man."

Many other books of the period included in their definitions something about the "study of exchange and production." Definitions of this sort emphasize that the topics with which economics is most closely identified concern those processes involved in meeting man's material needs. Economists today do not use these definitions because the boundaries of economics have expanded since Marshall. Economists do more than study exchange and production, though exchange remains at the heart of economics.

Most contemporary definitions of economics involve the notions of choice and scarcity. Perhaps the earliest of these is by Lionell Robbins in 1935: "Economics is a science which studies human behavior as a relationship between ends and scarce means which have alternative uses."

Virtually all textbooks have definitions that are derived from this definition. Though the exact wording differs from author to author, the standard definition is something like this: "Economics is the social science that examines how people choose to use limited or scarce resources in attempting to satisfy their unlimited wants."

The above definition has the following characteristics:

1. ***Economics is Social Science:*** A social science is a systematic body of knowledge that seeks solutions to the problems of the society, in general. Economics also does this. So it is considered a social science.

2. ***Economics examines how people choose to use scare resources:*** We all know that the resources on this earth are not in abundance. In simpler words, they are only limited. They will get over after some time. So, people have to use them very carefully.

3. ***Human wants are unlimited:*** one want gets satisfied, another one comes up. There is no limit to our wants.

Notes

Note **Scarcity and Choice**

Scarcity occurs because people want more than what is available. Scarcity limits us both as individuals and as a society. As individuals, limited income (and time and ability) keeps us from doing and having all that we might like. As a society, limited resources (such as manpower, machinery, and natural resources) fixes a maximum amount of goods and services that can be produced.

Scarcity requires choice. People must choose which of their desires they will satisfy and which they will leave unsatisfied. When we, either as individuals or as a society, choose more of something, scarcity forces us to take less of something else. Economics is sometimes called the study of scarcity because economic activity would not exist if scarcity did not force people to make choices.

When there is scarcity and choice, there are costs. The cost of any choice is the option or options that a person gives up. For example, if you gave up the option of playing a computer game to read this text, the cost of reading this text is the enjoyment you would have received playing the game. Most of economics is based on the simple idea that people make choices by comparing the benefits of option A with the benefits of option B (and all other options that are available) and choosing the one with the highest benefit. Alternatively, one can view the cost of choosing option A as the sacrifice involved in rejecting option B, and then say that one chooses option A when the benefits of A outweigh the costs of choosing A (which are the benefits one loses when one rejects option B).

The widespread use of definitions emphasizing choice and scarcity shows that economists believe that these definitions focus on a central and basic part of the subject. This emphasis on choice represents a relatively recent insight into what economics is all about; the notion of choice is not stressed in older definitions of economics. Sometimes, this insight yields rather clever definitions, as in James Buchanan's observation that an economist is one who disagrees with the statement that whatever is worth doing is worth doing well. What Buchanan is noting is that time is scarce because it is limited and there are many things one can do with one's time. If one wants to do all things well, one must devote considerable time to each, and thus must sacrifice other things one could do. Sometimes, it is wise to choose to do some things poorly so that one has more time for other things.

1.2 Scope of Economics

Economics is concerned with the application of economic concepts and analysis to the problem of formulating rational individual and national decisions. There are four groups of problem in both decision making and forward planning.

1. ***Resource allocation:*** Scarce resources have to be used with utmost efficiency to get optimal results. These include production planning, problem of transportation, etc.
2. ***Inventory and queuing problem:*** Inventory problems involve decisions about holding of optimal levels of stocks of raw materials and finished goods over a period. These decisions are taken by considering demand and supply conditions. Queuing problems involve decisions about installation of additional machines or hiring of extra labour in order to balance the business lost by not undertaking these activities.
3. ***Pricing problems:*** Fixing prices for the products of the firm is an important part of the decision making process. Pricing problems involve decisions regarding various methods of pricing to be adopted.

Notes

4. ***Investment problems:*** Forward planning involves investment problems. These are problems of allocating scarce resources over time. For example, investing in new plants, how much to invest, sources of funds, etc.

Study of economics essentially involves the analysis of certain major subjects like:

1. Demand analysis and methods of forecasting
2. Cost analysis
3. Pricing theory and policies
4. Profit analysis with special reference to break-even point
5. Capital budgeting for investment decisions
6. The business firm and objectives
7. Competition.

Demand analysis and forecasting help a manager in the earliest stage in choosing the product and in planning output levels. A study of demand elasticity goes a long way in helping the firm to fix prices for its products. The theory of cost also forms an essential part of this subject. Estimation is necessary for making output variations with fixed plants or for the purpose of new investments in the same line of production or in a different venture. The firm works for profits and optimal or near maximum profits depend upon accurate price decisions. Theories regarding price determination under various market conditions enable the firm to solve the price fixation problems. Control of costs, proper pricing policies, break-even point analysis, alternative profit policies are some of the important techniques in profit planning for the firm which has to work under conditions of uncertainty. Thus managerial economics tries to find out which course is likely to be the best for the firm under a given set of conditions.

Economics and other Disciplines

Economics is linked with various other fields of study like:

1. ***Operation Research:*** This field is used in economics to find out the best of all possibilities. Operation Research is a great aid in decision making in business and industry as it can help in solving problems like determination of facilities on machine scheduling, distribution of commodities, optimum product mix, etc.
2. ***Theory of Decision-making:*** Decision theory has been developed to deal with problems of choice or decision making under uncertainty, where the applicability of figures required for the utility calculus are not available. Economic theory is based on assumptions of a single goal whereas decision theory breaks new grounds by recognising multiplicity of goals and persuasiveness of uncertainty in the real world of management.
3. ***Statistics:*** Statistics helps in empirical testing of theory. With its help better decisions relating to demand and cost functions, production, sales or distribution are taken. Economics is heavily dependent on statistical methods.
4. ***Management Theory and Accounting:*** Maximisation of profit has been regarded as a central concept in the theory of the firm in microeconomics. In recent years, organisation theorists have talked about "satisficing" (a decision-making strategy that attempts to meet criteria for adequacy, rather than to identify an optimal solution) instead of "maximising" as an objective of an enterprise. Accounting data and statements constitute the language of business. In fact, the link is so close that "managerial accounting" has developed as a separate and specialised field in itself.

Notes

Caselet **Birla Yamaha – Shriram Honda and Ensuing Competition**

With Honda acquiring a majority in Shriram Honda, arch rival Birla Yamaha now has a strong opponent to tackle. As the two companies enjoy a virtual duopoly in the potable generator set market, Honda's move to acquire management control in its Indian venture was enough to rush Birla's executives back into a huddle. RS Sharma, MD, Birla Yamaha points out, "Our competitors are now witnessing a change of management. As fresh funds are infused in the company, we will be up against stronger competition."

It is obvious that it will be difficult to understand and tackle this problem without the knowledge of concepts like duopoly, competition, etc., which are a part of micro economics.

Task Name other fields that economics is linked to. Give examples to show their linkage.

1.3 Types of Economics and its use in Managerial Decisions

There are two major branches of economics – microeconomics and macroeconomics. Microeconomics is the study of decisions that people and businesses make regarding the allocation of resources and prices of goods and services. This means also taking into account taxes and regulations created by governments. Microeconomics focuses on supply and demand and other forces that determine the price levels seen in the economy. For example, microeconomics would look at how a specific company could maximize it's production and capacity so it could lower prices and better compete in its industry.

Macroeconomics, on the other hand, is the field of economics that studies the behavior of, not just on specific companies, but entire industry and economy. It looks at economy-wide phenomena, such as Gross National Product (GNP) and how it is affected by changes in unemployment, national income, rate of growth, and price levels. For example, macroeconomics would look at how an increase/decrease in net exports would affect a nation's capital account or how GDP would be affected by unemployment rate.

While these two studies of economics appear to be different, they are actually interdependent and complement one another since there are many overlapping issues between the two fields.

Example: Increased inflation would cause the price of raw materials to increase for companies and in turn affect the end product's price charged to the public. So in times of inflation, if you go to buy a t-shirt, it might cost you more than usual (micro effect) due to an increase in the price of cotton and other raw materials.

The bottom line is that Microeconomics takes a bottoms-up approach to analyzing the economy while Macroeconomics takes a top-down approach.

Caution Regardless, both Micro and Macro economics provide fundamental tools for any finance professional and should be studied together in order to fully understand how companies operate and earn revenues and thus, how an entire economy is managed and sustained.

Notes

1.3.1 Economics and Managerial Decision-making

As you have already learnt, economic activity is the constant effort to match ends to means because of scarcity of resources. The optimal economic activity is to maximise the attainment of ends, given the means and their scarcities or to minimise the use of resources, given the ends and their priorities.

Decision making by management is truly economic in nature because it involves choices among a set of alternatives – alternative courses of action. For example, a company may have to make a choice in cases like:

1. Setting up a plant at location A or setting up a plant at location B.

or

2. Producing more of product X or product Y.

The optimal decision making is an act of optimal economic choice, considering objectives and constraints. This justifies an evaluation of managerial decisions through concepts, precepts, tools and techniques of economic analysis of the following types:

1. ***Micro and Macro Analysis:*** In micro analysis the problem of choice is focused on single individual entities like a consumer, a producer, a market, etc. Macro analysis deals with the problem in totality like national income, general price level, etc.
2. ***Partial and General Equilibrium Analysis:*** To attain the state of stable equilibrium, the economic problem may be analysed part by part – one at a time – assuming "other things remaining the same." This is partial equilibrium analysis. In general, in equilibrium analysis the assumption of "given" or "other things remaining equal" may be relaxed and interdependence or interactions among variables may be allowed.
3. ***Static, Comparative Static and Dynamic Analysis:*** This is in reference to time dimension. A problem may be analysed:
   (a) Allowing no change at a point of time (static)
   (b) Allowing once for all change at a point of time (comparative static)
   (c) Allowing successive changes over a period of time (dynamic).
4. ***Positive and Normative Analysis:*** In positive economic analysis, the problem is analysed in objective terms based on principles and theories. In normative economic analysis, the problem is analysed based on value judgement (norms).

1.3.2 Central Problems of an Economy

An analysis of scarcity of resources and choice making poses three basic questions:

1. What to produce and how much to produce?
2. How to produce?
3. For whom to produce?

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A firm applies principles of economics to answer these questions. The first question relates to what goods and services should be produced and in what quantities. Demand theory guides the manager in the selection of goods and services for production. It analyses consumer behaviour with regard to:

1. Type of goods and services they are likely to purchase in the current period and in the future, Goods and services which they may stop consuming,
2. Factors influencing the consumption of a particular good or service, and
3. The effect of a change in these factors on the demand of that particular good or service.

A detailed study of these aspects of consumer behaviour help the manager to make product decision. At some particular time, a firm may decide to launch new goods and services or stop providing a particular good or service. Knowledge of demand elasticities helps in setting up of prices in context of revenue of a firm. Methods of demand forecasting help in deciding the quantity of a good or service to be produced.

How to produce the goods and services is the second basic question. It involves selection of inputs and techniques of production. Decisions are made with regard to the purchase of items ranging from raw materials to capital equipment. Production and cost analysis guides a manager in personnel practices such as hiring and staffing and procurement of inputs. For example, the decision to automate clerical activities using PC network results in a more capital-intensive mode of production. Capital budgeting decisions also constitute an integral part of the second basic question. Allocation of available capital in long-term investment projects can be done through project appraisal methods.

Firms' third basic question relates to segmentation of market. A firm has to decide:

For whom it should produce the goods and services. For example, it has to decide whether to target the domestic market or the foreign market. Production of a premium good is another example of market segmentation. An analysis of market structure explains how price and output decisions are taken under different market forms.

Appropriate business decision making with the help of economic tools has gained recognition in view of complex business environment. Since the macroeconomic environment is dynamic, it changes over time; managerial decisions have to be reviewed constantly. In this context, concepts of consumer behaviour, demand elasticities, demand forecasting, production and cost analysis, market structure analysis and investment planning help in making prudent decisions.

Task Give some real life examples of micro and macro analysis. If possible, collect some newspaper articles related to these two branches of economics.

Notes

Case Study

Decision-making at Asian Paints

Decision-making the vision of Asian Paints (India) Ltd., is to become one of the top five Decorative coatings companies worldwide by leveraging its expertise in the higher growth emerging markets, simultaneously, the company intends to build long term value in the Industrial coatings business through alliances with established global partners.

Asian Paints is India's largest paint company and ranks among the top ten decorative coatings companies in the world today, with a turnover of ₹ 20.67 billions (USD 435 millions) and an enviable reputation in the Indian corporate world for Professionalism, Fast Track Growth, and Building Shareholder Equity.

The October' 2002 issue of Forbes Global magazine USA ranked Asian Paints among the 200 Best Small Companies in the World for 2002 and presented the 'Best under Billion' award, to the company. One of the country's leading business magazines "Business Today" in Feb 2001 ranked Asian Paints as the Ninth Best Employer in India. A survey carried out by 'Economic Times' In January 2000, ranked Asian Paints as the Fourth most admired company across industries in India.

Among its various other achievements, Asian Paints is the only company in India to have won the prestigious Economic Times – Harvard Business School Association of India award on two separate occasions, once in the category of "Mini-Giants" and the other in "Private sector giants".

The major decisions taken by the company which helped it to achieve the set goals were:

1. ***Consumer Focus:*** The company has come a long way since its small beginnings in 1942. Four friends who were willing to take on one of the world's biggest, most famous paint companies operating in India at that time set it up as a partnership firm. Over the course of 25 years Asian Paints became a corporate force and India's leading paints company. Driven by its strong consumer-focus and innovative spirit, the company has been the market leader in paints since 1938. Today it is double the size of any other paint company in India.

2. ***Wide Range of Products:*** Asian Paints manufactures a wide range of paints for Decorative and Industrial use. Vertical integration has seen it diversify into Speciality products such as Phthalic Anhydride and Pentaerythritol. Not only does Asian Paints offer customers a wide range of Decorative and Industrial paints, it even Custom-creates products to meet specific requirements.

3. ***International Tie-ups:*** To keep abreast of world technology and to protect its competitive edge, Asian Paints has from time to time entered into technology alliances with world leaders in the paint industry. It has a 50:50 joint venture with Pittsburgh Paints & Glass Industries (PPG) of USA, the world leader in Automotive coatings, to meet the increasing demand of the Indian automotive industry.

Table 1: Tata's Group Profile 2

In %	Group	Top 10	Top 20	Last 10
SALES	100	78	90	0.35
PAT	100	76	93	0.20
TOTAL ASSETS	100	72	87	0.80
NET WORTH	100	71	90	0.90

Contd...

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Table 2: Ratios

In %	Group	Top 10	Top 20	Last 10
RONW	17.8	18.9	18.3	4.2
ROCE	7.4	77	7.8	1.9
PAT/SALES	8.9	8.7	9.2	5.5
ASSETS				

RONW = Return On Net Worth

ROCE = Return On Capital Employed

PAT = Profit After Tax

4. ***Latest Technology:*** It has also drawn on the world's latest technology for its manufacturing capabilities in areas like powder coatings and high-tech resins – thus ensuring that its product quality lives up to exacting international standards, even in the most sophisticated product categories.

5. ***Emphasis is on R&D:*** The company places strong emphasis on its own in-house R&D, creating new opportunities by effectively harnessing indigenous creativity. The Asian Paints Research & Development Center in Mumbai has acquired the reputation of being one of the finest in South Asia. With its team of over 125 qualified scientists, it has been responsible for pioneering a number of new products and creating new categories of paints. The entire decorative range of the company has been developed by the R&D team.

6. ***State of the Art Plants:*** The company boasts of state-of-the-art manufacturing plants at Bhandup in the state of Maharashtra; at Ankleshwar in the state of Gujarat; at Patancheru in the state of Andhra Pradesh; and at Kasna in the state of Uttar Pradesh. All the company's plants have been certified for ISO 9001 – the quality accreditation. All the company's plants have also received the ISO 14001 certificate for Environment Management Standard. The Phthalic Anhydride plant has been certified for ISO 9002 and ISO 14001 whereas the Penta plant has been certified for ISO 14001. The Penta plant will shortly receive its ISO 9002 certification.

7. ***Environment Friendly:*** In June 2002, Asian Paints plant in Patancheru was conferred "The Golden Peacock" award by the World Environment Foundation and the award for 'Excellence in Environment Management' by the Government of Andhra Pradesh.

8. ***Emphasis on IT:*** Asian Paints was one of the first companies in India to extensively computerize its operations. In addition to computerized manufacturing, computers are used widely in the areas of distribution, inventory control and sophisticated MIS to derive benefits of faster market analysis for better decision making. It is a continuously evolving company deriving its cutting edge from the use of innovative IT solutions. All the locations of the company are integrated through the ERP solution.

9. ***World Wide Presence:*** Asian Paints operates in 23 countries across the world. It has manufacturing facilities in each of these countries and is the largest paints company in nine overseas markets. It is also India's largest exporter of paints, exporting to over 15 markets in the Asia-Pacific region, the Middle East and Africa. In 12 markets it operates through its subsidiary, Berger International Limited and in Egypt through SCIB Chemical SAE.

Further decisions that the company may consider are:

1. More focus on industrial paints, especially the automotive paints division
2. Manage the chemicals business more efficiently

Contd...

Notes

3. Better marketing strategies to adopt top line growth in international operations
4. Reduce the input costs of production
5. Consolidate on the 'colourworld' and 'home solutions' initiatives to consolidate the leadership position in decorative paints segment.

Question

How does economics play a role in decision-making at Asian Paints?

Ans. Analysis of economic variables allows the firm to make optimal business decisions. The concepts of economics like demand, supply, production, costs and macro economic variables that affect the entire economy play a vital role in decision-making.

Source: Atmanand, Managerial Economics, 2nd Edition, Excel Books, New Delhi.

1.4 Summary

- Economics is the social science that examines how people choose to use limited or scarce resources in attempting to satisfy their unlimited wants.
- Economics is a science which studies human behavior as a relationship between ends and scarce means which have alternative uses.
- Economics is concerned with the application of economic concepts and analysis to the problem of formulating rational economic decisions.
- Micro-economics is the study of decisions that people and businesses make regarding the allocation of resources and prices of goods and services
- Macro-economics is the field of economics that studies the behavior of the economy as a whole and not just on specific companies, but entire industries and economies.
- Economic activity is the constant effort to match ends to means because of scarcity of resources. The optimal economic activity is to maximise the attainment of ends, given the means and their scarcities or to minimise the use of resources, given the ends and their priorities.

1.5 Keywords

Economics: The study of how the forces of supply and demand allocate scarce resources.

General equilibrium: Market situation where demand and supply requirements of all decision makers (buyers and sellers) have been satisfied without creating surpluses or shortages.

Macro economics: Study of the entire economy.

Micro economics: Study of firms and markets, individual units.

Normative analysis: A perspective on economics that incorporates subjectivity within its analyses.

Partial equilibrium: Analysis that treats one particular sector of the economy as operating in isolation from the other sectors of the economy.

Positive analysis: The study of economics based on objective analysis.

Scarcity: It refers to the deficiency of goods and services available.

Notes

1.6 Self Assessment

Fill in the blanks:

1. Economics is often referred to as a …… science.
2. Theory of 'Invisible Hands' was given by……..
3. As per Marshall, economics is the study of ……... in ordinary business of life.
4. Resources are ……. and human wants are ……..
5. Scarce resources should be used with maximum …….. to get optimum results.
6. …… problems involve decisions about installation of additional machines or hiring of extra labour.
7. Any firm works for profits and optimal or near maximum profits depend upon accurate ……decisions.
8. …….. helps in empirical testing of the economic theory.

State whether the following statements are true or false:

9. Study of national income would be a part of macro economics.
10. Study of pricing decisions of a firm is a part of micro economics.
11. Macro and micro economics are two distinct branches of economics that have no connection with each other.
12. Micro economics takes a top-down approach and macro economics takes a bottom-up approach in analyzing the economy.
13. The optimal economic activity is to optimise the attainment of ends, given the means and their scarcities.
14. In macro analysis, the focus is on a single individual in an economy.
15. General equilibrium and partial equilibrium are slightly different concepts.
16. "We should cut taxes in half to increase disposable income levels." It is a normative statement.

1.7 Review Questions

1. Define the term economics in your own words.
2. 'Economics is a dismal science'. Do you agree. Give reasons for your answers.
3. Discuss the scope of economics.
4. Contrast micro and macro economics using examples.
5. Discuss the different analysis methods used in economics.
6. Examine the use of economic analysis in managerial decision making.
7. How do you justify the fact that most of the economies in the world have registered growth even after influenced by the global meltdown?
8. Are micro and macro economics interdependent on each other? Give reasons for your answer.

Notes

9. " Decision-making by management is truly economic in nature". Justify
10. 'Resources are limited whereas the human wants are unlimited'. Substantiate
11. "Managers have to study, both the micro and macro economic variables in order to take optimal decisions". Discuss
12. Following are the examples of typical economic decisions made by managers of a firm. Determine whether each is an example of what, how, or for whom to produce.
    (a) Should the company make its own spare parts or buy them from an outside vendor?
    (b) Should the company continue to service the equipment it sells or ask the customers to use independent repair companies?
    (c) Should a company expand its business to international markets or concentric in domestic markets?
    (d) Should the company replace its telephone operators with a computerised voice messaging system?
    (e) Should the company buy or lease the fleet of trucks that it uses to translate its products to markets?

Answers: Self Assessment

1.	social	2.	Adam Smith
3.	mankind	4.	limited, unlimited
5.	efficiency	6.	Queuing
7.	price	8.	Statistics
9.	True	10.	True
11.	False	12.	False
13.	False	14.	False
15.	True	16.	True

1.8 Further Readings

Books

Atmanand, *Managerial Economics,* Excel Books

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

Samuel Bowles, *Microeconomics: Behavior, Institutions, and Evolution,* Oxford

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Online links

http://www.swlearning.com/economics/hirschey/managerial_econ/chap01.pdf

http://www.referenceforbusiness.com/encyclopedia/Man-Mix/Managerial-Economics.html

http://bilder.buecher.de/zusatz/14/14727/14727814_vorw_1.pdf

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Unit 2: Demand Analysis

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Objectives

After studying this unit, you will be able to:

- Identify the determinants of demand
- State the law of demand
- Know the exceptions to law of demand
- Discuss the effect of shift and movement in demand curve

Introduction

Demand and supply are two most fundamental concepts in economics. Demand conveys a wider and definite meaning than in the ordinary usage. Ordinarily, demand to you would mean your desire to buy something, but in economic sense it is something more than a mere desire. It is interpreted as your want backed up by your purchasing power. Further demand is per unit of time such as per day, per week etc. Moreover, it is meaningless to mention demand without reference to price. Considering all these aspects the term demand can be defined in the following words, "Demand for anything means the quantity of that commodity, which is desired to be bought, at a given price, per unit of time."

Example: Suppose price of a pen is ₹ 10 per unit of time. At this price, people are willing to buy 100 units of that pen at a specific point of time. So, it is the demand for that pen.

2.1 The Concept of Demand: An Introduction

Demand is one of the crucial requirements for the existence of any business enterprise. A firm is interested in its own profit and/or sales, both of which depend partially upon the demand for its product. The decisions which management takes with respect to production, advertising, cost allocation, pricing, etc., call for an analysis of demand.

Notes

Demand for a commodity refers to the quantity of the commodity which an individual household is willing and able to purchase per unit of time at a particular price.

Demand for a commodity implies:

1. Desire to acquire it,
2. Willingness to pay for it, and
3. Ability to pay for it.

Demand has a specific meaning. As stated earlier, mere desire to buy a product is not demand.

Example: A miser's desire for and his ability to pay for a car is not demand because he does not have the necessary will to pay for it. Similarly, a poor man's desire for and his willingness to pay for a car is not demand because he does not have the necessary ability to pay (purchasing power).

One can also think of a person who has both the will and purchasing power to pay for a commodity, yet this is not demand for that commodity if he does not have desire to have that commodity.

Demand for a commodity has to be stated with reference to time, its price and that of related commodities, consumer's income and taste, etc. Demand varies with changes in these factors.

Example: As demand for sweets go up, the demand for sugar also goes up Or as your income increases, you demand for branded clothes also goes up.

2.1.1 Determinants of Demand

The demand for a commodity arises from the consumer's willingness and ability to purchase the commodity. The demand theory says that the quantity demanded of a commodity is a function of or depends on not only the price of a commodity, but also on income of the person, price of related goods – both substitutes and complements – tastes of consumer, price expectation and all other factors. Demand function is a comprehensive formulation which specifies the factors that influence the demand for the product.

$$D_x = f(P_x, P_y, P_z, B, A, E, T, U)$$

Where,

D_x = Demand for item x

P_x = Price of item x

P_y = Price of substitutes

P_z = Price of complements

B = Income of consumer

E = Price expectation of the user

A = Advertisement expenditure

T = Taste or preference of user

U = All other factors

The impact of these determinants on demand is:

1. ***Price effect on demand:*** Demand for x is inversely related to its own price.

   This can be shown as:

$$D_x \propto \frac{1}{P_x}$$

Notes

This shows that demand for x is inversely proportional to price of x. This means- as price of x increases, the quantity demanded of x falls.

2. ***Substitution effect on demand:*** If y is a substitute of x, then as price of y increases, demand for x also increases. For example, tea and coffee, cold drinks and juice etc. are substitutes.

   This can be shown as:

$$D_x \propto P_y$$

   This shows that the demand for x is directly proportional to price of substitute commodity y. This means -demand for x and price of substitute commodity y are directly related.

3. ***Complementary effect on demand:*** If z is a complement of x, then as the price of z falls, the demand for z goes up and thus the demand for x also tends to rise. For example, ink and pen, bread and butter etc. are complements.

   This can be shown as:

$$D_x \propto \frac{1}{P_z}$$

   This shows that the demand for x is inversely proportional to the price of complementary commodity z. This means – demand for x and price for complementary commodity y are inversely directly related.

4. ***Price expectation effect on demand:*** Here the relation may not be definite as the psychology of the consumer comes into play. Your expectations of a price increase might be different from your friends'.

5. ***Income effect on demand:*** As income rises, consumers buy more of normal goods (positive effect) and less of inferior goods (negative effect). Examples of normal goods are t-shirts, tea, sugar, noodles, watches etc. and examples of inferior goods are low quality rice, jowar, second hand goods etc.

   This can be shown as:

$$D_x \propto B, \text{ if X is a normal good.}$$

   And,

$$D_x \propto \frac{1}{B}, \text{ if X is an inferior good.}$$

6. ***Promotional effect on demand:*** Advertisement increases the sale of a firm up to a point.

   This can be shown as:

$$D_x \propto A$$

   This means that, demand for x is directly proportional to advertisement expenditure of the firm producing x. (Note: advertisements do not that powerful effect on demand)

   Socio-psychological determinants of demand like tastes and preferences, custom, habits, etc., is difficult to explanation theoretically.

Did u know? **If there is an increase in GDP, will the demand be affected?**

Yes. An increase in GDP means that the total output of products and services have increased. Since, it represents the economy of a country, so any increase will have a positive effect on demand.

Notes

Task List a few products that are: a) substitutes and b) complements

Case Study

Micro Factors affecting Demand for Tanishq Products

Price of Jewellery – Symbol of Quality Provided

Price of a commodity is known to have a direct influence on demand for it. This follows from the Law of Demand. But in the case of Tanishq jewellery this does not hold true, making it an exception to the Law. This can be explained in terms of Veblen effect, where the price of a commodity is regarded as an indicator of its quality. Sometimes certain commodities are demanded just because they happen to be expensive or prestige goods, and hence have a "snob appeal". These are generally luxury articles that are purchased by the rich as status symbols. The price of Tanishq jewellery is regarded by patrons as being the just cost of the purity and trustworthiness of the brand. Not only was Tanishq the first to offer branded jewellery in India, but it was also the first to introduce concepts such as testing the purity of jewellery through the Karat meter, a buyback guarantee as well as other exchange schemes. Each move by Tanishq has shown its confidence in its own product. This has in turn inspired confidence in its customers, who are loyal. Usually, when the price of gold bullion increases people tend to curb/postpone their purchases of gold ornaments. However, the demand for Tanishq jewellery is independent of this price factor because each piece of jewellery represents a promise of quality and purity, each piece is something different and new, each piece is something special. As such the income and substitution effects do not adversely affect the demand for Tanishq jewellery, and price has title impact overall. But it has also been observed that an escalation in the gold price, diamonds seem to have caught the fancy of the customer and the promotional offers are being designed to provide customers with significantly enhanced value.

Designs Offered

The average Indian has always been very discerning when it comes to the purchase of jewellery. However, with the spread of globalization customers want the best quality in terms of designs. Best quality is provide to meet the international standards. Creativity is the buzzword. Tanishq's primary customer, the urban Indian woman, has come along way. She is smart, educated, and confident of handling career and family, and looking to secure value for her money. Today's urban women no longer wear jewellery only at weddings and formal occasions. They require trendy accessories that match her attire and reflect her personality. In this context the demand is vast and widespread in terms of prices. The women of today want the best of everything and have become more and more and more selective in their choices. The brand's designs address the needs of the modern woman. Tanishq had crafted award-winning designs in 18 karat and 24 karat gold and gemstone jewellery. It's new range looks beautiful and yet is affordable and feels light.

Promotional Schemes

With cutthroat competition in the market, every company comes up with schemes to woo the customers. These offers are all the more visible during the festival season. Purchase of jewellery can happen any time of the year like – for birthdays, anniversaries, gifting, impulse purchases, etc. and of course for marriages as well. Therefore, in absolute terms, there is no lean period for jewellery – the jewellery market can be stimulated throughout the year through a host of well-designed marketing inputs. Tanishq to promote its brand

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comes up with all kinds of schemes like a jewellery exhibition which brings fresh talent to the forefront, launched a nationwide jewellery design competition on May 22nd 2004, 'Get Gold free with Diamonds' promotional offer across all 66 exclusive Tanishq boutiques in India. Its also specially designed the three crowns for the Ponds Femina Miss India Contest this year. It reached out to the target group through exclusive working women's meets, where well known career women spoke about issues relevant to working women. In addition, 'Tanishq Collection-G' ran joint promotions with brands such as L'Oreal and Wills Lifestyle, which it believed appeal to a similar set of consumers. Tanishq has successful stimulated demand for jewellery throughout the year through launches of new jewellery collections, a range of exchange programs and other offers (such as our recently concluded "Impure to Pure" exchange offer) and a number of in-store events. As a result of these efforts, even while the market for jewellery declined by more than 15% last year, Tanishq grew by 40% for the third successive year. Amongst the most recent initiatives of Tanishq has been the targeting of the wedding market by making special offers on wedding jewellery. This promotional scheme has had the masses thronging in, in very large numbers. It also got the 4th Annual Lycra Images Fashion Awards in the Jewellery category.

Discounts

Discounts play a major role in determining the demand for a product. Tanishq periodically offers discounts. In 2002 it offered a vast gamut of discounts in its showrooms in Bihar during the festival of Dhanteras resulting in sales of ₹ 5 crore in one particular store. During its fifth anniversary celebrations Tanishq offered discounts to customers, and the response was so overwhelming that extra security was called to handle the crowd even before the store opened. At select points of time in the year Tanishq also offers 20%-40% discount on making charges, which is also a large crowd puller.

Guarantee

Tanishq has managed to establish its position in the market because its quality products are backed by a guarantee certificate. Each item of jewellery that is sold is accompanied by a guarantee card that states the weight of the gold/platinum as well as the cartage of the gemstones used. In case of any discrepancy the company is liable for legal action. All diamonds used are VVS certified, and the platinum is passed by the official Platinum Authority of India. 100% purity backed by an ironclad guarantee is thus the hallmark of Tanishq jewellery. This is a major demand inducer as the traditional jewelers are increasingly fudging on such things.

Question

Analyse the role of other factors (other than price of products) in influencing the demand for Tanshiq's products.

2.1.2 Types of Goods and Demand

For a purposeful demand analysis for decision-making, you should be able to classify the large number of goods and services available in the economy. Policy decisions are also facilitated by an understanding of demand at various levels of aggregation.

A classification in these respects is as follows:

1. ***Consumer goods and producer:*** Goods and services used for final consumption are called consumer goods. These include those consumed by human beings, animals, birds, etc. Producer goods refer to the goods used for production of other goods, like plant and machines, factory buildings, services of employees, raw materials, etc.

Notes

2. ***Perishable and durable goods:*** Perishable goods become unusable after sometime, the rest are durable goods. To be precise, perishable goods are those which can be consumed only once while in the case of durable goods, their services only are consumed.

   Example: Milk and food items are perishable goods and cars, books, pen, clothes and home appliances are durable goods.

   Durable goods pose more complicated problems for demand analysis than do non-durables. Sales of non-durables are made largely to meet current demands which depends on current conditions. In contrast, sales of durable goods go partly to satisfy new demand and partly to replace old items. It can be seen that the durable goods are generally more expensive than the perishable goods. Also, based on the current and expected market conditions, demand for durable goods can be preponed or postponed.

3. ***Autonomous and derived demand:*** You must have noticed that our demand for basic necessities, like demand for food, clothing and shelter, is independent of demand for any other good. On the other hand, demand for labour is dependent on our demand for houses or products and demand for mobile phones depend on our demand for communication with each other. The goods whose demand does not depend on the demand for some other goods are said to have autonomous demand, while the rest have derived demand. However, there is hardly anything whose demand is totally independent of any other demand. But the degree of this dependence varies widely from product to product. Thus, the autonomous and derived demand varies in degree more than in kind.

4. ***Firm and industry demand:*** You must have heard or seen situations where the industry does not have jobs to offer but still a particular firm in that specific industry is hiring people. This shows us that there can be a difference between industry and firm demand. Since, goods are produced by more than one firm , so there is a difference between the demand facing an individual firm and that facing an industry. (All firms producing a particular good constitute an industry engaged in the production of that good). For example, demand for Hyundai car alone is a firm's demand and demand for all kinds of cars is industry's demand.

5. ***Demand by market segments and by total market:*** It can happen that a particular brand of cold drink is not doing well in India but in a particular region, say north, it is doing well. In this case, we can say that the demand in the total market is negligible but in a market segment (north), the demand is high. If the market is large in terms of geographical spread, product uses, distribution channels, customer sizes or product varieties, and if any one or more of these differences were significant in terms of product price, profit margins, competition, seasonal patterns or cyclical sensitivity, then it may be worthwhile to distinguish the market by specific segments for a meaningful analysis. In that case, the total demand would mean the total demand for the product from all market segments while a particular market segment demand would refer to demand for the product in that specific market segment.

Caselet

Transportation as a Derived Demand

In economic systems what takes place in one sector has impacts on another; demand for a good or service in one sector is derived from another. For instance, a consumer buying a good in a store will likely trigger the replacement of this product, which will generate demands for activities such as manufacturing, resource extraction and, of course, transport. What is different about transport is that it cannot exist alone and a movement

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cannot be stored. An unsold product can remain on the shelf of a store until a customer buys it (often with discount incentives), but an unsold seat on a flight or unused cargo capacity in the same flight remain unsold and cannot be brought back as additional capacity later. In this case an opportunity has been missed since the amount of transport being offered has exceeded the demand for it. The derived demand of transportation is often very difficult to reconcile with an equivalent supply and actually transport companies would prefer to have some additional capacity to accommodate unforeseen demand (often at much higher prices). There are two major types of derived transport demand:

Direct derived demand: This refers to movements that are directly the outcome of economic activities, without which they would not take place. For instance, work-related activities commonly involve commuting between the place of residence and the workplace. There is a supply of work in one location (residence) and a demand of labor in another (workplace), transportation (commuting) being directly derived from this relationship. For freight transportation, all the components of a supply chain require movements of raw materials, parts and finished products on modes such as trucks, rail or containerships. Thus, transportation is directly the outcome of the functions of production and consumption.

Indirect derived demand: Considers movements created by the requirements of other movements. The most obvious example is energy where fuel consumption from transportation activities must be supplied by an energy production system requiring movements from zones of extraction, to refineries and storage facilities and, finally, to places of consumption. Warehousing can also be labeled as an indirect derived demand since it is a non movement of a freight element. Warehousing exists because it is virtually impossible to move commodities instantly from where they are produced to where they are consumed.

Transportation can also be perceived as an induced (or latent) demand which represents a demand response to a reduction in the price of a commodity. This is particularly the case in the context where the addition of transport infrastructures results in traffic increases due to higher levels of accessibility. Roadway congestion is partially the outcome of induced transport demand as additional road capacity results in mode shifts, route shifts, redistribution of trips, generation of new trips, and land use changes that create new trips as well as longer trips. However, the induced demand process does not always take place. For instance, additional terminal capacity does not necessarily guarantee additional traffic as freight forwarders are free to select terminals they transit their traffic through, such as it is the case for maritime shipping.

Source: http://people.hofstra.edu/geotrans/eng/ch1en/conc1en/deriveddemand.html

2.2 Law of Demand

The Law of demand explains the functional relationship between price of a commodity and the quantity demanded of the commodity. It is observed that the price and the demand are inversely related which means that the two move in the opposite direction. An increase in the price leads to a fall in quantity demanded and vice versa. This relationship can be stated as "Other things being equal, the demand for a commodity varies inversely as the price".

Example: Ram is demanding a motorbike manufactured by Company A. Now, if Company A increases the price of the bike substantially, say by 10% , then Ram might change his mind and decide to buy motorbike from company B whose price is lesser or he might postpone his demand altogether.

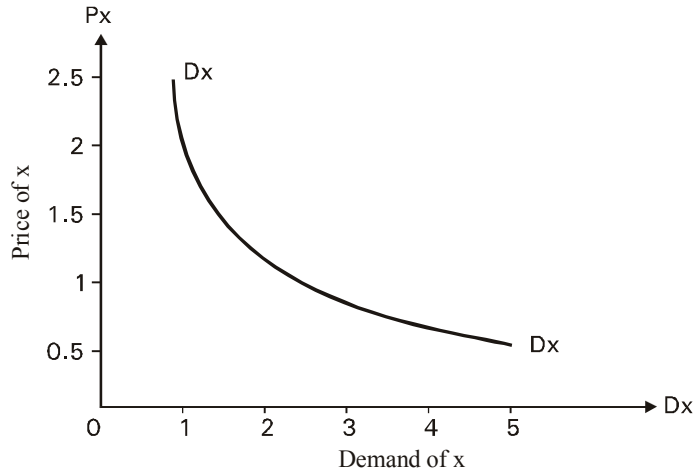
Notes

A demand curve considers only the price-demand relation, other factors remaining the same. The inverse relationship between the price and the quantity demanded for the commodity per time period is the demand schedule for the commodity and the plot of the data (with price on the vertical axis and quantity on the horizontal axis) gives the demand curve of the individual.

Example:

An Individual's Demand Schedule for Commodity X

Price x (per Unit) Px	Quantity of x demanded (in Units) Dx
2.0	1.0
1.5	2.0
1.0	3.0
0.5	4.5



Demand Curve

The Demand curve is negatively sloped, indicating that the individual purchases more of the commodity per time period at lower prices (other factors being constant).

The inverse relationship between the price of the commodity and the quantity demanded per time period is referred to as the Law of Demand.

A fall in Px leads to an increase in Dx (so that the slope is negative) because of the substitution effect and income effect.

Note

Why Demand Curve Slopes Downward?

The first reason for the validity of downward sloping demand curve is that the lower prices bring in new buyers. Secondary, when the price of a commodity declines, the real income or purchasing power of the consumers increases which induced them to buy of this commodity. This is known as the income effect. Thirdly, when the price of a commodity falls while prices of all other goods remain constant, the commodity becomes relatively cheaper. This induces the consumers to substitute this commodity in place of other commodities which have been relatively dearer. This is known as substitution effect.

Notes

2.3 Exceptions to Law of Demand

There are a few exceptions to the law of demand. Some goods behave differently and defy the law.

Case of inferior goods: Low quality rice, bajra, second hand goods etc. are all considered as inferior goods whereas basmati rice, branded clothes, watches etc. are all considered as normal goods. When an increase in income leads to an increased consumption of a good, it is called a normal good or superior good. But when an increased in income of buyers leads to a fall in the consumption of a good it is called an inferior Good. Inferior goods have preferred but more expensive substitutes. With rise in income, consumers can afford more of the expensive substitutes, e.g., ordinary bread, costly soaps and perfumes to ordinary ones.

Case of giffen goods: The concept of Giffen goods will be clear after going through the following example: It was observed that British workers bought more bread even when there was a rise in its price. This phenomenon was observed by Robert Giffen in the 19th century and is called the Giffen's paradox. Bread was the main diet of the poor labourers when the price of bread rose, it affected the resources of these families. They curtailed the consumption of costlier products like meat and increased the consumption of bread. After all even after price rice, bread was till cheaper than meat. This phenomenon shows a perverse demand relation. A Giffen good is an extreme type of inferior good. When the price of a Giffen good rises, consumers actually buy more of that good.

In the Giffen good situation, cheaper close substitutes are not available. Because of the lack of substitutes, the income effect dominates, leading people to buy more of the good, even as its price rises.

Case of Veblen goods: Expensive perfumes, designer clothes, imported cars etc. fall in category of Veblen goods. Veblen goods are goods for which people's preference for buying them increases with the increase in the prices of those goods. This happens because a greater price confers greater status. So when price of such goods increase their demand also goes up, instead of decreasing. This concept is referred to as the Veblen effect, named after the economist Thorstein Veblen, who first pointed out the concepts of conspicuous (easily noticeable and attracting attention) consumption and status-seeking.

Some types of high-status goods, such as exclusive watches, designer handbags and luxury cars, are Veblen goods, because a decrease in their prices decreases people's preference for buying them because they are no longer perceived as exclusive or high status products.

Task Find out some more practical examples from your day to day life, where you see law of demand being violated.

2.4 Shift and Movement of Demand Curve

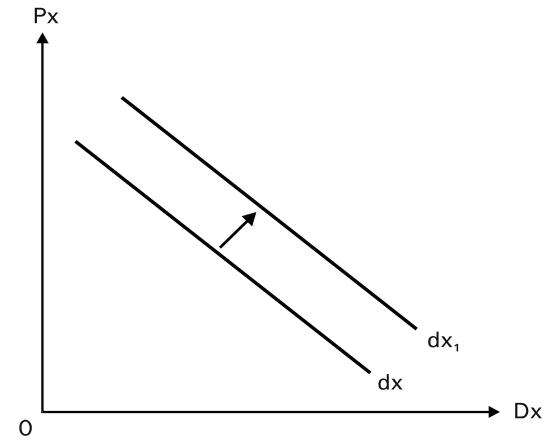
Theoretically, we will see that the basic of law demand has a role to play in shift and movement in demand curve.

If any of the components held constant in drawing a demand curve change, there is a shift in the demand curve. It is of two types:

1. ***Increase in Demand:*** The demand curve shifts upward or to the right, so that the individual demands more of the commodity at each commodity price if the price of a substitute commodity increases or the price of a complimentary commodity falls, and if the consumer's taste for the commodity changes. This is shown in Figure 2.1.

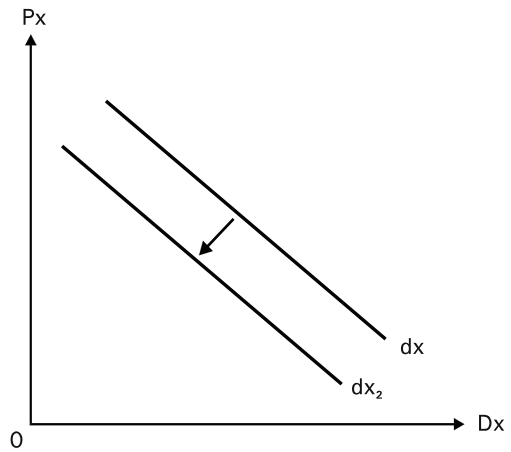
Notes

Figure 2.1: Increase in Demand



2. ***Decrease in Demand:*** With opposite changes in factors affecting demand, the demand curve shifts to dx_2. This is shown in Figure 2.2.

Figure 2.2: Decrease in Demand

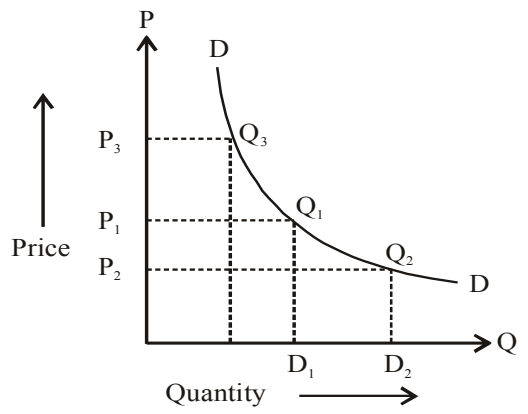


It is important to clearly distinguish between a movement along a given demand curve (as a result of change in price) from a shift in demand (as a result of change in income, price of related commodities and tastes). The first is known as a change in quantity demanded and the second is known as a change in demand.

Movement along a demand curve is different from shift in demand curve. Movement along a demand curve is the change in a point on the demand curve. Shift in the demand curve means the change in the whole demand curve. In Figure 2.3, movement from Q_1 to Q_2 is "expansion" of demand and from Q_1 to Q_3 is "contraction" of demand. The contraction and expansion along a demand curve depends on the change in "quantity demanded".

Notes

Figure 2.3: Movement along a Demand Curve

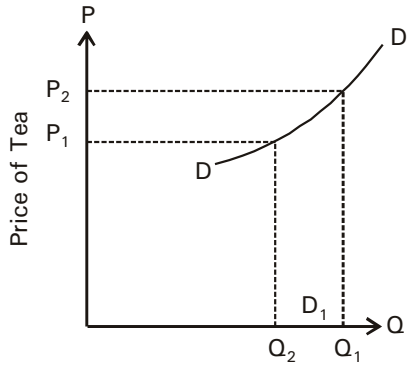


Example: You must have noticed the increase in demand for cold drinks during the month of summer. This leads to an increase in price cold drinks. This action is followed by reports that the rising price of typical consumer's purchases of cold drinks. They have switched to cheaper substitutes. The two actions appear contradictory and they refer to different things. The first describes a shift in the demand curve, the second refers to a movement along a demand curve in response to a change in price.

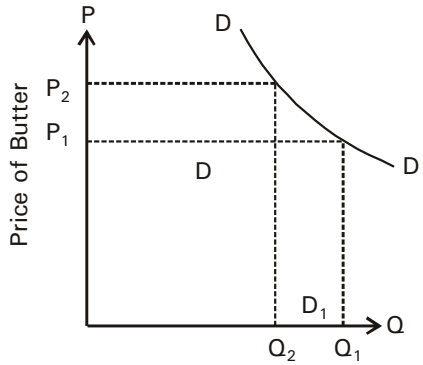
An increase in price of cold drinks has been caused by an increased demand for cold drinks. This is shift in demand curve for cold drinks. The demand curve shifts to the right indicating more cold drinks demanded at each price. Next, less cold drinks are being bought because they have become more expensive. This refers to a movement along a given demand curve and reflects a change between two specific quantities being bought, one before the price rise and one after it. Some important factors that cause a shift in the demand curve need to be discussed here the general rule for the shift in the demand curve is "Any change will shift the demand curve to the right if it increase the amount that households wish to buy, other things remaining equal. It will shift the demand curve to the left if it decreases the amount that households wish to buy, other things remaining constant or equal."

1. A Change in testes in favour of a product shift the demand curve to the right that households with to buy, other. More will be demanded at each price.
2. Goods that can be used in place of another good are called SUBSTITUTES, e.g., a bus ride substitutes for a train ride, ball pens for fountain pens. A rise in the price of substitutes for a product shifts the demand curve for the product to the right. More will be demanded at each price.
3. Complements are products that tend to be used jointly, e.g., cars and gasoline, hamburgers and french fires, tapes and tape players. Complementary goods are consumed together, so a price fall in one will increase the demand for both products. A fall in price of one will shift the products demand curve to the right. More will be demanded at each price.
4. A change in the distribution of income will case an increase in demand for products brought most by households whose incomes increase and a decrease in the demand for products bought most by households whose incomes decrease.
5. Household's tastes and preferences in favour of product shift the demand curve to the right. More will be demanded at each price.
6. Rise in consumer's income shifts the demand curve to the right.

Notes



Amount demanded of coffee/milk SUBSTITUTE GOODS CASE



Amount demanded of butter per day COMPLEMENTARY GOODS CASE

2.5 Summary

- In economics demand has a specific meaning. Demand for any commodity implies: desire to acquire it, willingness to pay for it, ability to pay for it and at a particular time.
- Demand depends on not only the price of a commodity, but also income, price of related goods – both substitutes and complements – taste of consumer, price expectation and all other factors.
- According to Law of Demand, there is an inverse relationship between the price of a commodity and the quantity demanded (other things remaining equal)
- Sometimes, we find that with a fall in the price demand also falls and with a rise in price demand also rises. These cases are referred to as exceptions to the general law of demand. The demand curve in these cases will be an upward sloping. This happens in case of inferior goods, Giffen goods and Veblen goods.
- For economics, the "movements" and "shifts" in relation to the demand curves represent very different market phenomena. A movement refers to a change along a curve. On the demand curve, a movement denotes a change in both price and quantity demanded from one point to another on the curve.
- A shift in a demand curve occurs when a good's quantity demanded changes even though price remains the same. This happens due to a change in other factors that affect demand.

Notes

2.6 Keywords

Autonomous demand: when a particular commodity is demanded for its own sake

Demand: The quantity of the commodity which an individual is willing to purchase per unit of price at a particular time.

Derived demand: Goods whose demand is tied with the demand for some other goods

Direct demand: Goods whose demand is not tied with the demand for some other goods

Demand function: A comprehensive formulation which specifies the factors that influence the demand for the product

Veblen goods: Goods that are perceived to be exclusive as long as prices remain high or increase

Inferior goods: a good that decreases in demand when consumer income rises

2.7 Self Assessment

State whether the following statements are true or false:

1. Demand of petrol is direct demand.
2. Demand is just a want or desire to purchase a product or a service.
3. Demand for labour is always a derived demand.
4. When price of tea goes up, then the demand for coffee is likely to go up as well.
5. When the price of X brand of soap went up, people began buying Z brand of soap. This happened due to the substitution effect.
6. When the price of bread goes up, the demand for butter usually goes up.

Fill in the blanks:

7. Demand for machinery in industries is a ..... demand.
8. Shoes and socks are ..... goods.
9. The most basic source of demand is ..... of the individuals.
10. The shape of the demand curve is ..... sloping.
11. Usually, income of the individuals and demand have a ..... relationship.

2.8 Review Questions

1. Define 'demand'. Discuss different types of demand.
2. Explain the law of demand. Discuss some practical applications of law of demand.
3. Distinguish between direct and derived demand with help of suitable examples.
4. Examine the impact of increase in prices of a good on its:
   (a) Substitutes
   (b) Complements
5. "Demand for everything in this world is a derived demand." Discuss
6. It is generally believed that when fares of airlines go up, the demand for railway travel also goes up? Does this seem logical to you?

Notes

7. Explain the downward sloping shape of demand curve.
8. It was noticed that even though the price of salt went up, there was no fall in demand. Can you explain, why?
9. Explain the income effect and substitution effect with help of suitable examples.
10. Draw a demand curve based on following data- Number of units demanded of X: 35, 46, 67, 89, 90 and 120 and respective prices: ₹ 40, ₹ 45, ₹ 50, ₹ 55, ₹ 60 and ₹ 65.

Answers: Self Assessment

1.	False	2.	False
3.	True	4.	True
5.	True	6.	False
7.	Derived	8.	Complementary
9.	Need	10.	Downward
11.	Positive		

2.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books, Delhi.

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

N. Gregory Mankiw, *Principles of Microeconomics,* Harcourt College Publications

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford

Online links

http://www.netmba.com/econ/micro/supply-demand/

http://www.basiceconomics.info/supply-and-demand.php

http://ingrimayne.com/econ/DemandSupply/OverviewSD.html

http://tutor2u.net/economics/revision-notes/as-markets-equilibrium-price.html

Notes

Unit 3: Supply and Market Equilibrium

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Objectives

After studying this unit, you will be able to:

- Define 'supply'
- State the Law of Supply
- Discuss the movements and shifts in supply curve
- Explain how market equilibrium is reached
- Describe the concept of price ceiling and price floor

Introduction

It is true that economy runs on demand but that demand has to be fulfilled with corresponding supply as well. Say, if there is a huge demand for mobile phones in an economy, there has to be corresponding supply to fulfill that demand.

If adequate supply is not there, then the demand would not be fulfilled.

Example: You are willing to buy a tennis ball, but the shopkeepers tell you that there are no balls available in the market due to short supply. We all do face such situations, many a times.

The imbalance between demand and supply creates a lot of problems in an economy. So, there should be an attempt to balance demand and supply and reach a point, where the demand equals supply. Such a state of balance is known as equilibrium.

3.1 Meaning of Supply

Supply is the specific quantity of output that the producers are willing and able to make available to consumers at a particular price over a given period of time.

Notes

In one sense, supply is the mirror image of demand. Individuals' supply of the factors of production or inputs to market mirrors other individuals' demand for these factors. For example, if we want to rest instead of weeding the garden, we hire someone: we demand labour. For a large number of goods, however, the supply process is more complicated than demand.

Supply is not simply the number of a commodity a shopkeeper has on the shelf, such as '10 oranges' or '10 packet of chips', because supply represents the entire relationship between the quantity available for sale and all possible prices charged for that good. The specific quantity desired to sell of a good at a given price is known as the quantity supplied. Typically a time period is also given when describing quantity supplied. For example, when the price of an umbrella is ₹ 100, the quantity supplied is 500 umbrellas a week.

The supply of produced goods (tangibles) is usually indirect and the supply of non-produced goods (intangibles) is more direct. Individuals supply their labour in the form of services directly to the goods market. For example, an independent contractor may repair a washing machine. The contractor supplies his labour directly.

3.2 Law of Supply

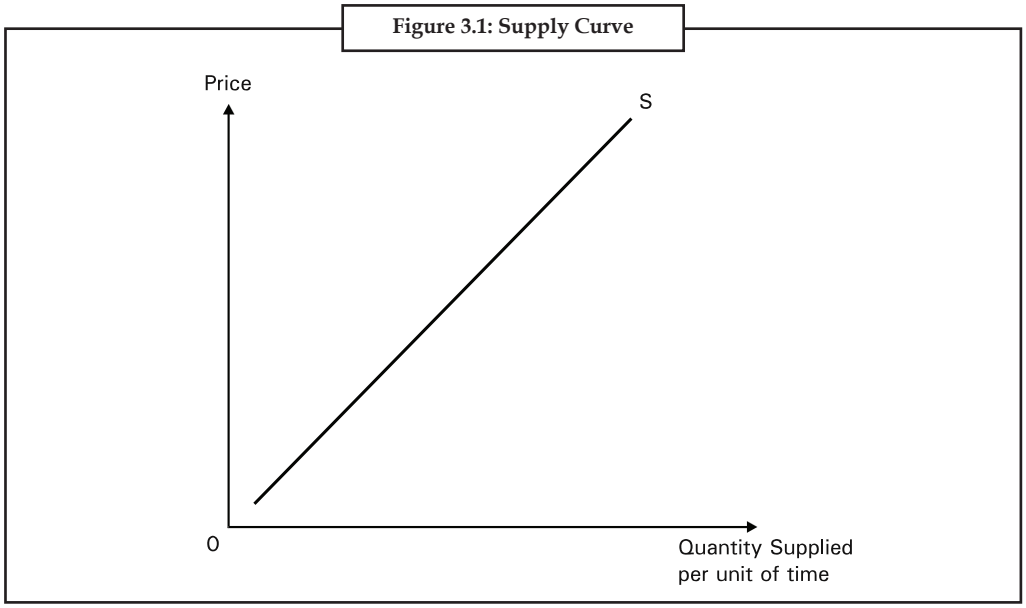
According to the Law of Supply, other things remaining constant, higher the price of a commodity, higher will be the quantity supplied and vice versa. There is a positive relationship between supply and price of a commodity.

As in the case of quantity demanded, price is the major determinant of quantity supplied. In graphical terms supply refers to the entire supply curve because a supply curve tells us how much of a commodity will be offered for sale at various prices. Quantity supplied refers to a point on a supply curve. In case, the price of a good rises, individuals and firms can rearrange their activities in order to supply more of that good to the market, substituting production of that good for production of other goods.

With the firms, there is another explanation. Assuming firm's costs are constant, higher price means higher profits (the difference between a firm's revenues and its costs). The expectation of those higher profits leads it to increase output as price rises, which is what the law of supply states.

Figure 3.1 depicts a supply curve, which is based on law of supply.

Figure 3.1: Supply Curve



Notes

The law of supply also assumes that other things are held constant. Other variables, like price of inputs used in production, technology, producers' expectations and number of producers in the market, might change, causing a shift in supply. This will be discussed in the next section.

A supply schedule is a table which lists the possible prices for a good and service and the corresponding quantity supplied.

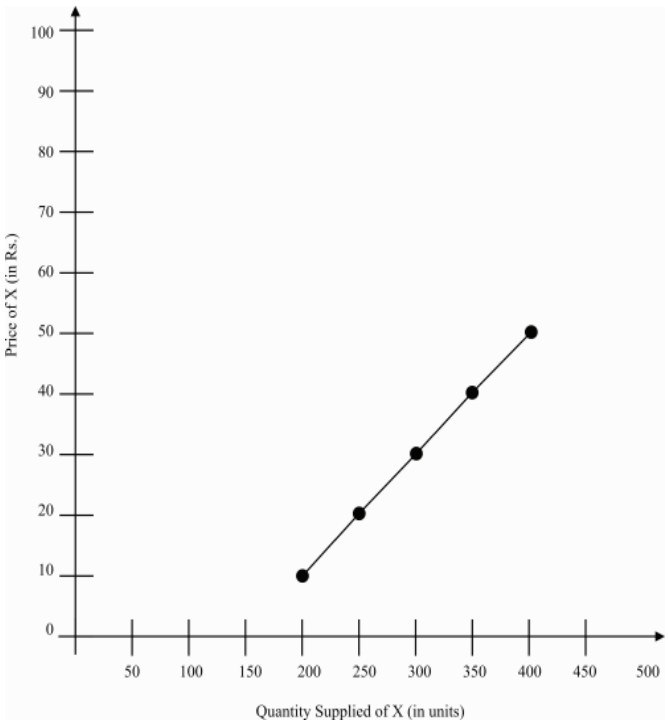
Market supply is the summation of all individual supplies at a given price. The market supply curve is the horizontal sum of the individual supply curve.

Example: From a supply schedule to a supply curve

Let's see how a supply curve is drawn on the basis of figures given in the supply schedule.

Supply Schedule

Price of X (in ₹)	Quantity Supplied of X (in units)
10	200
20	250
30	300
40	350
50	400



From Supply Schedule to Supply Curve

Task

Consider a hypothetical supply schedule for potatoes and draw a supply curve for potatoes.

Notes

Caselet

Nutmeg, Mace Prices Shoot up amid Supply Crunch

The prices of nutmeg and mace have shot up in the Indian and international markets this year due to a supply crunch following a fall in output in the major producing country, Indonesia.

"Though India is one of the major producers of this spice, production has not matched demand," trade sources said.

The price of Indian mace in the domestic market ranges between ₹ 1,300 and ₹ 1,800 a kg depending upon the colour, while that of the imported variety is ₹ 1,400–1,450 a kg for red.

Nutmeg with the shell was fetching ₹ 350 a kg while that without shell was sold at around ₹ 600 a kg, they said.

The area under the crop went up to 16,400 hectares in 2008-09 from 11,270 hectares in 2005-06, but the output has not kept pace with the growing demand, they said.

Total production in the country is estimated at around 13,000 tonnes of nutmeg, including the shell. Once the shell weight is reduced, the net weight of the nutmeg comes down to 9,100 tonnes, while the weight of the mace is only 10 per cent of the nutmeg i.e. around 910 tonnes as against the demand of over 2,000 tonnes in the country, they said.

Meanwhile, the requirement of nutmeg has ranged between 13,000 tonnes (without shell) and 15,000 tonnes of late given its growing use in indigenous medicines/drugs, cosmetics and in various food products.

Changes in food habits following a change in lifestyles has been responsible for the rise in demand for many such commodities.

The annual growth in demand for nutmeg and mace is estimated at 5 to 10 per cent of late, they said. Whereas the production (without shells) was around 8,000 tonnes in 2008-09, with shell was at 11,362 tonnes from 16,400 hectares. The weight of the shell comes to around 30 per cent, while that of mace is 10 per cent, they said.

It is grown in the mid-lands of Kerala, especially on the banks of rivers, as it requires a deep, well-drained loamy sandy soil. Shade is required for the first two to three years. The optimal growing temperature is between 20-30°C and the annual rainfall should be between 1,500-2,500mm, Spices Board sources said.

Kerala topped in area and production (13,494 ha/11,361 tonnes) of nutmeg and mace followed by Karnataka (136 ha/1,997 tonnes) and Andaman and Nicobar Islands (79 ha/4 tonnes) in 2006-07 according to the Board.

Half the trees are male and do not produce fruit. Unfortunately, the sex of the plants cannot be determined until they are six to eight years old. However, budded plants which are able to bear fruits, are made available by the nurseries run by the Universities/Agricultural departments at a price, they said.

The principal import markets are the European Community, the US, Japan and India. Singapore and the Netherlands are the major re-exporters.

The US is the biggest individual market for whole nutmegs. US importers prefer the East Indian type of deep brown, aromatic nutmeg and orange-red mace in their whole form.

Contd...

Notes

As the Indian production is below the demand, the country continues the import of both nutmeg and mace. Much of the imports are by the oleoresin industry, they said. During 2008-09, India imported 1,325 tonnes of nutmeg valid at ₹ 25.37 crore and 265 tonnes of mace worth ₹ 8.46 crore, they said. At the same time, the country has exported an estimated 3,275 tonnes of nutmeg and mace worth ₹ 91.87 crore. A good chunk of the Indian exports of this commodity is value-added items such as oleoresins, oil and in powdered form, they said.

Nutmeg and mace, their oleoresins and essential oils are used in the food and beverage industries. Although whole nutmeg is available, ground nutmeg is more popular. The ground form is mainly used in the food processing industry, extraction industry sources said.

Nutmeg is a standard seasoning in many Dutch dishes. Nutmeg and its oleoresin are used in the preparation of meat products, soups, sauces, baked foods, confectioneries, puddings, seasoning of meat and vegetables, to flavour milk dishes and punches. The fleshy outer cover of the fruit is crystallised or pickled or made into jellies, they said.

Mace is sold either whole or as ground spice and is used in savoury dishes. It is used to flavour milk-based sauces and processed meats such as sausages. Soups, pickles and ketchup, pickles and chutneys are also seasoned with mace. Because of its aroma, the essential oil is used as a natural flavouring extract and is employed for flavouring food products and liquors. Nutmeg oil and mace oil are used mainly in flavouring soft drinks, canned foods and meat products.

Nutmeg oil is used in cosmetics, men's perfume and toiletries due to its aromatic properties. Mace oil possesses almost identical "physico-chemical" and "organoleptic" properties as nutmeg oil. Mace oil is also used to a limited extent in perfumes and soaps. They are used in the pharmaceutical industries also, industry sources told Business Line.

Nutmeg is produced in the tropical areas of Indonesia and the West Indies. The world production of nutmeg is about 25,000 tonnes a year. The global demand is also estimated at around this level, they said.

The production of mace is about 3,000 tonnes. Indonesia and Grenada dominate production and export both products with a world market share of 75 per cent and 20 per cent respectively. The other producing countries include India, Malaysia, Papua New Guinea, Sri Lanka and a few Caribbean islands.

Source: www.thehindubusinessline.com

3.3 Shift and Movement of Supply Curve

Top understand the shift and movement of supply curve better, we must recognise the factors that affect supply. Other than price of the commodity, the important factors that affect supply of a commodity are:

1. ***Price of inputs:*** In addition to the price of the commodity being the main factor as stated in the Law of Supply, the price of production inputs also plays a part. The lowest price at which a firm can sell a good without losing money is the amount of money that it costs to produce it.

Example: Firm produced a shirt by using inputs worth ₹ 500 and sells the shirt at ₹ 500.

Notes

Producing a good or service involves taking inputs and applying a process to them to produce an output. The output is the finished good or service, and inputs are raw materials, labor, utilities, licensing fees, or even other goods. These inputs are also known as factors of production. If the price of inputs goes up, the cost of producing the commodity increases. And therefore at each price producers need to sell their good for more money. So an increase in the price of inputs leads to a decrease in supply. Similarly, a decrease in the price of inputs leads to an increase in supply.

2. ***Current state of production technology:*** Production of a good involves taking inputs, applying a process to them, and producing an output. Well, production technology is involved in the process part. Increases in the level of production technology can make that process more efficient.

Example: Imagine that you run a basic garments screen printing business out of your home. Now let's say you decide to invest in a workshop installed with the latest production technology. With this use of technology, the operation becomes more efficient and you are able increase the supply of garments. If you decide to expand even further, some added technological improvements might be warranted. This further increases your ability to supply garments since it reduces your labor costs. By automating the process, reliance upon labor is lessened and those resources are released for utilization elsewhere.

3. ***Producer's expectations:*** It doesn't just matter what is currently going on - one's expectations can also affect how much of a product one is willing and able to sell.

Example: If your firm produces budget mobile phones and you hear that Nokia will soon introduce a new phone that has more features than your phone at similar prices, you (and other producers) may decide to hurry up and sell off your stock before the new Nokia phone is launched. When people decide to increase production/sales today, they are increasing the current supply for mobile phones because of what they expect to happen in the future.

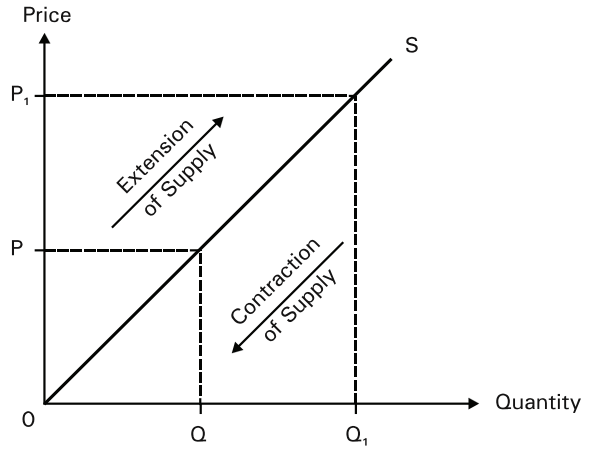
4. ***Number of producers in the market***: As more or fewer producers enter the market this has a direct effect on the amount of a product that producers (in general) are willing and able to sell. More competition usually means a reduction in supply, while less competition gives the producer an opportunity to have a bigger market share with a larger supply. If the number of producers in the same market increases, then the market supply will go up but the individual supply might come down.

Each of these shift factors will cause a shift in supply, whereas a change in price causes a movement along the supply curve.

Any change in price will cause a movement along an existing supply curve. The result will be an extension or contraction of supply, in other words, an increase or decrease in the quantity supplied. Refer to Figure 3.2, when price increases from P to P_1, quantity supply increases from Q to Q_1. Conversely, when supply decreases from P_1 to P, quantity supplied decreases from Q_1 to Q.

Notes

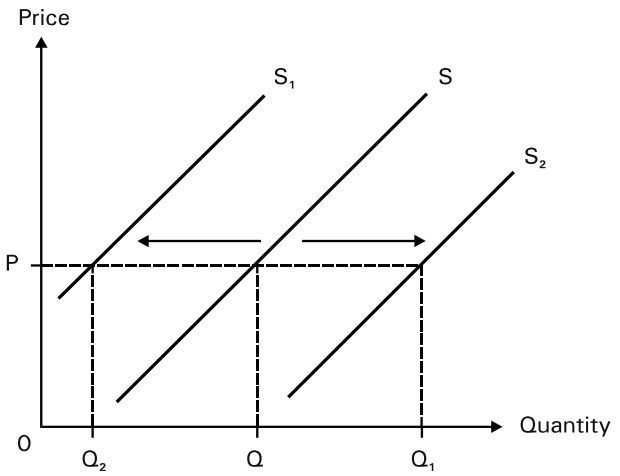
Figure 3.2: Movements along the Supply Curve



Variables other than prices also affect the supply curve by shifting the entire curve. This is because changes in these variables will mean that at each and every price, producers will be able to produce either more or less than before, and a new supply curve will be drawn. Any change in the factors discussed above would lead to a shift in the supply curve.

For example, if at any given level of output, there is an increase in costs of production, this will reduce the ability of producers to purchase factors of production at any given price for their product. In consequence, the supply curve will shift to the left – there will be reduction in supply and vice versa. This can be seen in Figure 3.3.

Figure 3.3: Shifts in the Supply Curve



Some other factors that can affect supply are:

1. ***Inter-related supply:*** Some goods are in joint supply so that variations in the amount of one good produced almost automatically affect the supply of by-products. Other goods are in competitive supply, especially when they use a common raw material. Thus increase in supply of cheese can reduce supply of butter as both are made from milk.

2. ***Events beyond human control*** like good/bad harvest, weather conditions and natural disasters like floods.

3. ***Taxes and subsidies*** also have an important effect on supply.

Notes

3.4 Market Equilibrium

Price is determined in a free market by the interaction of supply and demand. We can underline three dynamic laws of supply and demand.

1. When quantity demanded is greater than quantity supplied, prices tend to rise; when quantity supplied is greater than quantity demanded, prices tend to fall.
2. In a market, larger the difference between quantity supplied and quantity demanded, the greater the pressure on prices to rise (if there is excess demand) or fall (if there is excess supply).
3. When quantity supplied equals quantity demanded, prices have no tendency to change.

Price theory answers the question of interaction of demand and supply to determine price in a competitive market. Let's see an example, given in table.

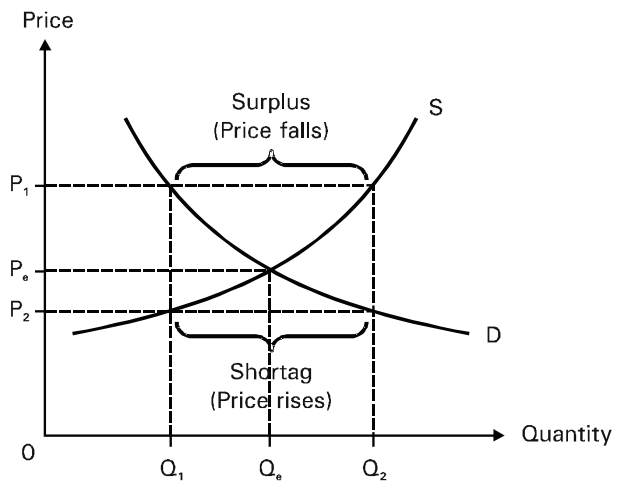
Table 3.1: Market Supply and Demand for Commodity X

Price of Commodity	Total Quantity Supplied per Month	Total Quantity Demanded per Month	Surplus or Shortage
5	12,000	2,000	+10,000
4	10,000	4,000	+6,000
3	7,000	7,000	0
2	4,000	11,000	–7,000
1	1,000	16,000	–15,000

At a price of 3 units, and only at this price, the quantity which producers are willing to produce and supply is identical to the amount consumers are willing to buy. As a result, there is neither a shortage nor a surplus of commodity X at this price. A surplus causes prices to decline and a shortage causes prices to rise. With neither shortage nor surplus at 3 units, there is no reason for the actual price of commodity X to move away from this price. This price is called the equilibrium price. Equilibrium represents a situation from where there is no tendency to change. It is a state of balance. Stated differently, the price of X will be established where the supply decisions of producers and demand decisions of buyers are mutually consistent.

Interaction of demand and supply to reach equilibrium is shown in Figure 3.4.

Figure 3.4: Equilibrium Point



Notes

Graphically, the interaction of supply and demand curves will indicate the equilibrium point (E).

If market price is OP_1, the quantity demanded by consumers is OQ_1, while the quantity which producers wish to supply is OQ_2. There is thus a surplus of Q_1Q_2 at this price. It is well known that a surplus leads to a downward pressure on price and so market price will fall. At the lower price of OP_2, the quantity supplied is OQ_1, while the quantity demanded is OQ_2. There is, therefore, a shortage at this price, represented by Q_1Q_2. This shortage tends to put an upward pressure on price and market price is expected to rise.

There is only one price, at which the quantity supplied is equal to the quantity demanded, there is no surplus or shortage, no rise or fall of price – OP_e. It is thus referred to as the equilibrium position.

3.4.1 Complex Changes in Demand and Supply

Once price settles at an equilibrium level, it can be expected to remain there until something happens to disturb the equilibrium. This can only be a change in one or more of the underlying conditions of demand and/or supply which cause demand and/or supply to shift. For example, let us consider the market for lettuces. How would this market be affected by a sudden spell of late frost which destroyed many young plants? Clearly such an occurrence would shift the supply curve to the left and this would result in a higher price with a lower equilibrium quantity. Suppose, instead, that there were a long spell of warm weather so that people demanded more lettuces to put in their summer salads. In this case the demand curve would shift to the right, resulting in a rise both in equilibrium price and in quantity.

All sorts of things can happen to alter the underlying conditions of supply or demand but they can all be reduced to four possibilities: either demand will shift or supply will shift; and the shift will either be an increase or a reduction. Case I illustrates the decrease in supply of lettuces discussed above while Case II corresponds with the increase in demand for lettuces. The possibilities are summarised in Table 3.2.

Table 3.2: Altering the underlying Conditions of Demand and Supply

Case	Shift	Price	Quantity
I	Supply, left	Increase	Decrease
II	Supply, right	Decrease	Increase
III	Demand, left	Decrease	Decrease
IV	Demand, right	Increase	Increase

Figure 3.5: A Decrease in Supply

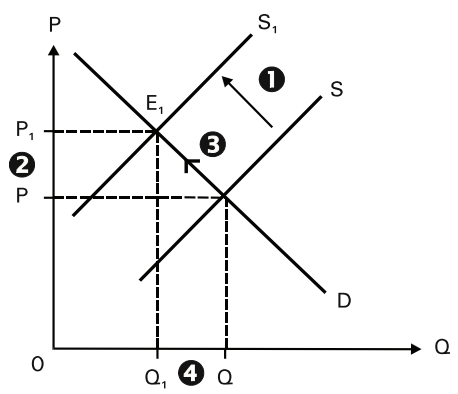


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Figure 3.6: An Increase in Supply

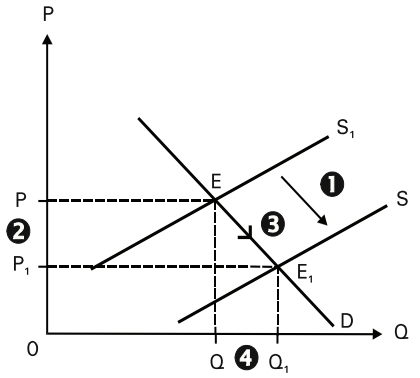


Figure 3.7: A Decrease in Demand

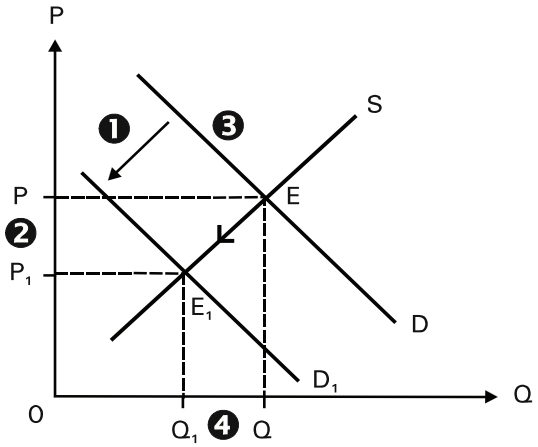
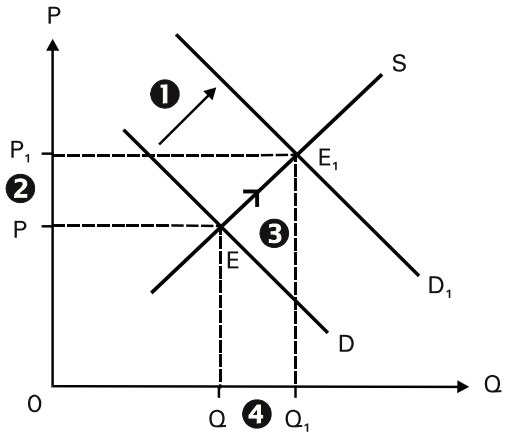


Figure 3.8: A Increase in Demand



It is important to note that when a demand curve shifts, there is movement along the supply curve, with the result that the amount supplied and demanded in equilibrium change – although for different reasons. Similarly, a shift in supply is accompanied by a movement along the demand curve.

Notes

Supply and demand theory can be used to analyse simple problems and make predictions. Suppose, for instance, the question is how the following changes would affect the market for text books:

1. A large fall in incomes.
2. The introduction of relatively cheap computerised printing methods.

In (a), a fall in income will have at least two effects on this market. First, students will have less money to spend on all goods and services, including textbooks. Secondly, the Government will receive less money in tax revenue and might, therefore, have to reduce expenditure on school books. The demand curve shifts to the left, price falls and the quantity supplied contracts. Case III provides a suitable diagram (Figure 3.7) which could be used to illustrate this reasoning.

An answer to (b) would incorporate a diagram (Figure 3.8) similar to Case II as in this case the reduction in costs of production can be expected to shift the supply curve to the right.

3.4.2 Price Ceiling and Price Floors

A price ceiling occurs when the price is artificially held below the equilibrium price and is not allowed to rise. There are many examples of price ceilings. Most price ceilings involve the government in some way. For example, in many cities, there are rent controls. This means that the maximum rent that can be charged is set by a governmental agency. This rent is usually allowed to rise a certain percent each year to keep up with inflation. However, the rent is below the equilibrium rent.

If the price ceiling is above the market price, then there is no direct effect. If the price ceiling is set below the market price, then a "shortage" is created; the quantity demanded will exceed the quantity supplied. The shortage may be resolved in many ways. One way is "queuing"; people have to wait in line for the product, and only those willing to wait in line for the product will actually get it. Sellers might provide the product only to family and friends, or those willing to pay extra "under the table". Another effect may be that sellers will lower the quality of the good sold. "Black markets" tend to be created by price ceilings.

Figure 3.9: Price Ceiling and Price Floor

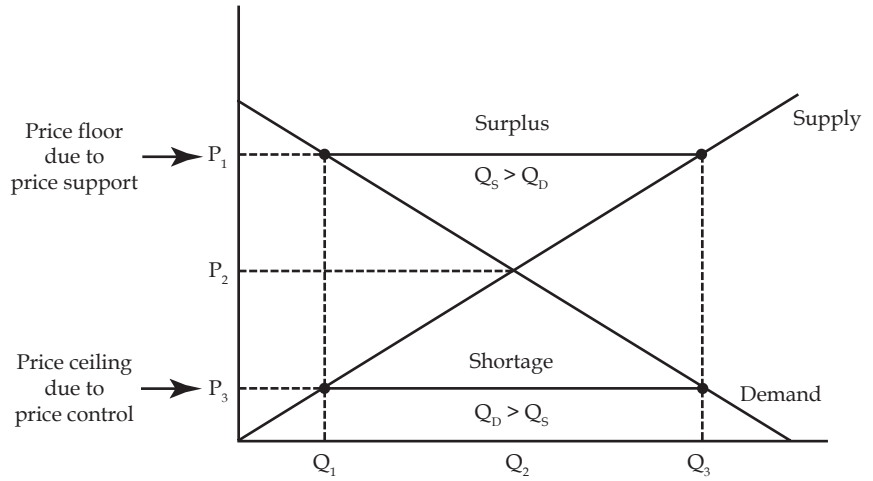


Figure 3.9 depicts the effect of price ceiling and price floor.

Notes

A price floor exists when the price is artificially held above the equilibrium price and is not allowed to fall. There are many examples of price floors. In some cases, private businesses maintain the price floor while, in other cases, it is the government that maintains the price floor. One price floor that was maintained by the private businesses used to be called "fair trade". In the case of fair trade, the manufacturer would set a price for the product that was above the equilibrium price. The manufacturer then told the retail stores that the price could not be lowered or the store would not be able to sell any of the manufacturer's products.

When a "price floor" is set, a certain minimum amount must be paid for a good or service. If the price floor is below a market price, no direct effect occurs. If the market price is lower than the price floor, then a surplus will be generated. Minimum wage laws are good examples of price floors.

Task Give examples from real life situations, where a price ceiling or price floor has been imposed.

Case Study

Demand – Supply and Price of Gold

Last month saw more housewives in the jewellery shops than in any month in the past. There were no big festivals, neither too many marriages. What attracted them was the fall in the price of gold. That was so the world over.

Gold prices have been falling for nearly a decade now. Last week they had drifted to their lowest in the past 18 years. The highest price in the world market was reached in 1980 when it touched $850 an ounce, almost three times the present price. Indian buyers did not experience the full impact because of the restrictions on import of gold. These have been significantly eliminated and the price behaviour in the domestic market now conforms to the international price.

The fall in the price of gold has more to do with the change in demand. Gold has many uses, Jewellery is only of them. It is an industrial metal, a form of saving for the rainy day and an international reserve asset for most central banks. The lure of gold for ornaments remains almost in tact. But as a form of saving or as reserve for the central banks, gold is no longer attractive. It is precisely this loss in trust that has caused the fall in the price of gold.

Gold has become a bad investment. Anyone would weigh an asset in terms of the return it earns, the security it gives and the ready market it enjoys. The last is the best with gold. But with the price going down; investment in gold makes no sense. An investment of ₹ 1,000 in gold in India in 1990 would have fetched today ₹ 1,120. That gives a yield of less than 3 per cent. Not worth the game.

The same investment in equity would have matured into ₹ 1,900 and in bank deposit ₹ 2,200. Gold is no longer a viable investment though the housewife may still buy gold partly for display and partly from ignorance about the alternative opportunities.

The penchant for jewellery is much more in India and West Asia than in most other countries. The world demand for jewellery was 2,807 tonnes last year. Gold that was actually mined was only 1,350 tonnes. The balance came from sales by the central banks. The bankers are

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Notes

hard-nosed fellows and the new generation bankers even more so. For their predecessors gold meant total security. That was not without reasons.

Countries had adopted gold standard and issue of currency had to have commensurate gold backing. The system had continued till the beginning of this century and in a modified form, even later. The final link with gold was given up in 1972, after the oil crisis, when the dollar ceased to be convertible into gold. But the gold hangover continued until the new generation bankers looked at gold only as an income generating asset. It had ceased to be one.

Over the years, the central banks had piled up huge reserves of gold. These currently exceed 37,000 tonnes – equivalent to 12 years' supply. When part of this gold began to come to the market, prices crashed. Netherlands possibly took the lead to empty the central bank coffers of gold. It sold 300 tonnes in four instalments to cut down its gold reserves by a fifth. The big shock came when Australia slashed its reserves by two-thirds. It was a shock because Australia is a major producer of gold.

Argentina came out even more boldly and sold out its entire gold reserve of 124 tonnes for about $1.5 billions. Had it continued with gold, the central bank would have lost $1.5 millions for every one per cent fall in the price of gold. With the shift from gold to US treasury bonds which are rated even higher than AAA the central bank would, instead, be earning an income of $80 a year.

The real gold hoarders are the Swiss bankers. They are conservative and gold is the most prized asset for them. However, last October, a panel of experts suggested that the banks sell out a half of their reserves in gold. The report of the panel created big waves. The fear that the central banks will unload their stocks of gold caused panic. Gold prices crashed. The fall was the highest in any single day.

It is not just the mismatch between demand and supply that forced prices to drop so sharply. Gold is a favourite with speculators. Even banks have been indulging in this lucrative activity. Quite a few American banks sold gold short in anticipation of the fall in price and earned a good packet. Speculation has made prices more volatile than what they would have been. Considering the oversupply position, it is the bears that hold the sway.

Will gold prices recover? If they do gold would be a good investment. But they won't. The demand for gold will now be almost exclusively for jewellery and, to a minor extent, for industrial use. Even that demand is dwindling because gold does not have a good resale value and has nearly ceased to be a status symbol for the rich. When most people understand this the demand for gold, even for jewellery, purposes will shrink.

For the present, it may freeze at around 2,500 tonnes. There is no demand at all from the bankers for reserves or for investment. The supply will be from the mines from which 2,300 tonnes are dug out every year. On top of that there will be sale by the central banks.

Even if 2 per cent of the world reserves are disposed off, nearly 700 tonnes of additional supply will enter the market. Again a mismatch between demand and supply is likely which will prevent prices from firming up.

Gold has little future. By and by even its use for ornaments will die out. A bad investment and no longer kept for reserve, gold will be on par with other metals. The switch will be from gold to US treasury bonds for the banks and from gold to equity for the general public. In India, gold will survive a little longer until the public is acquainted with alternative investment opportunities. Eventually, gold is bound to lose its lustre.

Contd...

Notes

Table 1: World Gold Supply and Demand

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Mine production	1908	2063	2133	2159	2234	2287	2278	2273	2257	2464
Official sector sales	-	434	198	111	622	464	81	173	275	406
Old gold Scrap	394	393	530	480	487	574	615	623	640	611
Gold Loans	164	78	5	-	-	-	-	-	-	-
Forward sales	126	115	222	96	156	215	158	466	30	329
Option hedging	63	-	7	15	103	-	57	92	101	18
Implied disinvest-ment	91	2	-	304	-	-	173	-	108	260
Total supply fabrica-tion	2746	3085	3095	3166	3602	3541	3362	3627	3510	4254
Jewellery	1645	2039	2188	2358	2760	2553	2615	2790	2837	3328
Electronics	207	209	216	205	176	180	191	206	211	237
Official coil (sales)	130	141	123	143	93	117	80	84	63	99
Others	147	152	156	162	178	187	194	210	212	226
Total fabrication	2130	2541	2683	2868	3208	3037	3079	3280	3322	3890
Bar Hoarding	461	530	224	252	282	162	231	306	182	337
Official sector pur-chases	155	-	-	-	-	-	-	-	-	-
Gold loans	-	-	-	45	85	65	52	23	5	28
Forward sales	-	-	-	-	-	-	-	-	-	-
Option hedging	-	15	-	-	-	35	-	-	-	-
Implied investment	-	-	188	-	27	242	-	17	-	-
Total demand	2746	3085	3095	3166	3602	3541	3362	3627	3510	4254
Gold Price (PM fix,$/oz)	**436.87**	**380.79**	**383.59**	**362.26**	**343.95**	**359.82**	**384.15**	**384.05**	**387.87**	**331.29**

Question

Analyse the effect of demand and supply on the price of gold with the help of demand supply curves.

3.5 Summary

- Supply is the specific quantity of output that the producers are willing and able to make available to consumers at a particular price over a given period of time.
- According to the Law of Supply, more of a good will be supplied the higher its price, other things constant or less of a good will be supplied the lower its price, other things remaining constant.
- Price is determined by the two forces of demand and supply, in a free market. A point of balance, where demand equals supply is known as market equilibrium.
- A movement along the supply curve is caused by a change in PRICE of the good or service. For instance, an increase in the price of the good results in an extension of supply (quantity supplied will increase), whilst a decrease in price causes a contraction of supply (quantity supplied will decrease).
- A shift in the supply curve is caused by a change in any non-price determinant of supply. The curve can shift to the right or left.

Notes

- Government imposes price ceiling and price floors to control demand and supply. If the price ceiling is above the market price, then there is no direct effect. If the price ceiling is set below the market price, then a "shortage" is created; the quantity demanded will exceed the quantity supplied.
- When a "price floor" is set, a certain minimum amount must be paid for a good or service. If the price floor is below a market price, no direct effect occurs. If the market price is lower than the price floor, then a surplus will be generated.

3.6 Keywords

Equilibrium: A state of balance.

Law of supply: More of a good will be supplied the higher its price and vice-versa

Price ceiling: a government-imposed limit on how high a price can be charged on a product.

Price floor: government- or group-imposed limit on how low a price can be charged for a product

Supply: Willingness and ability to produce a specific quantity of output available to consumers at a particular price over a given period of time.

3.7 Self Assessment

State whether the following statements are true or false:

1. Supply is a positive function of price.
2. A trader has 10 bags of cement in his store. This represents supply of cement.
3. A supply schedule is a table that represents the various amounts of goods available for supply at various prices.
4. When quantity demanded is more than quantity supplied, the prices tend to fall.
5. Price floor can be imposed by anyone in the market.

Fill in the Blanks

6. ……. is a position at which there is no surplus or shortage in the economy.
7. As per law of supply, more goods will be supplied at ……. price.
8. The supply curve is …….. sloping.
9. There is only one possible price at which quantity supplied is ……. quantity demanded
10. In price ceiling, price is purposely held ……. the equilibrium price.
11. If the market price is lower than the price floor, then ……. is generated.

3.8 Review Questions

1. When profit for a firm relies on demand, then why is the study of supply important?
2. Draw a supply schedule based on the following data: Number of units supplied of X: 20, 40, 50, 60, 100 and Respective price: ₹ 30, ₹ 32, ₹ 34, ₹ 36 and ₹ 38.
3. Using demand and supply analysis explain why the government might wish to control the price of rice below the market equilibrium price?

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4. Using the supply analysis, describe the recent increase in food items worldwide.
5. Over time, the demand for wheat has shifted to the right. Why, do you think, it has occurred?
6. Analyse the impact of taxes and subsidies on the supply of cigarette and LPG
7. Assume yourself as a manager of any FMCG firm. In what ways supply analysis is important for you?
8. Consider the following simplified demand-supply functions

   Demand: $Q = 200 - 2P$

   Supply: $Q = 20 + 4P$

   What are the equilibrium price and quantity sold? (Hint: Just equate demand and supply equations)
9. Given the data below showing the demand and supply of X in a given market:

Price at X per ton (₹)	1	2	3	4	5
Demand at X per period (₹)	25	16	12	10	9
Supply at X per period (Tons)	3	3	12	14	19

   (a) What would be the free market price of X?

   (b) What would be the price if demand increased by 4 tons at every price?

   (c) What would be the effect of a government's imposing of a minimum price of ₹ 5 per ton in the original situation?
10. Discuss the concepts of price ceiling and price floor with examples.
11. State the factors that affect demand and supply of a commodity. Show the effect diagrammatically.

Answers: Self Assessment

1.	True	2.	False
3.	True	4.	False
5.	False	6.	Equilibrium
7.	higher	8.	upward
9.	equal to	10.	below
11.	surplus		

3.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books, Delhi.

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

N. Gregory Mankiw, *Principles of Microeconomics,* Harcourt College Publications

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford

Notes

Online links

http://www.netmba.com/econ/micro/supply-demand/

http://www.basiceconomics.info/supply-and-demand.php

http://ingrimayne.com/econ/DemandSupply/OverviewSD.html

http://tutor2u.net/economics/revision-notes/as-markets-equilibrium-price.html

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Unit 4: Elasticity of Demand

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Objectives

After studying this unit, you will be able to:

- Define elasticity of demand
- Identify the factors affecting demand elasticity
- Describe price elasticity of demand
- Explain income elasticity of demand
- Discuss the concept of cross elasticity of demand

Introduction

Elasticity is the measure of responsiveness. It is the ratio of the percent change in one variable to the percent change in another variable. The key thing to understand is that we use elasticity when we want to see how one thing changes when we change something else. How does demand for a good change when we change its price? How does the demand for a good change when the price of a substitute good changes?

Elasticity varies among products because some products may be more essential to the consumer. A good or service is considered to be elastic if a slight change in price leads to a sharp change in the quantity demanded or supplied. Usually these kinds of products are readily available in the market and a person may not necessarily need them in his or her daily life.

Example: Air conditioners, televisions, movie tickets, branded clothes etc.

Notes

On the other hand, an inelastic good or service is one in which changes in price witness only modest changes in the quantity demanded or supplied, if any at all. These goods tend to be things that are more of a necessity to the consumer in his or her daily life.

Example: Rice, potatoes, onion, salt, medicines etc.

4.1 Concept of Elasticity: An Introduction

The law of demand tells us that consumers will respond to a price decline by buying more of a product. It does not, however, tell us anything about the degree of responsiveness of consumers to a price change. Demand elasticity indicates responsiveness of demand to a change in a determinate like price, price of other goods and income.

Graphically, elasticity of demand can be represented by the appearance of the demand curve.

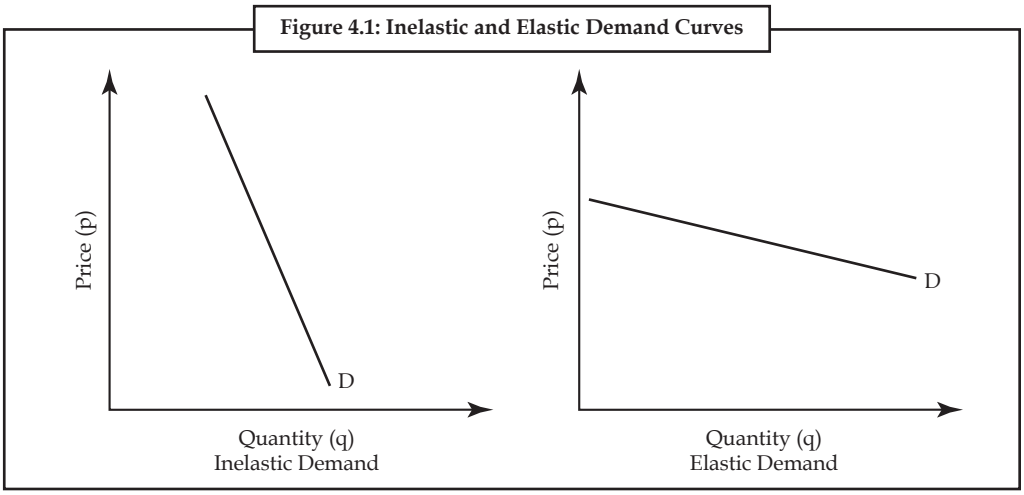
For our discussion, let's assume that the independent variable is price.

In cases where demand is not very responsive to change in price, the rate of change in quantity demanded of the good is less than the rate of change in its price. In such cases, the elasticity of demand is less than 1. (e_d<1). The demand for the good is said to be inelastic in nature.

Similarly, in cases where demand is responsive to change in price, the rate of change in quantity demanded of the good is more than the rate of change in its price. In such cases, the elasticity of demand is more than 1. (e_d>1). The demand for the good is said to be elastic in nature.

Both these cases are shown in Figure 4.1.

Figure 4.1: Inelastic and Elastic Demand Curves



In cases where a change in price does not have any influence on quantity demanded of the good, the elasticity of demand is equal to zero. (e_d =0). The demand for the good is perfectly inelastic. The demand curve for such a good is vertical.

In cases where, any change in price will see quantity demanded of the good fall to zero, the elasticity of demand is equal to infinity. ($e_d = \infty$). The demand for the good is perfectly elastic. The demand curve for such a good is horizontal.

Both these cases are shown in Figure 4.2.

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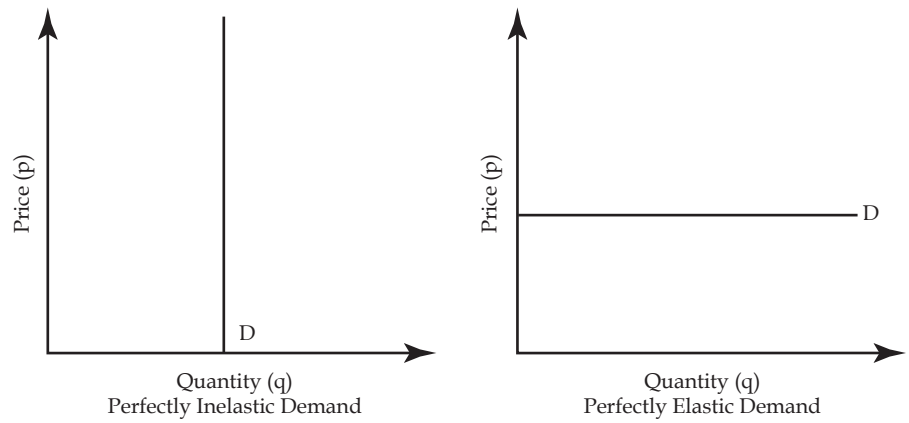
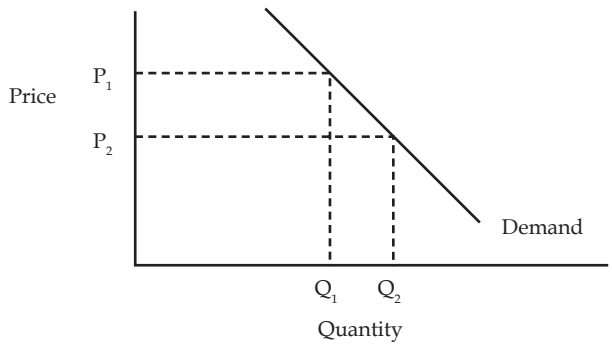
Figure 4.2: Perfectly Inelastic and Perfectly Elastic Demand Curves



In cases where, the percentage change in quantity demanded of the good is equal to the percentage change in its price, the elasticity of demand is equal to 1. (e_d =1). The good has unit elastic demand. The demand curve for such a good is shown in Figure 4.3.

Figure 4.3: Unit Elastic Demand Curve



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Factors determining elasticity of demand

Some important factors that determine the elasticity of demand are:

1. ***Luxury or Necessity Goods:*** Luxury goods tend to have an elastic demand, while necessity goods have an inelastic demand. Purchasers can stop buying the luxury goods when their prices rise.
2. ***Percentage of Income:*** Big items in a budget tend to have a more elastic demand than small items. For example, consumers may be affected by a 1 per cent rise or fall in price of a flat but are insensitive to such fluctuations in pens.
3. ***Substitutes:*** Items that can be substituted easily have a more elastic demand than those that cannot.
4. ***Time:*** The demand for a product becomes more elastic the longer the time period under consideration. It takes time to decide about another product before buying it as one develops a habit of using a particular product.

Notes

Task A firm has just increased its price by 5 per cent over last year's price and it was found that quantity sold remained the same. The firm comes to you and wants to know its elasticity of demand. How would you calculate it? What additional information would you search for before you did your calculation?

4.2 Price Elasticity of Demand

The concept of price elasticity of demand is a numerical measure of the extent to which quantity demanded responds to a change in price, other determinants of demand being kept constant.

Example: If the price of cold drinks fell by 20% and the price of salt fell by 20%, the increase in quantity demanded due to equal changes in prices would be different for salt and cold drinks. Thus salt and cold drinks are said to have a different price elasticity of demand.

Price elasticity of demand, e_p, measures the degree to which the quantity demanded responds to a change in price when all other factors that influence demand such as tastes or income are kept constant. In the example, it is extremely likely that the percentage increase in quantity demanded would be much more for cold drinks than for salt, even though the percentage decreases in price are the same. Thus price elasticity of demand allows us to compare the sensitivity of the demand for various goods for the same changes in price. From the definition

$$e_p = \frac{\text{\% change in quantity demanded}}{\text{\% change in price}}$$

Let us consider a commodity X. If its price rose, then the percentage change in price would be positive (since the new price is greater than the old price). This means that the denominator in the expression for e_p would be positive. However, the quantity demanded would fall and the percentage change in quantity demanded would be negative. Hence the numerator in the expression would be negative.

Thus, for most goods as quantity demanded and price have an inverse relationship, e_p is likely to be negative. However, by placing a minus sign in the formula we make e_p positive. The reason is that we want to equate "more elastic" with "more responsive".

Example: Let two commodities X and Y have elasticities of +10 and +0.5 (calculated after multiplying by (–1) in accordance with the formula). The demand for commodity X is more responsive to price changes than is the demand for commodity Y, and X has a larger elasticity since +10 is greater than +0.5. Hence "more elastic" is equated with "more responsive".

Caution However, if we did not multiply by (–1), the two elasticities would be –10 and –0.5. Since –0.5 is greater than –10 we would be likely to say that Y has a greater elasticity than X (when in fact it is the other way round). Hence without multiplying by (–1) we would not be able to substitute "more elastic" for "more responsive".

The factors that govern the price elasticity of demand are:

1. ***The number and closeness of substitutes:*** The more and the better the substitutes, the greater is the price elasticity of demand. For example, if the price of "chocolate" ice cream rose by a small amount, consumers would readily switch to other flavours of ice cream such as "strawberry" or "butter-scotch". Thus, for a small percentage change in price, there would be a large percentage change (decrease) in quantity demanded. Hence "chocolate"

Notes

ice cream would be highly elastic. One the other hand, there are no good substitutes for salt, hence it is likely to be inelastic.

2. ***Number of uses the commodity satisfied:*** The greater the number of uses of the commodity, the greater is its price elasticity of demand. For example, aluminium, which has several uses, is likely to be highly elastic. Thus, if the price of aluminium fell by a small amount, the quantity demanded would increase substantially since it can be put to so many uses. Since the percentage change in price is small and the percentage change in quantity large, aluminium has a high price elasticity of demand. On the other hand, salt (which is only a food) has only a single use and hence is inelastic.

3. ***Time period:*** The greater the time period, the greater is the price elasticity of demand. For example, if the price of diesel increases, the quantity demanded by a firm will decrease by a very small amount because in the short run the firm uses equipment that runs on diesel. In the long run (greater time period), the firm can replace its existing equipment (which runs on diesel) for one which runs on electricity. Thus, the percentage change in quantity demanded is greater in the long run for the same percentage change in price. Thus, any commodity is likely to be more elastic when its "adjustment time" is longer.

4. ***Proportion of income spent on the commodity:*** The greater the proportion of income spent on a commodity, the larger is the price elasticity of demand. The reason is that the proportion of income previously being spent on the commodity determines what amount of income will be released as a result of the fall in price of the commodity. The income thus released will be spent on increasing the purchase of the commodity as well as all other commodities. Hence cars, refrigerators, etc., are likely to be price elastic while soaps, etc., are likely to be inelastic.

5. ***How narrowly the commodity is defined:*** The more narrowly a commodity is defined, the greater is its price elasticity of demand. Hence the price elasticity of Marlboro cigarettes is greater than the price elasticity of cigarettes; the elasticity of Campa Cola is higher than that of soft drinks, etc. The reason is that there are many other good substitutes for Marlboro (namely the many other brands of cigarettes) than cigarettes in general (namely cigars and pipes).

A review of the basic formula of elasticity will show that it follows from the definition of price elasticity.

$$e_p = -\frac{\text{\% change in quantity demanded}}{\text{\% change in price}}$$

where,

$$\text{\% change in Quantity demanded} = \frac{\text{New Quantity} - \text{Old Quantity}}{\text{Old Quantity}} \times 100$$

and $$\text{\% change in price} = \frac{\text{New price} - \text{Old price}}{\text{Old price}} \times 100$$

Let, P = Old price

Q = Old quantity

ΔQ = New quantity – Old quantity

ΔP = New price – Old price

$$e_p = (-)\frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100} = (-)\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Notes

Example: Given the following data, calculate the price elasticity of demand when (a) price increases from ₹ 3.00 per unit to ₹ 4.00 per unit and (b) the price falls from ₹ 4.00 per unit to ₹ 3.00 per unit.

P_X (per unit)	6	5	4	3	2	1
Q_X	750	1250	2000	3250	4650	8000

$$e_p = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} \text{ or } \frac{dq}{dp} \times \frac{P}{Q}$$

(a) When price increases from ₹ 3 to ₹ 4 per unit, P, the old price = ₹ 3 and Q, the old quantity (from the table) = 3250 units.

New Price = ₹ 4

New Quantity = 2000 units.

ΔP = New price – Old price = 4 – 3 = 1

ΔQ = New quantity – Old quantity = 2000 – 3250 = – 1250

Substituting,

$$e_p = (-)\frac{(-1250)}{1} \times \frac{3}{3250} = 1.15$$

(b) When price falls from ₹ 4 to ₹ 3 per unit,

P, the old price = ₹ 4

Q, the old quantity (from the table) = 2000

New price = ₹ 3

New quantity = 3250 units

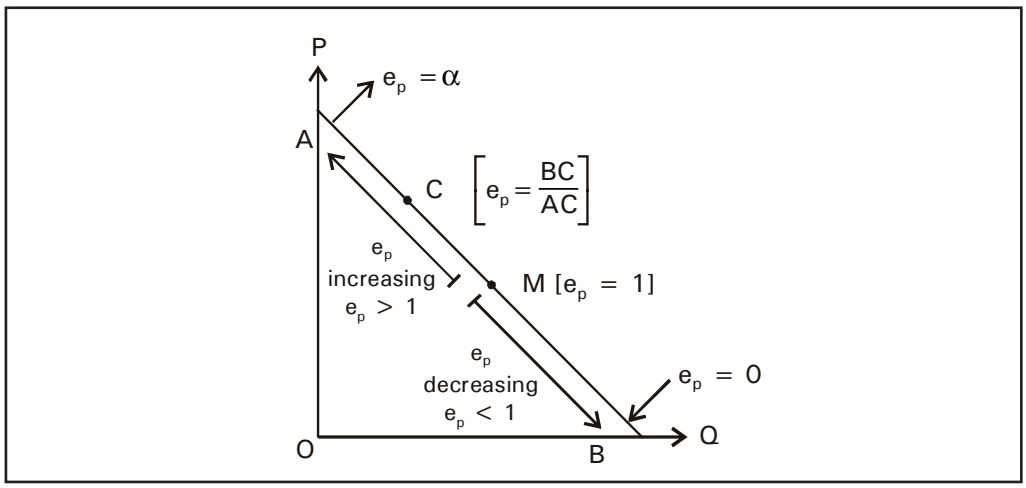
ΔP = New price – Old price = 2000 – 3250 = –1250

ΔQ = 3250 – 2000 = 1250

Substituting,

$$e_p = (-)\frac{(-1250)}{1} \times \frac{4}{2000} = 2.5$$

The price elasticity of a straight line demand curve varies from infinity at the price axis to zero at the quantity axis.



Notes

Consider a straight line demand curve cutting both the axes as shown above figure. Elasticity of demand, e_p, is defined as the numerical measure of the degree to which quantity demanded responds to a change in price (assuming all other factors are held constant).

$$e_p = (-).\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

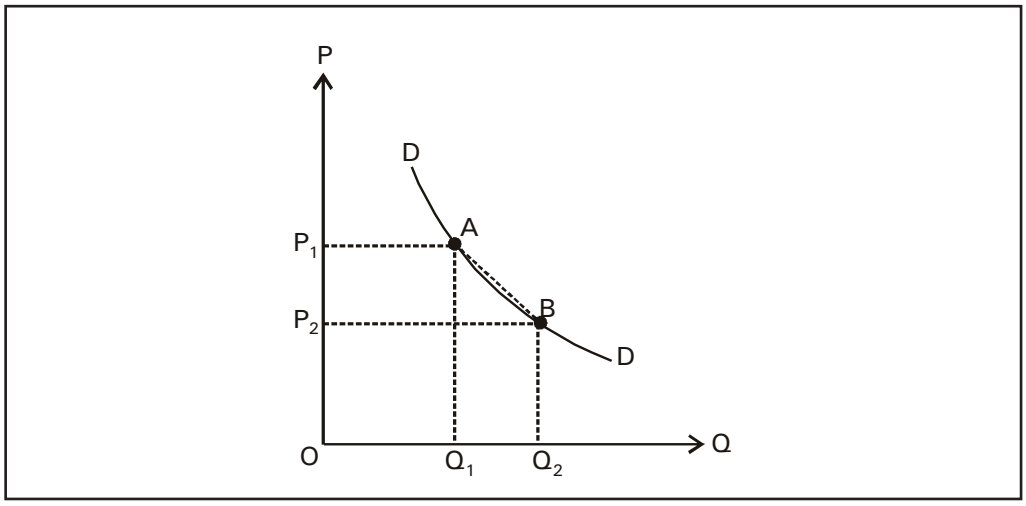
The responsiveness of quantity demanded to price for a point on the demand, curve is known as point (price) elasticity of demand. This concept is useful when there are very small changes in price along a demand curve.

It can be shown that the elasticity of demand at a point C, is given by the ratio of lower segment to upper segment.

$$e_p(\text{at C}) = \frac{\text{Lower segment}}{\text{Upper segment}}$$

Thus, it is clear that the elasticity of demand varies from point to point along the demand curve AB.

It is equal to unity at the midpoint M. It is greater than unity in the range AM and increases from unity to infinity as one moves along the demand curve from M to A. It is less than unity in the range MB and declines from unity to zero as one moves along the demand curve from M to B. In case the change in price and the resultant change in quantity demanded are not infinitesimally small, the point method does not lead to a reliable measure of elasticity. Then it is required to take average value over some range of the demand function. This is called the arc elasticity of demand.



The elasticity of demand over the arc AB of the demand curve DD is given by the formula.

$$e_p = \frac{\dfrac{\Delta Q}{(Q_1 + Q_2)/2}}{\dfrac{\Delta P}{(P_1 + P_2)/2}} = \frac{\Delta Q}{\Delta P} \times \frac{P_1 + P_2}{Q_1 + Q_2}$$

Where P_1 and Q_1 are original price and quantity, P_2 and Q_2 are the final price and quantity, ΔP is the absolute change in price and ΔQ is the absolute change in quantity.

e_p is always a pure number because it is a ratio of percentages. Since the demand curve is downward sloping, either ΔP or ΔQ will be negative. Thus, the calculated value for elasticity has a negative sign.

Notes

If $e_p > 1$, demand is said to be elastic, if $e_p = 1$, demand is unitary elastic and if $e_p < 1$, demand is inelastic. The numerical value of elasticity helps to know about responsiveness of demand to change in price.

Example: A person has constant income at $3000. The present price of a good is $10 and present quantity demanded is 125 units per month. The price falls to $9 and a large quantity of 150 units per month is likely to be demanded. What is the arc price elasticity over this range of the demand curve?

Solution

$$e_p = \frac{25}{-1} \times \frac{10+9}{125+150} = -1.73$$

It indicates that quantity expands by 1.73% for each 1% fall in price over the relevant range of the demand curve.

Task From the demand function Q = 600/P, show that the total expenditure remains unchanged as price falls. Estimate elasticity of demand along the demand curve at P = ₹ 4 and P = ₹ 6.

Caselet

Price Gouging takes you Home

Picture this. It is raining and you are caught inside a mall after a long shopping expedition. The auto drivers want twice the "normal" fare to take you home. Is life unfair? Or is pure economics at play?

You know that price is determined by demand and supply. If demand goes up with supply remaining same, prices ought to go up. And we know that the rain has increased the demand for autos — people who would have otherwise walked or travelled by public transport now want to hire an auto. The increased demand ought to increase the hire charges, considering the supply of autos remain the same.

This does not, however, consider fairness of the price. You may argue that several people who cannot afford to hire an auto for the twice the "normal" fare will be priced out of the market. That is, of course, partially true.

If the rates are way too high, very few will hire the auto. This denies the auto drivers a good chance to make more money. The sensitivity to price (or elasticity of demand) will ensure that there is no intense price gouging.

The question still remains: Should auto drivers charge higher prices during rainy days or such other market conditions? Suppose autos ply only on metered rate. You will agree that driving on rainy days is more difficult than driving on other days. The risk for the auto driver is higher but his return (metered fare), the same. There is, hence, no incentive for auto drivers to work on rainy days. This would drive several autos out of the market. It means you can hire an auto at "normal" fare… if you are lucky enough to get one!

So, consider price gouging (or call it free market pricing if you will) as a means to keep the autos' supply high… enough to get you home, if you agree on the price. This does not, of course, justify unfair prices on regular days as well!

Source: www.thehindubusinessline.com

Notes

4.3 Income Elasticity of Demand

The income elasticity of demand (e_i) is similar to the concept of price elasticity of demand. Just as price determines price elasticity, so does income, another determinant of demand, determine income elasticity.

The income elasticity of demand is a numerical measure of the degree to which quantity demanded responds to a change in income, other determinants of demand being kept constant.

Example: Let there be two goods, clothing and salt. Let the consumers income increase by 5%. Then the percentage change (increase) in quantity demanded would be different for clothing and different for salt (the percentage increase in quantity demanded for clothing is likely to be much higher than that for salt). Thus, clothing and salt are said to have a different income elasticity of demand. Thus, for the same percentage increase in income (i.e., 5%) the percentage increase in the quantity demanded for different goods is different. Income elasticity of demand provides us with a numerical measure of this difference.

Thus, income elasticity of demand allows us to compare the sensitivity of the demand for various goods for the same change in income. From the definition,

$$e_i = \frac{\text{\% change in quantity demanded}}{\text{\% change in income}}$$

The income elasticity of a commodity may be positive (the usual or likely case) or negative, depending on whether the good is normal or inferior.

A ***normal good*** is one where a percentage increase in income causes a percentage increase in quantity demanded and vice-versa (assuming that all other factors are held constant). Thus, for normal goods (e.g., clothing, cold drinks) income and quantity demanded vary in direct proportion (assuming that all other factors are held constant) due to which the income elasticity of demand is positive.

An ***inferior good*** is one where a percentage increase in income, causes a percentage decrease in quantity demanded and vice-versa (assuming that all other factors are held constant). Thus, for inferior goods (e.g., cheap wine, artificial jewellery, imitation shoes, etc.) income and quantity demanded vary in an inverse proportion (assuming that all other factors are held constant) due to which the income elasticity of demand is negative.

When $e_i = 1$, the good is said to have unitary income elasticity; when $e_i > 1$, the good is said to be income elastic, and so on. Remember when e_i is negative, the good is an inferior good.

4.4 Cross Elasticity of Demand

The cross elasticity of demand (e_c) is a numerical measure of the degree to which quantity demanded of a good responds to changes in the prices of other commodities, the other determinants of demand being kept constant.

Example: Let there be two goods X and Y. If the price of Y changes (increases or decreases), this may have an effect on the quantity demanded of good X. The concept of cross elasticity provides a numerical measure of the percentage change in quantity demanded due to a change in price of other commodities. It measure the degree to which quantity demanded is a function of the price of all other commodities. From the definition,

$$e_c = \frac{\text{\% change in quantity demanded of good X}}{\text{\% change in price of good Y}}$$

Notes

If X and Y (say butter and bread) are complements, e_c will be negative. If the price of bread rose (assuming that all other factors are held constant), there would be a decrease in the quantity demanded of bread and a decrease in the quantity demanded of butter. Thus, for complements, a change in price of one good causes the quantity demanded of the complements to move in the opposite direction (assuming that all other factors are held constant).

If there is a percentage increase in the price of bread, the denominator in the formula would be positive. Similarly, if there is a percentage decrease in the quantity of butter, the numerator in the formula would be negative. Hence, e_c is negative for complements.

If X and Y (say tea and coffee) are substitutes, e_c will be positive. If the price of coffee rose (assuming that all other factors are held constant), there would be a decrease in the quantity demanded of coffee and an increase in the quantity demanded of tea as consumers would readily "substitute" tea for coffee. Thus, for substitutes the price change of one good (assuming that all other factors are held constant) causes the quantity demanded of the substitute to move in the same direction. If there is a percentage increase in the price of coffee, the denominator in the formula would be positive. Similarly, if there is a percentage increase in the quantity demanded of tea, the numerator in the formula would be positive. Hence, e_c is positive for substitutes.

The higher the numerical magnitude of cross elasticity, the greater is the degree of complementarity/ substitution between the two goods. Thus, theoretically the value of cross elasticity ranges from minus infinity (– ∞) for perfect complements to plus infinity (+∞) for perfect substitutes.

$$e_c = \frac{dQ_x}{Q_x} \div \frac{dP_x}{P_x}$$
$$= \frac{dQ_x}{dP_x} \times \frac{P_x}{Q_x}$$

Case Study

Student's Dilemma

A small state university is faced with a critical financial problem. At present tuition rates, the university is loosing ₹ 5 crores per year. The head of the university urges that there should be a 25% increase in tuition fee. Based on the total students enrolled, he projects that this increase would cover the ₹ 5 crores deficit in revenues. Student leaders protest but it falls on deaf ears. Students realise that their only hope is to demonstrate that the tuition hike is not in the best interest of the university. What can they do?

Students find a journal article that discusses the price elasticity of demand for college education. The author estimates that the elasticity of enrollment at state universities is –1.3 with respect to tuition charges. That is, a 1% increase in tuition would decrease enrollments by 1.3%. The data are current. Based on the elasticity estimate, the students calculate that the proposed tuition hike of 25% would decrease enrollment by 32.5%. This would result in a decrease in total revenue even after tuition increase.

The university is given this information and it is forced to withdraw its proposed hike and find alternative ways to meet the deficit.

Question

Evaluate the ultimate decision of the university to withdraw the proposed hike.

Source: Atmanand, Managerial Economics, 2nd Edition, Excel Books.

Notes

4.5 Summary

- Elasticity of demand tells the degree of responsiveness of consumer to a price change. It is measured as:

$$e_p = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

- The arc elasticity is a measure of average elasticity, that is, the elasticity at the midpoint of the chord that connects the two points (A and B) on the demand curve defined by the initial and new price levels.
- The income elasticity of demand is a numerical measure of the degree to which quantity demanded responds to a change in income, other determinants of demand being kept constant.
- The cross elasticity of demand is a numerical measure of the degree to which quantity demanded of a good responds to changes in the prices of other commodities, the other determinants of demand being kept constant.
- An understanding of elasticity is fundamental in understanding the response of supply and demand in a market.

4.6 Keywords

Arc elasticity: It computed if the data is discrete and therefore incremental change is measurable.

Cross elasticity: Degree to which demand for one product is affected by the price of another product.

Demand elasticity: Elasticity used to show the responsiveness of the quantity demanded of a good or service to a change in its price.

Elasticity: It measures the degree of responsiveness of demand/supply to change in price.

Point elasticity: It computed if demand function is continuous and therefore only marginal changes are calculable.

4.7 Self Assessment

Fill in the blanks:

1. Elasticity of demand measures responsiveness of demand of a commodity to ……., ……and……..
2. Such horizontal demand curves, where quantity demanded is infinitely responsive to price changes, are called ..... .
3. Demand curves which have an elasticity coefficient as 1 are called ..... .
4. All such demand curves where quantity demanded is totally unresponsive to changes in price are called ..... .
5. The demand is ..... in the long run.

State whether the following statements are true or false:

6. If we go by the Law of Demand, the price elasticity for most goods would be negative.
7. The price elasticity of a straight line demand curve varies from zero to infinity.

Notes

8. When the income elasticity is equal to 1, the good is said to be income inelastic.
9. When the income elasticity is negative, the good is an inferior good.
10. For complementary goods, the cross elasticity will always be positive.

4.8 Review Questions

1. Discuss the factors that determine elasticity of demand.
2. Explain price elasticity of demand with help of examples.
3. Assume that our current consumption of paperback books is 1000 per year at the average price of ₹ 1.50 per book. The estimated coefficient of price elasticity is 0.75. The price increase is 50 paise per book. Calculate the change in the quantity of books demanded, other things being equal.
4. The market demand function of a commodity is represented by $Q_A = 20 - 2P_A - 0.5\,P_B + 0.01\,Y$, where Q_A is the quantity demanded of A, P_A is the price of A, P_B is the price of B, and Y is the consumer's income. Calculate price and cross elasticities of demand for A when $P_A = 5$, $P_B = 10$ and $Y = 1000$.
5. When the price of good X falls from ₹ 10 to ₹ 9, the demand for good Y increase from 20 Kg. to 25 Kg.
   (a) What is the cross elasticity of demand of good Y for good X?
   (b) Are goods X and Y compliments or substitutes?
6. You are given market data that says when the price of pizza is ₹ 60, the quantity demanded of pizza is 80 slices and the quantity demanded of cheese bread is 120 pieces. When the price of pizza is ₹ 30, the quantity demanded of pizza is 100 slices and the quantity demanded of cheese bread is 100 pieces.
   (a) Can the price elasticity of demand be calculated for either good?
   (b) If so, calculate the price elasticity of demand for each product.
7. Consider the markets for screw-gauge and vernier caliper. You study survey data and observe that if a screw-gauge costs ₹ 50,100 screw-gauges are demanded. You also observe that if a screw-gauge cost ₹ 30,150 vernier calipers are demanded and if a screw-gauge cost ₹ 40 then 100 vernier calipers are demanded. If a vernier caliper costs ₹ 20,125 vernier calipers are demanded.
   (a) Can the price elasticity of demand be calculated for either good?
   (b) If so, calculate the price elasticity of demand for each good.
8. As a business manager, how do you find the demand elasticity to be useful? Also, can you forecast you revenues in case you know the demand elasticity?
9. Examine the concept of price elasticity of demand. Which of the two methods of measuring it is preferred by you and why?
10. When an individual's income was ₹ 2000, the demand for rice was 10kg. An increase of ₹ 500 in the individual's income leads to a fall in the demand of rice by 2kg. Assuming that the price of rice remained constant, what is the income elasticity of demand for rice?
11. Think and state one situation where a business manager will use promotional elasticity to make business decisions.
12. Discuss cross elasticity of demand, prove its utility for business managers.

Notes

13. What will be the impact of price elasticity of the demand on the following product ranges available in the Indian market: (a) edible oil (b) computer hardware.

Answers: Self Assessment

1. price, income of consumers and price of other goods
2. perfectly elastic
3. unit elastic
4. perfectly elastic
5. more elastic
6. True
7. True
8. False
9. True
10. False

4.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books, Delhi.

Dominick Salvatore, *Managerial Economics,* Thomson

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford

Online links

http://economics.about.com/cs/micfrohelp/a/priceelasticity.htm

www.quickmba.com/econ/micro/elas/ped.shtml

ingrimayne.com/econ/elasticity/Elastic1.html

Unit 5: Consumer Behaviour: Cardinal Approach

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Objectives

After studying this unit, you will be able to:

- Discuss the utility analysis
- Describe types of utility
- State the laws of utility
- Explain consumer's equilibrium using cardinal approach

Introduction

Human wants are unlimited and they are of different intensity. The means at the disposal of a man are not only scarce but they have alternative uses. As a result of scarcity of recourses, the consumer cannot satisfy all his wants. He has to choose as to which want is to be satisfied first and which afterward if the recourses permit. The consumer is confronted in making a choice. For example, a man is thirsty. He goes to the market and satisfies his thirst by purchasing coca-cola instead of tea. We are here to examine the economic forces which make him purchase a particular commodity. The answer is simple. The consumer buys a commodity because it gives him satisfaction. In technical term, a consumer purchases a commodity because it has utility for him.

When utility is treated as something that can be measured and its quantity represented in numbers, it is called cardinal utility.

5.1 Utility Analysis

Utility is an economic term referring to the total satisfaction received from consuming a good or service.

Example: Satisfaction you get by consuming a cup of tea is the utility of that cup of tea.

Notes

If this measure is given, one may think of increasing or decreasing utility, and thereby explain economic behavior in terms of attempts to increase one's utility. Changes in utility are sometimes expressed in fictional units called utils.

The concept of utility can be looked upon from two angles: the commodity angle and the consumers' angle. At first sight, utility is the want-satisfying property of a commodity. And at the other, utility is the psychological feeling of satisfaction; pleasure, happiness or well-being which a consumer derives from the consumption, possession or the use of a commodity. The concept of a want-satisfying property of a commodity is 'absolute' in the sense that this property is inbuilt in the commodity irrespective of whether one needs it or not.

Example: A pen has its own utility of writing irrespective of whether a person is literate or illiterate.

Another important feature of the 'absolute' concept of utility is that it is 'ethically neutral' because a commodity may satisfy socially immoral needs, for example alcohol. Contrary to the consumer's point of view, utility is supposed as a post-consumption phenomenon as one derives satisfaction from a commodity only when one consumes or uses it.

Utility in terms of satisfaction is a subjective or relative concept because (i) a commodity need not be useful for all. For instance, cigarettes do not have any utility for non-smokers and meat has no utility for pure vegetarians; (ii) utility of a commodity varies from person to person and from time to time; and (iii) a commodity need not have the same utility for the same consumer at different points of times, at different levels of consumption and at different moods of a consumer. In consumer analysis, only the 'subjective' concept of utility is used.

5.2 Types of Utility

Let's learn about different kinds of utility:

Total Utility (TU)

The total satisfaction derived from the use of all the units of goods and services in a given period of time is called total utility. In other words, the total of marginal utility is called total utility. It can be expressed as:

$$TU = f(x)$$

where, TU = Total utility

f = Function

x = Consumed units of commodity (number of goods)

Average Utility (AU)

Average utility is a utility which is derived from per unit of commodity. In the other words, the utility which is derived by dividing the total utility by the total units of goods and services consumed is the average utility. It can be expressed as:

$$AU = \frac{TU}{x}$$

where, AU = Average utility

TU = Total utility

x = Consumed goods and services.

Notes

Marginal Utility (MU)

A change in the total utility while consuming one more unit in a given period of time is called marginal utility. In the other words, additional made in total utility due to the consumption of one more unit of commodity is known as marginal utility. An additional utility derived from an additional unit of commodity in a given period of time is marginal utility. It can be expressed as:

$$MU = \frac{\text{Change in total utility}}{\text{Change in commodity}}$$

Cardinal and Ordinal Utility

There are mainly two kinds of measurement of utility implemented by economists: cardinal utility and ordinal utility.

Utility was originally viewed as a measurable quantity, so that it would be possible to measure the utility of each individual in the society with respect to each good available in the society, and to add these together to yield the total utility of all people with respect to all goods in the society. Society could then aim to maximise the total utility of all people in society, or equivalently the average utility per person. This conception of utility as a measurable quantity that could be aggregated (summed up) across individuals is called cardinal utility.

Cardinal utility quantitatively measures the preference of an individual towards a certain commodity. Numbers assigned to different goods or services can be compared.

Example: For a coffee addict, a utility of 100 utils towards a cup of cappuccino is twice as desirable as a cup of tea with a utility level of 50 utils.

The concept of cardinal utility suffers from the absence of an objective measure of utility.

Example: The utility gained from consumption of a particular good by 'A' will be different than 'B'.

Ordinal utility represents the utility, or satisfaction derived from the consumption of goods and services, based on a relative ranking of the goods and services consumed. With ordinal utility, goods are only ranked only in terms of more or less preferred, there is no attempt to determine how much more one good is preferred to another.

Example: You may prefer to consume or buy more apples than bananas while your friend may prefer to consume or buy more bananas than apple.

Ordinal utility is the underlying assumption used in the analysis of indifference curves.

5.3 Laws of Utility

There are two major laws of utility, as discussed below:

Law of Diminishing Marginal Utility

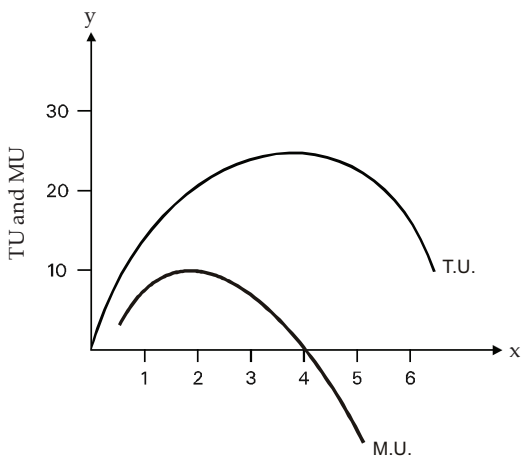
Marginal utility refers to the change in satisfaction which results when a little more or little less of that good is consumed.

Notes

Example: When a thirsty person takes five bottles of cold drink continuously, the consumption of first bottle gives him a high utility. The consumption of the second bottle gives him lesser utility than first but his total utility increases. Third bottle gives him still less utility but increases total utility. The utility from fourth bottle may be zero as he is no more thirsty. But the fifth bottle may cause uneasiness and thus give negative utility, i.e., the total utility may now actually go down.

Let's understand this law with the help of an example given in Table below

Bottle consumed	Total Utility (Units)	Marginal Utility (Units)
0	0	–
1	14	14
2	23	9
3	27	4
4	27	0
5	24	–3
6	18	–6



According to the law of diminishing marginal utility when a person consumes more and more units of a good his total utility increases while the extra utility derived from consuming successive units of the good diminishes. The total utility reaches a maximum value when marginal utility approaches zero and then total utility starts declining. This is shown in above figure.

Law of Equi-marginal Utility

The Law of Equi-marginal Utility is an extension to the law of diminishing marginal utility. The principle of equi-marginal utility explains the behavior of a consumer in distributing his limited income among various goods and services. This law states that how a consumer allocates his money income between various goods so as to obtain maximum satisfaction.

Assumptions

The principle of equi-marginal utility is based on the following assumptions:

1. The wants of a consumer remain unchanged.
2. He has a fixed income.

Notes

3. The prices of all goods are given and known to a consumer.
4. He is one of the many buyers in the sense that he is powerless to alter the market price.
5. He can spend his income in small amounts.
6. He acts rationally in the sense that he want maximum satisfaction.
7. Utility is measured cardinally. This means that utility, or use of a good, can be expressed in terms of "units" or "utils". This utility is not only comparable but also quantifiable.

Principle

Suppose there are two goods 'x' and 'y' on which the consumer has to spend his given income. The consumer's behavior is based on two factors:

1. Marginal Utilities of goods 'x' and 'y'
2. The prices of goods 'x' and 'y'

The consumer is in equilibrium position when marginal utility of money expenditure on each good is the same.

Mathematically, the law can be explained by the help of the following formula:

MU of good A/Price of A = MU of good B/Price of B

In any case when the Marginal Utilities of the goods A and B are unequal, the consumer will purchase a combination that will give him highest Marginal Utility per dollar value of each good, in such a way that the entire budget amount is spent.

Task Do you think that there are exceptions to the law of diminishing marginal utility? Validate your opinion with the help of examples.

5.4 Consumer Equilibrium using Cardinal Approach

Law of Equi-marginal Utility or the principle of Equi-marginal utility says that the consumer would maximise his utility if he allocates his expenditure on various goods he consumes such that the utility of the last rupee spent on each good is equal.

Suppose your utility function is U = u (X). You buy good X. Your total expenditure is X. P_x. (where P_x is the price of X)

Presumably, you would want to maximise the difference between your utility and expenditure

$$L = u(X) - X.P_x$$

By way of first order condition [condition for the value of a variable to be stationary (not moving) at zero.]

$$\frac{dL}{dx} = \left[\frac{du}{dx} - P_x\right] = 0$$

Where, $dL/dx = d(U(X) - X.P_x)/dX$

And the term $\frac{du}{dx}$ stands for marginal utility of X (MU_x)

Notes

Thus at equilibrium,

$$MU_x = P_x \text{ and} \quad \text{...(i)}$$
$$MU_y = P_y \text{ and} \quad \text{...(ii)}$$

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

Then by cross-multiplying, we get

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

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

And note by definition

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = MU_m, \text{ which is constant} \quad \text{...(vi)}$$

Where,

MU_m = Marginal Utility of money

MU_x, MU_y = Marginal Utility of X and Y

P_x, P_y = Unit price of X and Unit Price of Y respectively.

The proportionality rule stated above (v) is the tenet of the Law of Consumer Equilibrium. The assumption of diminishing marginal utility proportionality rule when considered along with equi-marginal concept implies that a single price prevails for a commodity in the market. This is true of a perfectly competitive market.

Caselet

Should Canada Legalise Marijuana?

The war on drugs is an expensive battle, as a great deal of resources go into catching those who buy or sell illegal drugs on the black market, prosecuting them in court, and housing them in jail. These costs seem particularly exorbitant when dealing with the drug marijuana, as it is widely used, and is likely no more harmful than currently legal drugs such as tobacco and alcohol. There's another cost to the war on drugs, however, which is the revenue lost by governments who cannot collect taxes on illegal drugs. In a recent study for the Fraser Institute, Canada, Economist Stephen T. Easton attempted to calculate how much tax revenue the government of the country could gain by legalising marijuana.

The study estimates that the average price of 0.5 grams (a unit) of marijuana sold for $8.60 on the street, while its cost of production was only $1.70. In a free market, a $6.90 profit for a unit of marijuana would not last for long. Entrepreneurs noticing the great profits to be made in the marijuana market would start their own grow operations, increasing the supply of marijuana on the street, which would cause the street price of the drug to fall to a level much closer to the cost of production. Of course, this doesn't happen because the product is illegal; the prospect of jail time deters many entrepreneurs and the occasional drug bust ensures that the supply stays relatively low. We can consider much of this $6.90 per unit of marijuana profit a risk-premium for participating in the underground economy. Unfortunately, this risk premium is making a lot of criminals, many of whom have ties to organized crime, very wealthy.

Contd...

Notes

Stephen T. Easton argues that if marijuana was legalized, we could transfer these excess profits caused by the risk-premium from these grow operations to the government:

If we substitute a tax on marijuana cigarettes equal to the difference between the local production cost and the street price people currently pay – that is, transfer the revenue from the current producers and marketers (many of whom work with organized crime) to the government, leaving all other marketing and transportation issues aside we would have revenue of (say) $7 per [unit]. If you could collect on every cigarette and ignore the transportation, marketing, and advertising costs, this comes to over $2 billions on Canadian sales and substantially more from an export tax, and you forego the costs of enforcement and deploy your policing assets elsewhere.

One interesting thing to note from such a scheme is that the street price of marijuana stays exactly the same, so the quantity demanded should remain the same as the price is unchanged. However, it's quite likely that the demand for marijuana would change from legalization. We saw that there was a risk in selling marijuana, but since drug laws often target both the buyer and the seller, there is also a risk (albeit smaller) to the consumer interested in buying marijuana. Legalization would eliminate this risk, causing the demand to rise. This is a mixed bag from a public policy standpoint: Increased marijuana use can have ill effects on the health of the population but the increased sales bring in more revenue for the government. However, if legalized, governments can control how much marijuana is consumed by increasing or decreasing the taxes on the product. There is a limit to this, however, as setting taxes too high will cause marijuana growers to sell on the black market to avoid excessive taxation.

When considering legalizing marijuana, there are many economic, health, and social issues we must analyze. One economic study will not be the basis of Canada's public policy decisions, but Easton's research does conclusively show that there are economic benefits in the legalization of marijuana. With governments scrambling to find new sources of revenue to pay for important social objectives such as health care and education expect to see the idea raised in Parliament sooner rather than later.

5.5 Summary

- Utility is an abstract concept rather than a concrete, observable quantity. The units to which we assign an "amount" of utility, therefore, are arbitrary, representing a relative value.
- Total utility is the aggregate sum of satisfaction or benefit that an individual gains from consuming a given amount of goods or services in an economy.
- The amount of a person's total utility corresponds to the person's level of consumption. Usually, the more the person consumes, the larger his or her total utility will be.
- Marginal utility means the utility derived by consuming every next unit of same thing.
- According to the law of diminishing marginal utility when a person consumes more and more units of a good his total utility increases while the extra utility derived from consuming successive units of the good diminishes.
- Law of Equi-marginal Utility or the principle of Equi-marginal utility says that the consumer would maximise his utility if he allocates his expenditure on various goods he consumes such that the utility of the last rupee spent on each good is equal.

Notes

5.6 Keywords

Average utility: utility derived from per unit of the commodity

Cardinal measure of utility: Utility is a measurable and quantifiable.

Marginal utility: Utility derived from every next unit.

Total utility: The aggregate level of satisfaction or fulfillment that a consumer receives through the consumption of a specific good or service

Utility: An economic term referring to the total satisfaction received from consuming a good or service.

5.7 Self Assessment

State whether the following statements are true or false:

1. With more units of consumption total utility increases and marginal utility also increases.
2. The total utility reaches a maximum value when marginal utility approaches zero.
3. The law of demand can be derived from the law of diminishing marginal utility.
4. Almost all the goods in a market are related goods either by way of complementarity or substitutability.
5. The traditional marginal utility analysis ignored the income – effect assumption of constant marginal utility of money spent.

Fill in the blanks:

6. The total utility reaches a maximum value, when marginal utility approaches.....
7. The goal of consumption is to maximize ..... .
8. The law of diminishing marginal utility assumes constant marginal utility of .....
9. Utility is measured in fictional units called…….
10. A blanket is made to protect people from cold. This is ……..related utility.

5.8 Review Questions

1. Examine how the concept of Diminishing Marginal Utility can help to explain the downward slope of the demand graph.
2. Suppose Charlie Parker CDs cost $10 apiece and Lester Young CDs cost $5 apiece. You have $40 to spend on CDs. The marginal utility that you derive from additional CDs is as follows:

   # of CDS ---------- Charlie Parker --------- Lester Young

   Have 0 buy number 1 ---------- 60 ---------- 30

   Have 1 buy number 2 ---------- 40 ---------- 28

   Have 2 buy number 3 ---------- 30 ---------- 24

   Have 3 buy number 4 ---------- 20 --------- 20

   Have 4 buy number 5 ---------- 10 --------- 10

Notes

How many of each CD would you buy? Suppose the price of a Lester Young CD rises to $10. How many of each CD would you buy? Use this to show how the principle of rational choice leads to the law of demand.

3. Discuss the law of diminishing marginal utility with the help of an illustrate schedule and a corresponding graph.
4. Which of the following examples best shows the Law of Diminishing Marginal Utility and why?
   (a) Raina is happier after buying her fifth pair of shoes than she was after only four pairs.
   (b) A reasonably fat Motumal gets sick after eating too many Burgers.
   (c) Ramnaresh loves cheeseburgers but finds that the third burger did less to increase his happiness than the second burger did.
5. Give at least five examples to show how the law of diminishing marginal utility relates to everyday life?
6. Discuss with example the law of marginal utility.
7. Assign a measure of utility to the study you are putting into your various courses. Do your study habits follow the principle of rational choice?
8. Why do you think that the law of Equi-marginal utility holds under perfectly competitive market.
9. Compare and contrast cardinal and ordinal utility.
10. Explain how consumer's equilibrium is reached using cardinal approach.

Answers: Self Assessment

1.	False	2.	True
3.	True	4.	True
5.	True	6.	zero
7.	total utility	8.	money
9.	Utils	10.	Commodity

5.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Robert S. Pindyck, *Microeconomics,* Pearson Education

Sampat Mukherjee, *Microeconomics,* Prentice Hall

Notes

Online links

http://tutor2u.net/economics/revision-notes/as-markets-consumer-surplus.html

http://www.flatworldknowledge.com/node/28303#web-28303

http://www.oup.com/uk/orc/bin/9780199296378/01student/advanced/02indifference/

http://www.vazecollege.net/Micro_Economics_Part_II.pdf

Unit 6: Consumer Behaviour: Ordinal Approach

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Objectives

After studying this unit, you will be able to:

- Describe the concept of indifference curve
- Realise the concept of marginal rate of substitution
- Discuss the concept of consumer's equilibrium
- Explain the concept of consumer's surplus

Introduction

The modern economists have discarded the concept of cardinal utility and have instead employed the concept of ordinal utility for analysing consumer behaviour. The concept of ordinal utility is based on the fact that it may not be possible for consumers to express the utility of a commodity in absolute terms but it is always possible for a consumer to tell introspectively whether a commodity is more or less or equally useful as compared to another. For instance, a consumer may not be able to tell that an ice cream gives 5 utils and a chocolate gives 2 utils. But he or she can always tell whether chocolate gives more or less utility than ice cream. This assumption forms the basis of the ordinal theory of consumer behaviour. The consumer behaviour, in economics, can be studied with the help of indifference curves.

6.1 Indifference Curve Analysis

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

Notes

comes to making a choice between them. Such a situation arises because he/she consumes a large number of goods and services and often finds that one commodity can be substituted for another. This gives him/her an opportunity to substitute one commodity for another, if need arises and to make various combinations of two substitutable goods which give him/her the same level of satisfaction. If a consumer faced with such combinations, he/she would be indifferent between the combinations.

Example: If a consumer is asked whether he prefers combination 1 of two goods X and Y (assuming that the market price of X and Y are fixed) or combination 2, he may give one of the following answers:

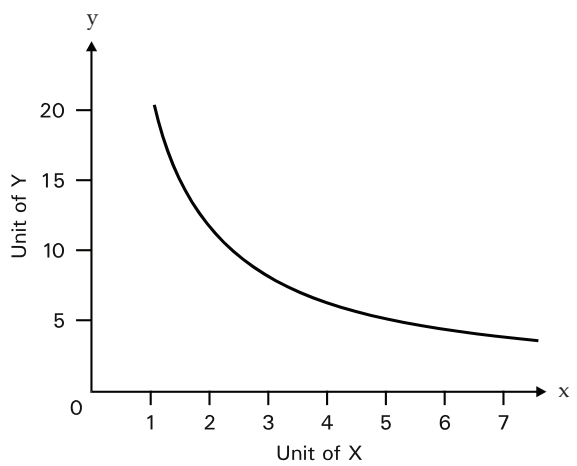
1. he prefers combination 1 to 2
2. he prefers combination 2 to 1
3. he is indifferent about combinations 1 and 2.

The third answer implies that the consumer prefers 1 as much as 2. There may be some more combinations of goods X and Y which are equally preferable to him. Suppose, there are five different combinations of X and Y, that gives him the same level of satisfaction.

Indifference Combination of X and Y Goods

Combination	Units of X	Units of Y
1	3	21
2	4	15
3	5	11
4	6	8
5	7	6

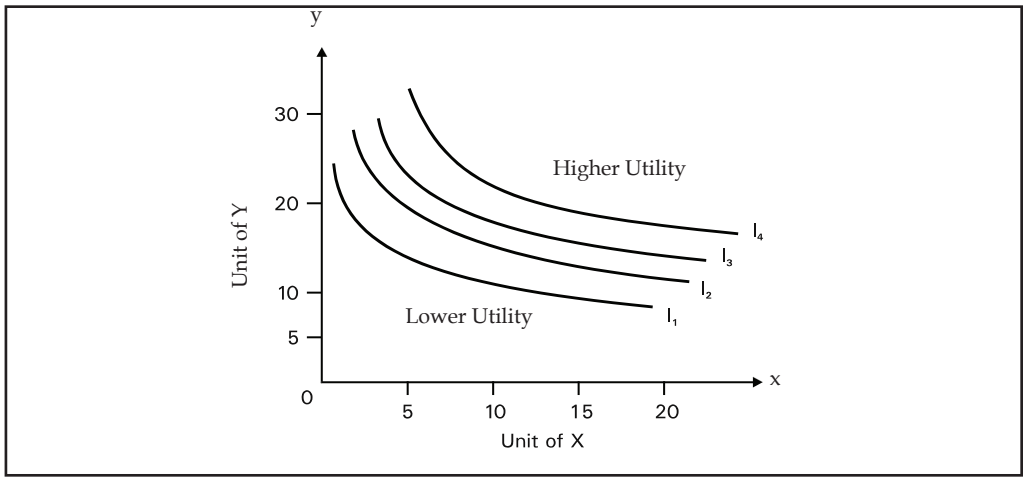
Figure shows the indifference curve drawn on the basis of the figure given in above table. It depicts, in general, all combinations of two goods which yield the same level of satisfaction to the consumer. The consumer is indifferent about any two points lying on this curve.



Indifference Curve

An indifference curve of a consumer represents a particular level of satisfaction for the consumer. A consumer may, infact, identify a large number of such curves each representing a different level of satisfaction. An indifference map gives a complete description of a consumer's tastes and preferences as shown in figure below to shows the different satisfaction levels.

Notes



6.1.1 Assumptions

The following assumptions about the consumer psychology are implicit in indifference curve analysis:

1. ***Transitivity:*** If a consumer is indifferent to two combinations of two goods, then he is unaware of the third combination also.
2. ***Diminishing marginal rate of substitution:*** The rarer the availability of a good, the greater is its substitution value. For example, water has a high substitution value as it is a scarce resource.
3. ***Rationality:*** The consumer aims to maximise his total satisfaction and has got complete market information.
4. ***Ordinal utility:*** Utility in this approach is not measurable. A consumer can only specify his preference for a particular combination of two goods, he cannot specify how much.

6.1.2 Properties of Indifference Curve

Indifference curves have the four basic characteristics:

1. Indifference curves have a negative slope
2. Indifference curves are convex to the origin
3. Indifference curves do not intersect nor are they tangent to one another
4. Upper indifference curves indicate a higher level of satisfaction.

These characteristics or properties of indifference curves, in fact, reveal the consumer's behaviour, his choices and preferences. They are, therefore, very important in the modern theory of consumer behaviour. Now, we will observe their implications.

Indifference Curves have a Negative Slope

In the words of Hicks, "so long as each commodity has a positive marginal utility, the indifference curve must slope downward to the right".

Notes

The negative slope of indifference curve implies:

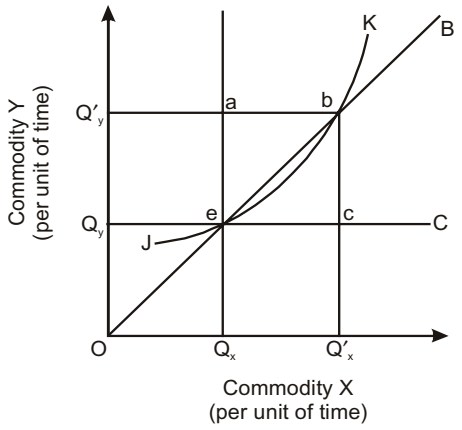
1. that the two commodities can be substituted for each other
2. that if the quantity of one commodity decreases, quantity of the other commodity must increase so that the consumer stays at the same level of satisfaction.

Example: Suppose you consume 10 apples and 20 bananas in a day, which gives you a particular level of satisfaction. Now, if you consume 2 apples less, without increasing the number of bananas, you will be at a lower level of satisfaction. You must consume 1 banana more, to remain at the same satisfaction level. If you don't do so, the bundle of goods (apples and bananas together) gets smaller and you will not get as much satisfaction.

The consumer's satisfaction cannot remain the same if indifference curves have a positive slope ($\Delta Y/\Delta X>0$) or if slope is equal to infinity ($\Delta Y/\Delta X>\infty$).

(***Note:*** $\Delta Y/\Delta X$ gives the slope of the indifference curves)

These situations are shown in figure through inconsistent indifference curves.



Inconsistent Indifference Curves

Let us suppose that the consumer is initially at point e where he/she is deriving some utility from OQ_x of X and OQ_y of Y. If an indifference curve has a positive slope (i.e., $\Delta Y/\Delta X>0$); as shown by the line OB and curve JK, it implies that the consumer is equally satisfied with larger and smaller baskets of X and Y. This means an irrational behaviour of the consumer.

For instance, if the consumer moves from point e to b, the combination of the two goods increases by ea (= bc) of Y and ec (= ab) of X. Unless MU of ea and ec are equal to zero, the level of satisfaction is bound to increase whereas on an indifference curve, the total utility is supposed to remain the same. Therefore, line OB and curve JK cannot be indifference curves.

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

Notes

Indifference Curves are Convex to Origin

Indifference curves are not only negatively sloped but are also convex to the origin. The convexity of the indifference curves implies two properties:

1. The two commodities are imperfect substitutes for one another
2. The Marginal Rate of Substitution (MRS) between the two goods decreases as a consumer moves along an indifference curve. This characteristic of indifference curves is based on the assumption of diminishing marginal rate of substitution.

The assumption of diminishing MRS, as mentioned above, states an observed fact that if a consumer substitutes one commodity (X) for another (Y), his willingness to sacrifice more units of Y for one additional unit of X decreases, as quantity of Y decreases. There are two reasons for this:

1. Two commodities are not perfect substitutes for one another.
2. MU of a commodity increases as its quantity decreases and vice versa.

Therefore, more and more units of the other commodity are needed to keep the total utility constant.

Indifference Curves can neither Intersect nor be Tangent to one Another

If two indifference curves intersect or are tangent with one another, it will reflect two rather impossible conclusions:

1. that two equal combinations of two goods yield two different levels of satisfaction.
2. that two different combinations – one being larger than the other – yield the same level of satisfaction.

Such conditions are impossible if the consumer's subjective valuation of a commodity is greater than zero. Besides, if two indifference curves intersect, it would mean negation of consistency or transitivity assumption in consumer's preferences.

Let us now see what happens when two indifference curves, IC and IC′, intersect each other at point A (Figure 6.1).

Point A falls on both the indifference curves, IC and IC′. It means that the same basket of goods (OM of X + AM of Y) yields different levels of utility below and above point A on the same indifference curve.

The inconsistency that two different baskets of X and Y yield the same level of utility can be proved as follows.

Consider two other points: point B on indifference curve IC′ and point C on indifference curve IC both being on a vertical line.

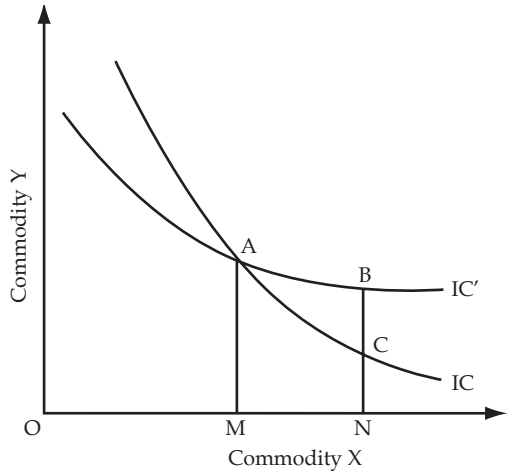
Points A, B and C represent three different combinations of commodities X and Y. Let us call these combinations as A, B and C, respectively. Note that combination A is common to both the indifference curves.

The intersection of the two indifference curves implies that in terms of utility, A=B; and A=C; therefore A=C. But if B = C it would mean that in terms of utility,

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

Notes

Figure 6.1: Intersecting Indifference Curves



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

BN of Y = CN of Y

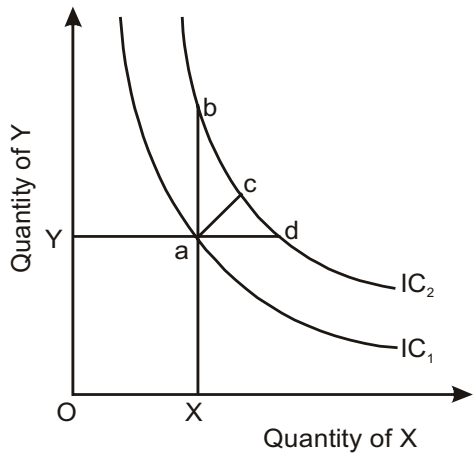
But Figure 6.1 shows BN > CN. Therefore, combinations Band C cannot be equal in terms of satisfaction. The intersection, therefore, violates the transitivity rule, which is a logical necessity in indifference curve analysis. The same reasoning is applicable when two indifference curves are tangent with each other.

Upper Indifference Curves represent a Higher Level of Satisfaction

An indifference curve placed above and to the right of another represents a higher level of satisfaction than the lower one. In Figure 6.2, indifference curve IC_2 is placed above the curve IC_1. It represents, therefore, a higher level of satisfaction.

The reason is that an upper indifference curve contains all along its length a larger quantity of one or both the goods than the lower indifference curve. And a larger quantity of a commodity is supposed to yield a greater satisfaction than the smaller quantity of it, provided MU>0. For instance, consider the indifference curves IC_1 and IC_2 in, Figure 6.2.

Figure 6.2: Comparison between Lower and Upper Indifference Curves



Notes

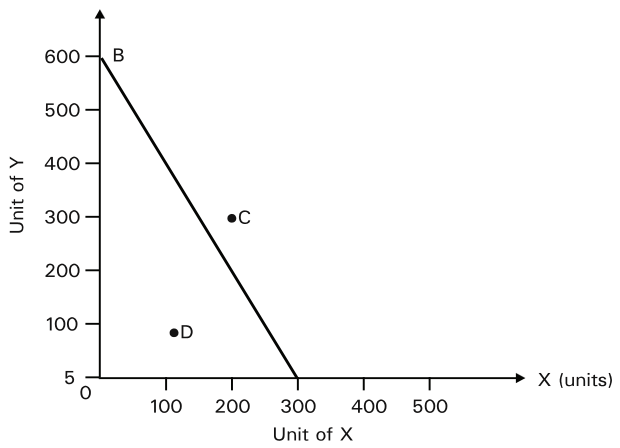
The vertical movement from point a on the lower indifference curve IC_1 to point b and Quantity of X on the upper indifference curve IC_2, means an increase in the quantity of Y by ab, the quantity of X remaining the same (OX). Similarly, a horizontal movement from point a to d means a greater quantity (ad) of commodity X, quantity of Y remaining the same (OY). The diagonal movement from a to c, means a larger quantity of both X and Y. Unless, the utility of additional quantities of X and Y are equal to zero, these additional quantities will yield additional utility.

Therefore, the level of satisfaction indicated by the upper indifference curve (IC_2) would always be greater than that indicated by the lower indifference curve (IC_1).

6.1.3 Budget Line

The budget line is also known as the price line, the consumption possibility line or the price opportunity line. It represents different combinations of two goods X and Y which the consumer can buy by spending all his income.

Example: A consumer having ₹ 1200 as income can buy 600 units of Y at ₹ 2 per unit or 300 units of X at ₹ 4 per unit as shown in figure below. The straight line joining the two points A and B is called the budget line.



Budget line

At any point on AB, the consumer spends all his income but point C is unattainable. At point D or any other point in DOAB he does not spend all his income.

Task

Task Assign a measure of utility you are putting into your various subjects. Do your study habits follow the principle of rational choice?

6.2 Marginal Rate of Substitution

MRS is the rate at which one commodity can be substituted for another, the level of satisfaction remaining the same.

Example: The indifference curve is I1 (as shown in figure below). A person would receive the same utility (satisfaction) from consuming 4 hours of work and 6 hours of leisure, as they would if they consumed 7 hours of work and 3 hours of leisure.

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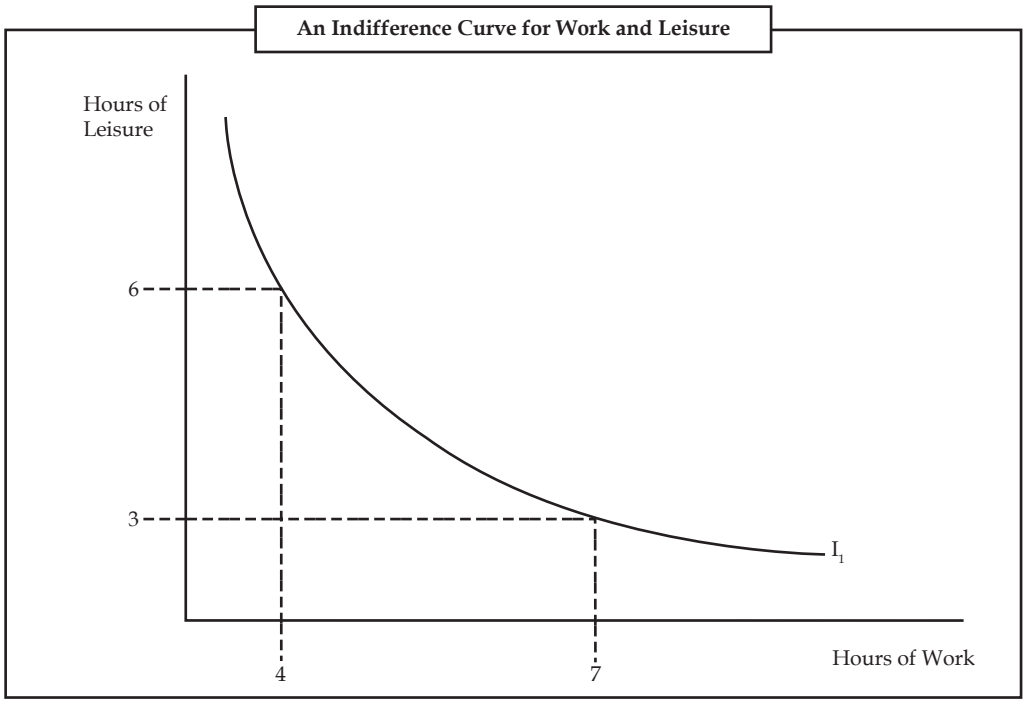


The marginal rate of substitution is the amount of one good (i.e. work) that has to be given up if the consumer is to obtain one extra unit of the other good (leisure).

The equation is below:

$$\text{Marginal rate of substitution (MRS)} = \frac{\text{Change in good X}}{\text{Change in good Y}}$$

Using figure, the marginal rate of substitution between point A and Point B is;

$$MRS = -3 / 3 = -1 = 1$$

Note, the rule is to ignore the sign.

The reason why the marginal rate of substitution diminishes is due to the principle of diminishing marginal utility. Where this principle states that the more units of a good are consumed, then additional units will provide less additional satisfaction than the previous units. Therefore, as a person consumes more of one good (i.e. work) then they will receive diminishing utility for that extra unit (satisfaction), hence, they will be willing to give up less of their leisure to obtain one more unit of work.

The relationship between marginal utility and the marginal rate of substitution is often summarised with the following equation:

$$MRS = Mu_x / Mu_y$$

6.3 Consumer Equilibrium using Ordinal Approach

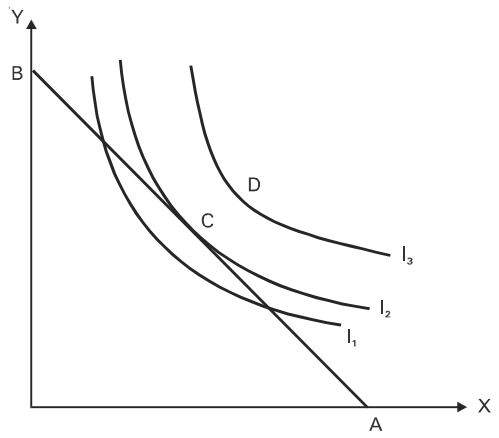
If we superimpose the indifference map and budget line as in Figure 6.3, we find that a consumer has to decide to purchase a particular combination (C) as it falls on his budget line, though a different combination (D) would be more desirable as it will give a higher level of satisfaction. At his point of equilibrium C, the price line is touching the indifference line tangentially meaning that the slopes are equal. The slope of indifference curve indicates the marginal rate of substitution

Notes

between X and Y, and the slope of budget line indicates the ratio of price of X to that of Y. Thus the principle of consumer's equilibrium works out; the marginal rate of substitution between X and Y must be proportional to the ratio of price of X to that of Y.

$$MRS_{xy} = \frac{P_x}{P_y}$$

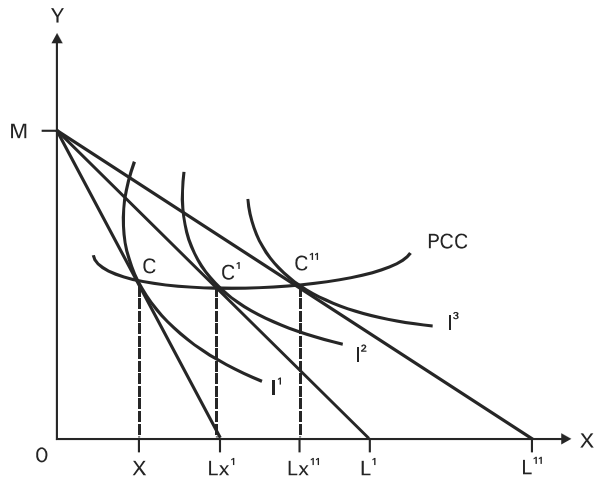
Figure 6.3



Changes in Price

According to the price consumption curve, if the price of X falls, the new budget or price line becomes M-L^1, as more of X can be brought out of the given budget and thus C^1 becomes the new equilibrium point. If the price of X falls again, the price of Y and budget remaining same, the new equilibrium point shifts to C^{11}. The line connecting such successive equilibrium points at C, C^1 and C^{11} is called PCC or price consumption curve.

Figure 6.4

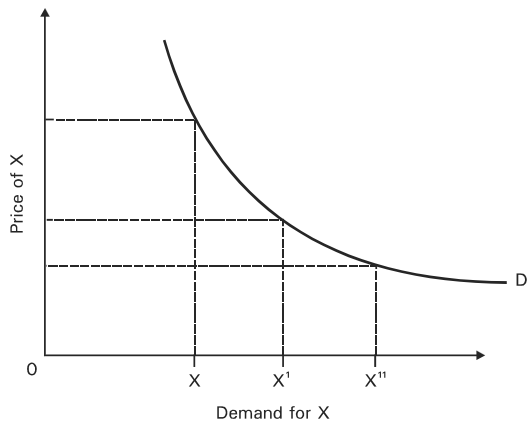


Notes

PCC and Demand Curve

The individual consumer demand curve for the commodity X can be derived from the price consumption curve. For example, when the price of X is given by the slope of ML, the amount of X demanded is OX^{11}; when the price of X is given by slope ML^1, OX^1 amount of X is purchased; and OX is purchased at a price of X denoted by the slope of ML^{11}. Thus the price consumption relations when taken out and plotted separately in Figure 6.5 gives the demand curve, D.

Figure 6.5



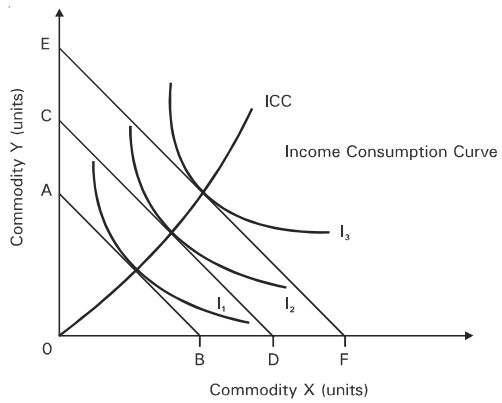
Income of the Consumer

When the price of the commodity X changes, the real income position of the consumer also changes and this has a considerable effect on the consumer's demand.

The traditional marginal utility analysis ignored this income-effect assumption of constant marginal utility of money spent. The indifference analysis considers this income effect, because it is an important determinant of demand.

Figure 6.6 shows three parallel budget lines corresponding to three different levels of the consumer's income which he spends on goods X and Y, the points E_1, E_2, and E_3 being the three equilibrium points. The curve joining such equilibrium points is known as the Income Consumption Curve (ICC). The slope of the budget line depends on the price ratio and hence remains constant.

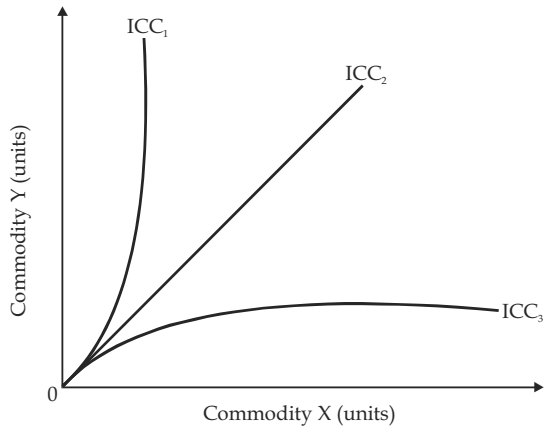
Figure 6.6



Notes

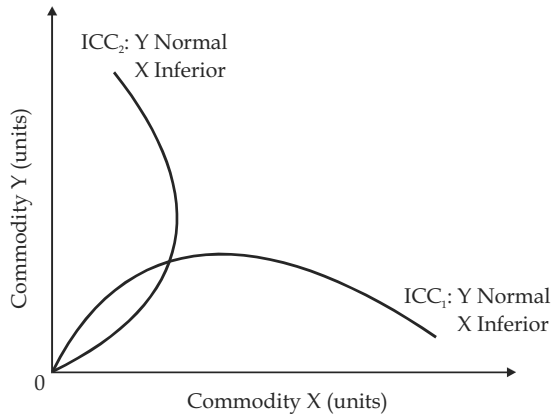
In case both commodities X and Y are normal goods the income consumption curve can take one of the shapes shown in Figure 6.7.

Figure 6.7



In case X is a normal good but Y an inferior good the income consumption curve would take the shape depicted as ICC_1 in Figure 6.8. This implies that as the income of the consumer increases he buys more of both X and Y up to a point and beyond that he buys more of X and less of Y. The curve ICC_2 in Figure 6.8 depicts the case when X is an inferior good and Y is a normal good.

Figure 6.8



Price of Related Goods

Almost all the goods that a consumer purchases in a market are "related goods" either by way of complementarity or substitutability. X and Y are compliments if the rise in demand of X increases the demand for Y, e.g., pen and ink, bread and butter, etc. X and Y are substitutes, if the rise in demand for x reduces the demand for Y, e.g., tea and coffee.

Did u know? Price Effect (KM) = Substitution Effect (KL) + Income Effect (LM).

The price effect can be broken up into two parts: income effect and substitution effect. Income effect occurs due to increase (decrease) in real income resulting from a decrease (increase) in the price of a commodity. Substitution effect occurs due to the consumer's inherent tendency to substitute cheaper goods for relatively expensive ones.

Notes

Case Study

Auto Industry — Economic Slowdown as a Determinant of Demand

Automobile sector is taken as the indicator of a modern and liberalised industrial India. But as of now there is not much to write in praise of this star-studded sector with gleaming Fords, Astras and Cielos. There is a gloom in this sector as on date. The economic slowdown has led to unexpected downturn in demand.

With the first quarter of the current financial year (1997-98) having ended, the ₹ 30,000 crores automobile industry has shown very little signs of a much hoped for recovery from the massive slowdown it registered last year. In fact it has shown continuous signs of a decline in growth with most segments cutting down production due to poor sales and inventory pile up. After witnessing whopping sales in 1995-96, the slowdown in the last fiscal year was viewed by many as the inevitable correction in growth. However, the continuing depressed condition has come as a dampener to the entire industry.

After becoming a blue-chip industry soon after the government liberalised the economy, the automobile industry has been growing at break-neck pace, almost to the point of being dubbed an overhead industry. The 1995-96 financial year saw the industry grow by around 30%, the luxury car segment by nearly 130 per cent. Last year the growth rates came back to normal figures, registering a decline of over 10 per cent. Worst affected was the luxury car segment – from a 132% growth rate it registered a negative growth. Though experts were quick to dismiss last year's poor performance, vis-à-vis 1995-96, as a correction, the continuing depressed conditions are beginning to worry manufacturers as inventories have started to pile up. With the general economy itself showing signs of a lethargy the chances of a speedy recovery by the automobile industry look anything but likely.

Production and sale of vehicles has registered declining growths in the first two months of the financial year according to the latest data released by the Association of Automobile Manufacturers (AIAM). The only segment that was able to register any impressive growth, both in production and sales, was the motor cycles segment. Despite the strong growth of the solitary segment, the entire automobile industry showed a declining growth.

While automobile production showed a negative two per cent growth the sales were dipping at a fraction over 0.6%. Worst affected were the scooter segment (production down 14% and sales down 9%) and mopeds (production down 13% and sales 11%).

The poor sales of heavy commercial vehicles virtually sums up the performance of the automobile industry. The industry is peculiar in the sense that most of the sales here take place through hire purchase or financing. While the three major heavy truck manufacturers did not cut down production in the first two months, their sales were down by a massive 19.8 per cent. The entire industry was reeling under the liquidity crunch last year. The effects of this do not seem to have worn out as evident from sales figures. With the general economy not picking up, the demand for the heavy vehicles too has come down. In such a situation a cut in production might be very pronounced in the coming months in this segment.

The light commercial vehicle segment was no different either. Boosted by the sales of Tata 'Sumo' last year, the light commercial vehicle segment has already shown signs of its inability to sustain the tempo. Though 'Sumo' continued to do well and improve its market share, the players in this segment cut down production by about two per cent. However, the effect on sales was even more significant as it dipped by nearly 9.5 per cent.

Contd...

Notes

No different was the case of luxury cars either. Although the car segment as a whole was able to post a growth in sales of 2.6 per cent, for the second time in a row the luxury car segment was able to grow only in single digits. Now that the base has widened much more, the days of a double digit growth in any of these segments is a near impossibility.

Table 1: Production and Sales in April-May 1996-98

	Production 1997-98	Variation 1996-97	Production 1997-98	Variation 1996-97		
HCV	216.30	211.53	2.25	154109	192272	-19.80
LCV	21870	22293	-1.89	18682	20617	-9.38
Cars	60593	60415 0.29	58850	57360	2.59	
Utility Veh.	71083	71239	-0.22	69471	69216	0.37
Scooters	189414	220645 -14.15	191457	211233	-9.37	
Motor cycles	172703	140659 22.78	168337	136916	22.93	
Mopeds	92470	10701	-13.59	89122	100969	-11.73

Question

How did slowdown affect the can industry?

6.4 Consumer Surplus

Consumer surplus is the satisfaction that a consumer obtains from a good over and above the price paid. This is the difference between the maximum demand price that buyers are willing to pay and the price that they actually pay. A related notion from the supply side of the market is producer surplus.

Example: Rahul is willing and able to pay ₹ 30 for a packet of chips. This is his demand price. However, the going market price, the actual price that everyone pays for a packet of chips is ₹ 25. While Rahul is willing and able to pay ₹ 30, he pays only ₹ 25. He receives a ₹ 5 consumer surplus on this purchase.

A comparable surplus from the supply side of the market is producer surplus. It is the revenue that a producer obtains from a good over and above the price paid. This is the difference between the minimum supply price that sellers are willing to accept and the price that they actually receive.

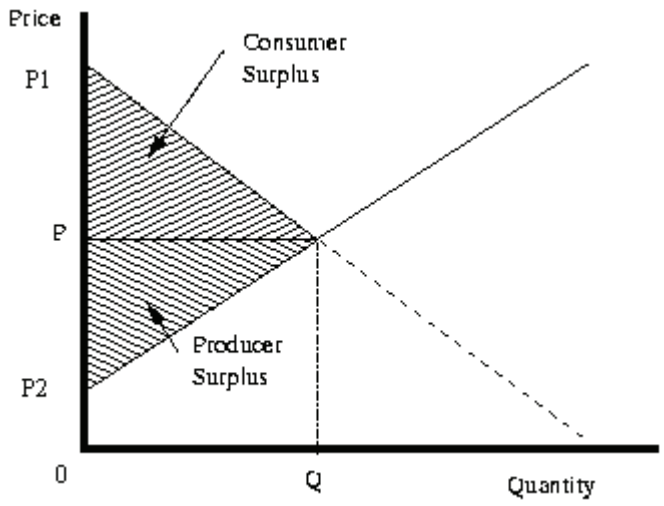
Example: Suppose that ABC Chips Producer is willing and able to accept ₹ 20 for a packet of chips. This is its supply price. This is what it needs to receive to cover production cost. However, the going market price, the actual price that everyone pays for a packet of chips is ₹ 25. While ABC Chips Producer is willing and able to accept ₹ 20, it receives ₹ 25. It receives ₹ 5 producer surplus on this sale.

A Diagrammatic Representation

The demand curve shows the quantum of demand at various potential prices, just as the supply curve shows the supply level to the market at various potential prices. For example, at too high a price like OP_1, there is no demand and at too low a price OP_2, there is no supply. Consumable quantities are indicated by the demand curve and marketable supplies are indicated by the supply curve.

Notes

Figure 6.9: Consumer and Producer Surplus



When OP gets settled as the actual equilibrium price, we can work out the area of:

Consumer's Surplus: The upper triangle represents the difference between the potential price and actual price paid by the buyers for all the units between O and Q.

Producer's Surplus: The lower triangle represents the difference between the potential price and actual price charged by the supplier for all the units between O and Q.

Note that at Qth unit of output and price P, there is neither consumer's surplus nor producer's surplus. OP is that equilibrium price at which we have zero consumer surplus and zero producer surplus.

6.5 Summary

- Indifference curve shows all combinations of two goods which yield the same level of satisfaction to the consumer. The consumer is indifferent about any two points lying on this curve.
- Budget line represents different combinations of two goods X and Y which the consumer can buy by spending all his income.
- The indifference curve analysis considers the income effect. Change in the price of commodity will change the real income position.
- Indifference curve also considers the effect of substitution goods.
- When the demand price is generally greater than the price actually paid, most consumers under most circumstances receive some surplus of satisfaction. It is known as consumer surplus.
- When the supply price is less than the price actually received, most producers under most circumstances receive some surplus of revenue. It is known as producer surplus.

Notes

6.6 Keywords

Budget line: It represents different combination of two goods which the consumer can buy by spending all his incomes.

Consumer surplus: the amount that consumers benefit by being able to purchase a product for a price that is less than they would be willing to pay

Indifference curve: The curve at which satisfaction is equal at each point.

Marginal rate of substitution: the rate at which a consumer is ready to give up one good in exchange for another good while maintaining the same level of satisfaction

Price consumption curve: The line connecting such (drawn because of change in price) successive equilibrium points is called PCC or price consumption curve.

Producer's surplus: the amount that a producer receives from the sale of a good and the lowest amount that producer is willing to accept for that good.

6.7 Self Assessment

State whether the following statements are true or false:

1. Each point on the indifference curve represents combination of goods that give same level of satisfaction to consumers.
2. Budget line represents different combinations of two goods X and Y which the consumer can buy by spending all his income.
3. The point at which consumer gets maximum satisfaction is referred to as consumer's equilibrium.
4. The slope of the budget line depends on the price ratio.
5. Marginal Rate of Substitution is the ratio of marginal utilities of two commodities in question.

Fill in the blanks:

6. Indifference curve represents a particular level of ..... .
7. Budget line is also known as the ..... .
8. The slope of indifference curve indicates the ..... .
9. The consumer is ..... about any two points on the indifference curve.
10. The concept of Ordinal Utility was given by ..... .

6.8 Review Questions

1. Every utility function uniquely determines the ordinal preferences, but for any ordinal preferences, there are many utility functions that represent those preferences. Is this statement true or false? Explain with reasons.
2. Manish is a typical economics graduate student and consumes 2 goods: economics text books and coffee. He also earns a part time earning of ₹ 2000 a month. He can either spend it all on books and get 5 or on coffee and get 20 cups.
   (a) Given this information, construct the equation for Manish's budget line (put books on the x-axis and coffee on the y-axis).

Notes

(b) The following are the bundles that Manish can afford with his income:

Books	Coffee
1	
	0
	8
2	

In the above table, fill in the blanks with the quantities that will exhaust Manish's income.

(c) Manish gets a research grant and his income increases to ₹ 4000 a month. What is the new equation of his budget line? What if income stays constant at ₹ 2000, and the price of a book increases to ₹ 5000?

(d) Assume that prices are the same as used in part a. If the marginal utility of a book is 20, what is the marginal utility of coffee if he is maximizing his utility?

(e) Now assume that textbooks and coffee are complements for Manish. For him to consume one textbook, he needs 1 cup of coffee. How many textbooks does he consume given his income of ₹ 2000, and the prices used in part a? What if economics is so boring that Manish needs 2 coffees for every book that he consumes?

3. What assumptions would you never alter while working on the theory of individual choice and why?

4. The marginal utility of consumption of good A is 40; it changes by 2 with each change in good A consumed. The marginal utility of consumption of another good B is also 40 but changes by 3 with each change in good B consumed. The price of good A is ₹ 20 and the price of good B is ₹ 30. How many of good A and good B should you consume?

5. The following table shows the marginal utility of your consumption of three goods, A, B and C.

Units of Consumption	MU of A	MU of B	MU of C
1	20	25	45
2	18	20	30
3	16	15	24
4	14	10	18
5	12	8	15
6	10	6	12

(a) Good A costs ₹ 80 per unit, and good B costs ₹ 40 and good C costs ₹ 120. How many units of each should be consumed with ₹ 480 to maximise utility?

(b) How will the answer change if the price of B rises to ₹ 80?

6. Explain the properties of indifference curves with the help of suitable examples.

7. Explain the concepts of consumer and producer surplus with help of an example and figure.

8. What is a budget line and how is it useful in reaching consumer equilibrium?

9. Explain the concept of Income Consumption Curves.

10. Show that Price Effect can be broken down into income and substitution effect.

Notes

Answers: Self Assessment

1.	True	2.	True
3.	True	4.	True
5.	True	6.	satisfaction
7.	price line	8.	marginal rate of substitution
9.	indifferent	10.	J.R. Hicks

6.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Robert S. Pindyck, *Microeconomics,* Pearson Education

Sampat Mukherjee, *Microeconomics,* Prentice Hall

Online links

http://tutor2u.net/economics/revision-notes/as-markets-consumer-surplus.html

http://www.flatworldknowledge.com/node/28303#web-28303

http://www.oup.com/uk/orc/bin/9780199296378/01student/advanced/02indifference/

http://www.vazecollege.net/Micro_Economics_Part_II.pdf

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Unit 7: Production Theory

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Objectives

After studying this unit, you will be able to:

- List the types of inputs
- State various production functions
- State the concept of isocost lines
- Discuss producer's equilibrium
- Explain the concept of expansion path

Introduction

The production analysis of the firm brings into focus the process of production and related costs of production. We must take inputs into consideration applied for production and resulting into output. There are different methods to produce a commodity. The firm has to identify the technically efficient production processes for avoiding any wastage of resources. These technically efficient production processes provide a choice for choosing the least-cost process.

Major portion of goods and services consumed in a modern economy are produced by firms. A firm is an organisation that combines and organises resources for the purpose of producing goods

and services for sale at a profit. The most important reason for a firm or business enterprises exist is that firms are specialised organisation devoted to manage the process of production.

7.1 Meaning of Production and Types of Inputs used in Production

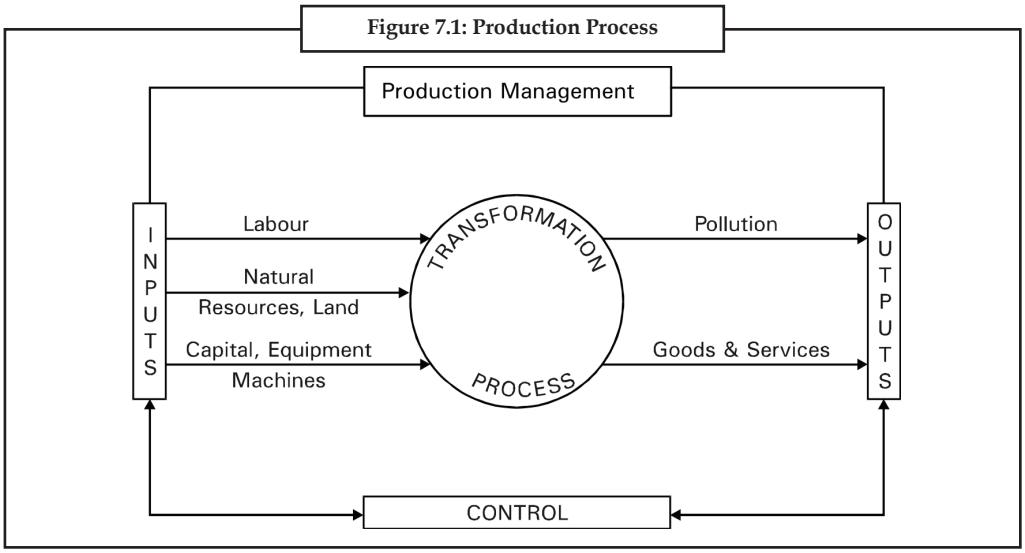
Production refers to the transformation of inputs or resources into outputs or goods and services. Production is a process in which economic resources or inputs (composed of natural resources like labour, land and capital equipment) are combined by entrepreneurs to create economic goods and services (outputs or products).

Firms are required to take different but interrelated production decisions like:

1. Whether or not to actually produce or shut down?
2. How much to produce?
3. What input combination to use?
4. What type of technology to use?

Figure 7.1 depicts a simple production process.

Figure 7.1: Production Process



In fact, production theory is just an application of constrained optimization technique. The firm tries either to minimize cost of production at a given level of output or maximize the output achievable with a given level of cost.

Inputs are the resources used in the production of goods and services and are generally classified into three broad categories – labour, capital and land or natural resources. They may be fixed or variable.

Fixed Inputs are those that cannot be quickly changed during the time period under consideration except, perhaps at a very great expense, (e.g., a firms' plant).

Variable Inputs are those that can be changed easily and on very short notice (e.g., most raw materials and unskilled labour).

The time period during which at least one input is fixed is called the, short run, while the time period when all inputs are variable is called, the long run. The length of the long run depends on the type of industry, e.g., the long run for a dry cleaning business may be a few weeks or months. Generally, a firm operates in the short run and plans increases or reductions in its scale

Notes

of operation in the long run. In the long run, technology generally improves so that more output can be obtained from a given quantity of inputs, or the same output can be obtained from fewer inputs.

7.2 Production Function

A production function is a function that specifies the output of a firm, an industry, or an entire economy for all combinations of inputs. In other words, it shows the functional relationship between the inputs used and the output produced.

Mathematically, the production function can be shown as:

$$Q = f(X_1, X_2 \ldots\ldots\ldots\ldots\ldots\ldots X_K)$$

where,

Q = Output,

$X_1 \ldots\ldots\ldots\ldots X_K$ = Inputs used.

For purposes of analysis, the equation can be reduced to two inputs X and Y. Restating,

$$Q = f(X, Y)$$

where,

Q = Output

X = Labour

Y = Capital

A more complete definition of production function can be:

'A production function defines the relationship between inputs and the maximum amount that can be produced within a given period of time with a given level of technology'.

A production function can be stated in the form of a table, schedule or mathematical equation. But before doing that, two special features of a production function are given below:

1. Labour and capital are both unavoidable inputs to produce any quantity of a good, and
2. Labour and capital are substitutes to each other in production.

Production function can be written in many ways, but the multiplicative form is most widely used

$$Q = Ak^aL^b$$

This is also referred to as the Cobb-Douglas production function. So a Cobb-Douglas Production function with parameters A = 100, a = 0.5 and b = 0.5 will be

$$Q = 100\ K^{0.5}\ L^{0.5}$$

$$Q = 100\sqrt{KL}$$

Given this production function, if two units of labour and four units of capital are used, maximum production is 283 units of output.

Another form is the Constant Elasticity of Substitution, CES function,

$$Q = B[gL^{-h} + (1 - g)K]^{-1/h}$$

where h > –1 and B, g and h are constants.

Notes

If h is assumed to be a variable, then the above function may be called the variable elasticity of substitution, VES function.

Still another form is the fixed proportion production function also called the Leontief function.

It is represented by

$$Q = \text{minimum}\left[\frac{K}{a}, \frac{L}{b}\right]$$

where a and b are constants and 'minimum' means that Q equals the smaller of the two ratios.

Finally there is a very simple linear production function. Assuming that the inputs are perfect substitutes so that all factors may be reducible to one single factor, say, labour, L, than the linear production function may be,

$$Q = aL$$

where

'a' is the constant term and

L stands for labour.

In order to analyse the relationship between factor inputs and outputs, economists classify time periods into short runs and long runs.

Before further discussion it is necessary to conceptualize three terms: total product, average product and marginal product.

1. Total product is the total quantity produced by that many units of a variable factor (i.e., labour). For example, if on a farm 2000 Kg. of wheat were produced by 10 men, the total product would be 2000 Kg.
2. Average product is the total output divided by the number of units of the variable factor (or the number of men). Thus AP = TP/L. On the same farm, the average product would be 2000/10 = 200 Kg.
3. Marginal product is the change in total output resulting from the change (using one more or one less unit) of the variable factor. If an eleventh man is now added to this farm and the output rose to 2,100 Kg, the marginal product (of labour) would be 100 Kg. Thus, MP = d(TP)/dL.

For a two-input production process, the Total Product of Labour (TP_L) is defined as the maximum rate of output coming up from combining varying rates of labour input with a fixed capital input $(\bar{K})$. (***Note:*** A bar over K or over any other variable means, that variable has been fixed, and therefore is no more variable)

$$TP_L = f\ (\bar{K}, L)$$

and total product of capital function is

$$TP_K = f\ (K, \bar{L})$$

Marginal Product (MP) is the change in output per unit change in the variable input. Thus the marginal product of labour and capital is

$$MP_L = \frac{\Delta Q}{\Delta L}$$

$$MP_K = \frac{\Delta Q}{\Delta K}$$

Notes

For the Cobb-Douglas production function,

$$Q = AK^aL^b$$

The marginal products are

$$MP_K = \frac{dQ}{dK} = aAK^{a-1}L^b \text{ and } MP_L = \frac{dQ}{dL} = bAK^aL^{b-1}$$

Average Product (AP) is total product per unit of variable input. It is found by dividing the rate of output by rate of variable input, i.e.,

$$AP_L = \frac{TP_L}{L} \text{ and } AP_K = \frac{TP_K}{K}$$

By holding the quantity of input constant and changing the other, we can derive TP of the variable input.

Example: By holding capital constant at one unit (K = 1) and increasing units of labour used from 0 to 6 units, we get total product of labour as in column (2) below in Table.

TP, MP and AP of Labour

(1) Labour (No. of workers)	(2) Output or TP	(3) MP of labour	(4) AP of labour	(5) Output Elasticity of labour
0	0	-	-	-
1	3	3	3	1
2	8	5	4	1.25
3	12	4	4	1
4	14	2	3.5	0.57
5	14	0	2.8	0
6	12	-2	2	-1

Marginal Product of Labour (MP_L) is the change in total product or extra output per unit change in labour used. Average Product of Labour (AP_L) equals total product divided by the quantity of labour used.

$$MP_L = \frac{\Delta TP}{\Delta L}$$

$$AP_L = \frac{TP}{L}$$

Output elasticity of labour (E_L) measures the percentage change in output divided by percentage change in quantity of labour used.

$$E_L = \frac{\%\Delta Q}{\%\Delta L}$$

or

$$E_L = \frac{\Delta Q / Q}{\Delta L / L} = \frac{\Delta Q / \Delta L}{Q / L} = \frac{MP_L}{AP_L}$$

This means that from zero units of labour (and with K = 1), TP or output grows proportionally to the growth in the labour input. For the second unit of labour E_L = 1.25 (that is, TP or output grows more than proportionally to the increase in L), and so on.

Notes

7.2.1 Short Run and Long Run Production Function

The above features show that some quantity of both the inputs is required to produce a given quantity of output. A two input long run production function for quantities of labour and capital upto 10 units can be expressed as in Table 7.1.

Table 7.1: Long Run Production Function

Labour (L)	Capital (K)										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
0	0	0	0	0	0	0	0	0	0	0	0
1	0	5	15	35	47	55	62	61	59	56	52
2	0	12	31	49	58	66	72	77	72	74	71
3	0	35	48	59	68	75	82	87	91	89	87
4	0	48	59	68	72	84	91	96	99	102	101
5	0	56	68	76	85	92	99	104	108	111	113
6	0	55	72	83	91	99	107	112	117	120	122
7	0	53	73	89	97	104	111	117	122	125	127
8	0	50	72	91	100	107	114	120	124	127	129
9	0	46	70	90	102	109	116	121	125	128	130
10	0	40	67	89	103	110	117	122	126	129	131

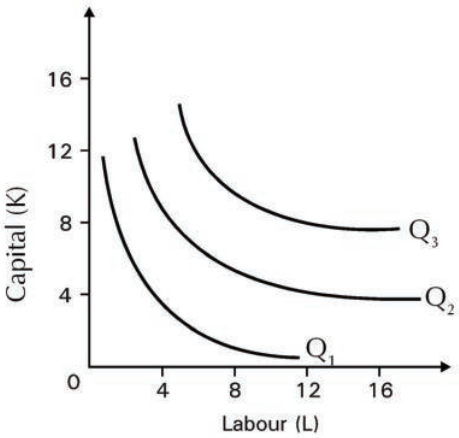
If capital was the fixed input in the short run, then each column of the table represents a short run production function with respect to a specific quantity of the fixed (capital) input.

Example: For K = 2, the short run production function would be as in Table.

Short Run Production Function

Labour (L)	0	1	2	3	4	5	6	7	8	9	10
Output (Q)	0	15	31	48	59	68	72	73	72	70	67

The above functions can be shown on a two dimensional diagram with a family of production curves, one for each production level. Such a representation for two selected levels of production, Q = 91 and Q = 122. Table shows that there are four alternative ways of producing 91 units and three for producing 122 units of output.



Long Run Production Function

Notes

Task Consider any one manufacturing company and note down its production in units for the last 5 years. Also try to find out what inputs do they use in their production.

7.2.2 Production Function with two Variable Inputs

A firm may increase its output by using more of two variable inputs that are substitutes for each other, e.g., labour and capital. There may be various technical possibilities of producing a given output by using different factor combinations. Which particular factor combination will be actually selected by the firm depends both on the technical possibilities of factor substitution as well as on the prices of the factors of production.

The technical possibilities of producing an output level by various combinations of the two factors can be graphically represented in terms of Isoquants (dealt with in this unit later).

Caselet

Real World — Advantages of Just-in-time Production

During the 1950s and 1960s, the Toyota Motor Company originated and developed the just-in-time system of production which has had an enormous effect in Japan and elsewhere. According to this system, materials, parts and components are produced and delivered just before they are needed. One advantage is that inventories of parts and of work in process are reduced considerably, but this is only part of the story. In addition, the time and cost required to change from the production of one part or model to another are reduced, thus cutting costs and enabling the firm to produce small lots economically.

A careful comparison of an automobile plant using the just-in-time system with an automobile plant not using it resulted in the following data:

	Plant using just-in-time system	Plant not using just-in-time system
Cars produced per day	1,000	860
Total factory workers	1,000	2,150
Workers per car per day		
Direct labour	0.79	1.25
Overhead personnel	0.21	1.25
Total	1.00	2.50

The above data reveals the following:

1. Yes – the number of cars produced per day divided by the number of workers is 1.0 in the plant using the just-in-time system but only 0.4 in the plant not using the just-in-time system.

2. The average product of labour – the number of cars produced per day divided by the number of workers – is the reciprocal of the number of workers per car per day. Thus, the average product of overhead workers is 1/0.21 = 4.76 using the just-in-time system, but 1/1.25 = 0.8 without it. On the other hand, the average product of workers engaged in direct labour is 1/0.79 = 1.27 using the just-in-time system, but 1/1.25 = 0.8 without it. Clearly the percentage increase in average product is greater for overhead workers than for direct labour.

Contd...

Notes

3. One reason why the just-in-time system decreases overhead labour considerably is that the time required for planning and management is reduced because changeovers are faster.
4. The firm's isoquants shifted inward to the origin.

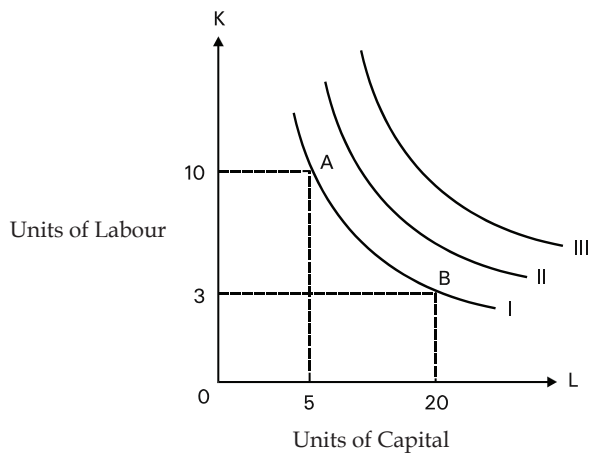
7.3 Isoquants

Isoquants are a geometric representation of the production function. The same level of output can be produced by various combinations of factor inputs. Imagining continuous variation in the possible combination of labour and capital, we can draw a curve by plotting all these alternative combinations for a given level of output. This curve which is the locus of all possible combination is called the 'isoquant'.

Any quantity of a good can be produced by using many different combinations of labour and capital (assuming both can be substituted for each other). An isoquant or an iso-product curve is the line which joins together different combinations of the factors of production (L, K) that are physically able to produce a given amount of output.

Suppose isoquant refers to 100 Kg. of output. This output can be produced by a large number of different combinations of labour and capital. All the different combinations for the same amount of output would lie on the same isoquant.

Example: 10 units of capital and 5 units of labour (A) provide the same output as 3 units of capital and 20 units of labour input (B). The firm can choose any one of these combinations (A or B) or any other combination which lies on the same isoquant to get 100 Kg. of output. The isoquant does not tell us the combination of factor inputs the firm actually uses; (that combination is based on process of the factors) but shows the technically possible combinations of factor inputs that are required to produce a given level of output. Isoquant I has been drawn by joining these combinations of labour and capital inputs which give out the same amount of total produce i.e., 100 Kg. Points like A which require more capital but less labour represent capital intensive methods of production. Points like B, which require less capital and more labour represent labour intensive methods of production.



For movements along an isoquant, the level of output remains constant and the ratio of capital to labour changes continuously. However, a movement from the isoquant to another means that the level of output changes.

Notes

7.3.1 Types of Isoquants

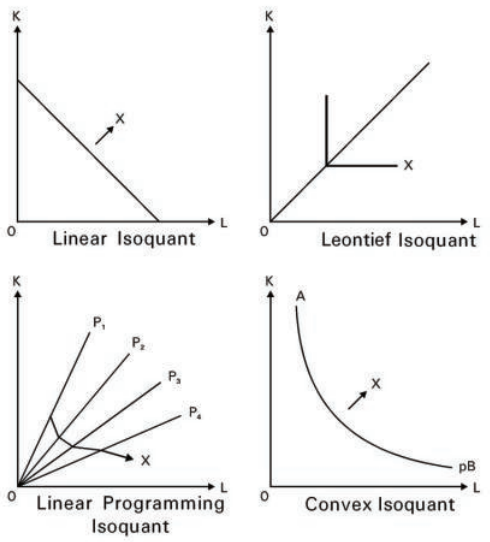
The production isoquant may assume various shapes depending on the degree of substitutability of factors. The types are discussed in Table 7.2 and the matching graphs are shown in Figure 7.2.

Table 7.2: Types of Isoquants

Types of Isoquants	Description
Linear Isoquants	This type assumes perfect substitutability of factors of production. A given commodity may be produced by using only capital, or only labour, or by an infinite combination of K and L.
Input-output Isoquants	This assumes strict complementarity, that is, zero substitutability of the factors of production. There is only one method of production for any one commodity. The isoquant takes the shape of a right angle. This type of isoquant is called "Leontief isoquant."
Kinked Isoquants	This assumes limited substitutability of K and L. There are only a few processes for producing any one commodity. Substitutability of factors is possible only at the kinks. It is also called "activity analysis isoquant" or "linear-programming isoquant" because it is basically used in linear programming.
Smooth, Convex Isoquants	This form assumes continuous substitutability of K and L only over a certain range, beyond which factors cannot substitute each other. This isoquant appears as a smooth curve convex to the origin.

7.3.2 Characteristics of Isoquants

Figure 7.2: Types of Isoquants



Isoquants show the following characteristics:

1. ***An isoquant curve slopes downwards to the right.*** In other words, it has a negative slope. The implication of such a slope is that if a firm wants to employ more of the factor input, it shall have to employ less of another factor input in order to achieve the same level of output.

Notes

Example: If the firm employs more labour, it must employ less capital if it wishes to continue producing the same level of output. However, only when there exists a technical substitution between the two inputs (labour and capital) will the isoquant have a negative slope. In other words, only if it is possible to substitute capital for labour, will the isoquant be downward sloping.

2. ***Isoquants curves are convex to the point of origin.*** This stems from the fact that while labour and capital may be technical substitutes for each other they are not perfect substitutes. Within limits, labour and capital can be substituted for each other but the more the capital is sacrificed for additional units of labour, the more difficult it becomes to substitute additional labour for capital. Thus the producer is willing to sacrifice fewer and fewer units of labour for additional units of capital.

3. ***Isoquants representing different levels of output can never intersect each other.*** If they did, it would be a logical contradiction. It will mean that isoquants representing different levels of output are showing the same amount of output at the point of intersection, which is an illogical conclusion.

4. ***Higher Isoquants denote higher level of output:*** The further away an isoquant lies from the origin, the higher is the level of output denoted by it.

7.3.3 Marginal Rate of Technical Substitution

Marginal Rate of Technical Substitution (MRTS) is the amount by which the quantity of one input has to be reduced ($-\Delta x_2$) when one extra unit of another input is used ($\Delta x_1 = 1$), so that output remains constant $(y = \bar{y})$.

$$MRTS(x_1, x_2) = -\frac{\Delta x_2}{\Delta x_1} = \frac{MP_1}{MP_2}$$

where MP_1 and MP_2 are the marginal products of input 1 and input 2, respectively.

Along an isoquant, the MRTS shows the rate at which one input (e.g. capital or labor) may be substituted for another, while maintaining the same level of output. The MRTS can also be seen as the slope of an isoquant at the point in question.

Task Take any hypothetical example and calculate MRTS for a firm.

7.4 Isocost Lines

If a firm uses only labour and capital, the total cost or expenditure of the firm can be represented by:

$$C = wL + rK$$

where,

C = Total cost

w = Wage rate of labour

L = Quantity of labour used

r = Rental price of capital

K = Quantity of capital used

Notes

The equation shows that the total cost of the firm (C) is equal to the sum of its expenditures on labour (wL) and capital (rK). This equation is a general one of the firm's isocost line or equal-cost line. It shows the various combinations of labour and capital that the firm can hire or rent at a given total cost.

Example: If C = 900 units, w = 10 units and r = 10 units, the firm could either hire 10 L or rent 10 K or any combination of L and K shown on isocost line AB in figure 10. For each unit of capital the firm gives up, it can hire one additional unit of labour. Thus the slope of the isocost line is - 1.

By subtracting wL from both sides of the equation above and then dividing by r, we get the general equation of the isocost line in the following more useful form:

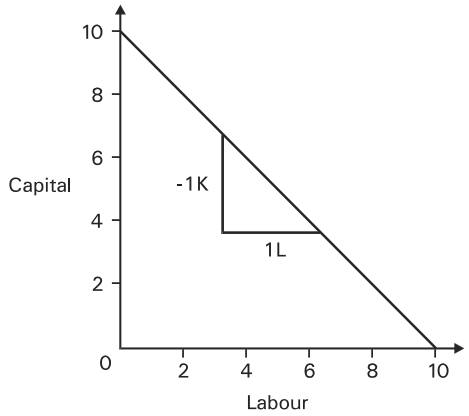
$$K = \frac{C}{r} - \frac{wL}{r}$$

where,

C/r is the vertical intercept of the isocost line and

-w/r is its slope.

Thus for C=100 units and w/r=10 units, the vertical intercept is c/r = 100/10=10K, and the slope is -w/r = -10/10 = -1. A different total cost by the firm would define a different but parallel isocost line, while different relative input prices would define an isocost line with a different slope.



Isocost Line

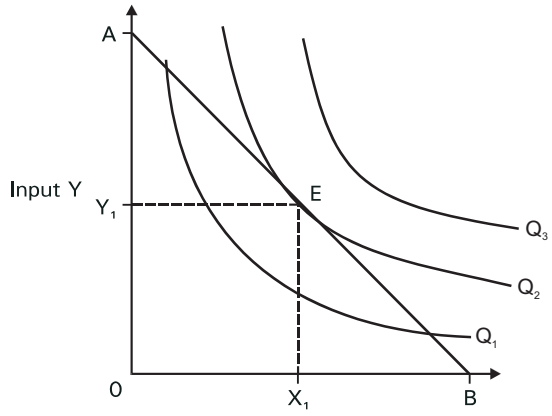
7.5 Producer's Equilibrium

The theory of production may be viewed from two angles which are dual to each other. A firm may decide to produce a particular level of output and then attempt to minimise the cost of total inputs or it may attempt to maximise its output subject to a cost constraint.

A firm spends money on two inputs only, X and Y. It decides its budget and knows the price of each of the inputs which remains constant. If the firm spends all its budget it can buy either OB units of input X or OA units of input Y or a combination of X and Y represented by a point lying on the straight line AB in Figure 7.3. The line AB is the budget line of the firm.

Notes

Figure 7.3: Optimum Factor Combination



The slope of the budget line or the isocost line will be $-\frac{OA}{OB}$, where

$$OA = \frac{\text{Cost}}{\text{Price of Y}} \text{ and } OB = \frac{\text{Cost}}{\text{Price of X}}$$

Therefore, $$\text{Slope of AB} = -\frac{OA}{OB}$$

$$= \frac{\text{Price of X}}{\text{Price of Y}} = -\frac{P_X}{P_Y}$$

The negative sign indicates negative slope. In absolute terms, the slope of the budget line is equal to the price ratio of the two inputs.

The budget line of the firm has been superimposed on its isoquant map. The firm would be in equilibrium at a point where an isoquant is tangent to the budget line AB, i.e., point E. Thus in equilibrium, the firm produces on the isoquant Q_2 and uses OX_1 units of input X and OY_1 units of input Y. At point E, the slope of the isoquant Q_2 is equal to the slope of the budget line, i.e., the marginal rate of technical substitution of X and Y is equal to the ratio of prices of two inputs.

Thus $$MRTS_{XY} = \frac{MP_X}{MP_Y} = \frac{P_X}{P_Y}$$

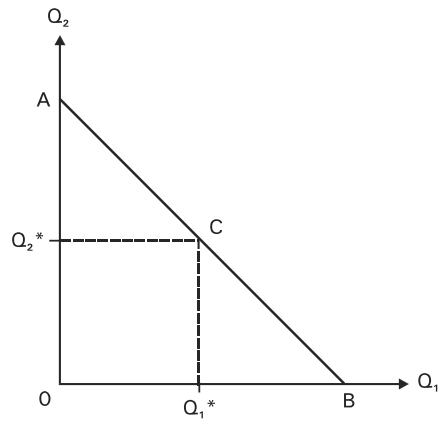
Thus, to minimise production costs (or to maximise output for a given cost outlay), the extra output or marginal product spent on labour must be equal to the marginal product per unit spent on capital.

7.6 Expansion Path

The case of a firm producing 1000 units of output using 10 units of capital and 10 units of labour (at point a) with input prices w=2 and r=2 is shown in Figure 7.4 using isoquants and isocosts.

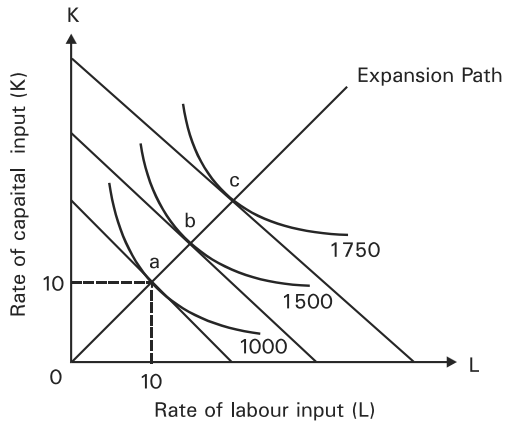
Notes

Figure 7.4



Thus the cost of this input combination is 40 units. At point a, the 1000 unit isoquant is tangent to the 40 unit isocost line. If the firm wants to increase its output or expand its production, it will move to point b if 1500 units are to be produced and then to point c if 1750 units of output are to be produced. In general, the firm expands by moving from one tangency or efficient production point to another. These efficient points represent the expansion path.

Figure 7.5



An expansion path is formally defined as the set of combinations of capital and labour that meet the efficiency condition $\frac{MP_L}{MP_K} = \frac{P_L}{P_K}$.

An equation for the expansion path can be determined by first substituting the marginal product functions and input prices into the efficiency condition, and then by solving for capital as a function of labour. If the production function is $Q = 100\ K^{½}\ L^{½}$, the corresponding marginal product functions are:

$$MP_L = \frac{dQ}{dL} = \frac{50K^{1/2}}{L^{1/2}}$$

and,

$$MP_K = \frac{dQ}{dK} = \frac{50L^{1/2}}{K^{1/2}}$$

Notes

Substituting the marginal product equations in the efficiency condition ($MP_L/MP_K = P_L/P_K = w/r$) gives:

$$\frac{50\frac{K^{1/2}}{L^{1/2}}}{50\frac{L^{1/2}}{K^{1/2}}} = w/r$$

Solving for K gives:

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

This expression is the equation for the expansion path for the production function $Q = 100\ K^{1/2}/L^{1/2}$. If w and r are known, equation $K = w/r\ L$ defines the efficient combination of capital and labour for producing any rate of output e.g., the expansion path in the above figure. If w=1, and r=1, the expansion path would be:

$$K = L$$

If w=2 and r=1, the equation for expansion path would be:

$$K=2L$$

If the expansion path is known, then knowing the isoquant-isocost system is not necessary to determine efficient production points. The firm will only produce at those points on the expansion path.

The expansion path indicates optimal input combinations, but it does not indicate the specific rate of output associated with that rate of input use. The output rate is determined by substituting the equation for the expansion path into the original production function.

Case Study

Cotton Board over Estimated Production

The Southern India Mills' Association (SIMA) said the Cotton Advisory Board (CAB's) has over estimated the production and under estimated the consumption. According to industry experts any further export of cotton would surpass the quantity decided by Group of Ministers by two lakh bales.

J Thulasidharan, chairman, SIMA said that CAB, at its first meeting held on January 6, 2011 has estimated the cotton production as 32.9 million bales and consumption as 27.5 million bales (including 2 million bales of non-mill consumption), retained the exportable surplus as 5.5 million bales and thus reducing the closing stock to 4.45 million bales as against the Group of Ministers (GoM) promised quantity of 5 million bales.

He said, "CAB has over estimated the production and under estimated the consumption, textile mills would be forced to curtail their production for want of raw cotton from July onwards resulting abnormal increase in cotton and yarn price." CAB has reported, cotton production in the northern region (Punjab, Haryana and Rajasthan) will be less than 4 million bales, which has been endorsed by the ginning and trading community. In the past several years, Maharashtra farmers have been selling sizable kapas in Gujarat to fetch higher income whereas in the current season, since the farmers are realising good prices in Maharashtra itself, trading of kapas to Gujarat has come down drastically. This will result in Gujarat crop to less than 10 million bales, he said, Thulasidharan said, in

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Notes

Maharashtra, both production and quality, has been affected from the fact of large scale arrivals of low micronnaire cotton. "This in turn is an indication of severe crop damage in this state, therefore Maharashtra crop would be only around 8 million bales as against the CAB estimate of 9.2 million bales".

On extra long staple (ELS) cotton production, he said, erratic weather condition and unseasonal rains have seriously affected the crop in Karnataka and Madhya Pradesh.

Total DCH production may not cross even 125,000 bales, out of which sizeable quantity of arrivals is in the hands of exporters due to recent export clearance and grant of additional quota. With abnormally high ELS cotton prices (280 to 285 cents for PIMA and GIZA 88), Indian spinning sector will have serious setback in fine and superfine counts, said Thulasidharan.

He further said the hoarding of ELS cotton by the exporters has increased the DCH 32 cotton price from ₹ 53,000 per candy to ₹ 70,000 in a span of 10 days (spot prices), an increase of 24 per cent.

Thulasidharan estimated cotton production for the season 2010-11 will be only around 30.9 million bales. As far as cotton consumption is concerned, he stated, that Textile Commissioner Office has already estimated at 27.5 million bales for the current cotton season. "Non-submission of data to the Textile Commissioner's office is a handicap in arriving at the consumption figure. If the consumption of non-reporting mills and also the capacity being added in the spinning sector, the requirement including non-mill consumption would exceed 28.5 million bales."

"Viewing the production and consumption data, any further export of cotton would seriously affect the entire textile value chain. Even with the current cotton position, mills will face shortage of cotton from July onwards thus resulting in abnormal increase in yarn prices, ultimately affecting the common man".

The Association has sought the ministry of textiles to take up the matter suitably with the commerce and agriculture ministries and restrict the cotton export at 5.5 million bales and pointed out that the permitted quantity of export of cotton has already exceeded the quantity decided by Group of Ministers by 200,000 bales.

Question

Do you think that the estimates of Cotton Board are logical? Is it easy for the Board to estimate production and therefore estimate the total revenue and the marginal revenue?

Source: www.business-standard.com

7.7 Summary

- Production means conversion of inputs or resources into usable commodities or services. Inputs are the resources used in the production of goods and services and are generally classified into three broad categories — labour, capital and land or natural resources.
- Production is a process in which economic resources or inputs are combined by entrepreneurs to create economic goods and services.
- Isoquants are a geometric representation of the production function. Various combinations of factor inputs can produce the same level of output.
- The marginal rate of technical substitution of L for K (denoted by $MRTS_{L,K}$) is defined as the number of units of input K that a producer is willing to sacrifice for an additional unit for L so as to maintain the same level of output

- An expansion path is formally defined as the set of combinations of capital and labour that meet the efficiency condition.

7.8 Keywords

Inputs: Resources used in the production of goods and services.

Isoquants: These are a geometric representation of the production function.

Kinked isoquant: This assumes limited substitutability of capital and labour.

Marginal rate of technical substitution: It is defined as the number of units of input K that a producer is willing to sacrifice for an additional unit for L.

Marginal revenue product of labor: Marginal product of labour times the marginal revenue from the sale of extra output produced.

Production: Transformation of inputs into output.

7.9 Self Assessment

Fill in the blanks:

1. Production refers to the ..... of inputs or resources into output of goods and services.
2. ..... are the resources used in the production of goods and services and are generally classified into three broad categories – labour, capital and land or natural resources.
3. ..... are those that can be varied easily and on very short notice.
4. The time period during which at least one input is fixed is called the ..... .
5. Mathematically, the production function can also be shown as: ..... .
6. The MPP of factor is a change in ..... resulting from a change in a factor of production.
7. Linear isoquant assumes ..... substitutability of factors of production.
8. Kinked isoquant assumes ..... substitutability of factors of production.
9. Kinked isoquant assumes ..... substitutability of capital and labour.
10. ..... is the slope of a given isoquant.

7.10 Review Questions

1. Calculate the total cost of production, if only two inputs are used- labour and capital. Consider the following data: Cost of labour = ₹ 50/unit, price of capital = ₹ 500, number of labour used = 35 and capital used 45.
2. Show that the different relative input prices would define an isocost line with a different slope.
3. Show that the ratio of marginal products is equal to the ratio of price.

Notes

4. Which of the following statements best describes the general form of a production function and why?
   (a) It is a purely technological relationship between quantities of input and quantities of output.
   (b) It represents the technology of an organisation, sector of an economy.
   (c) Prices of inputs or of the output do not enter into the production function.
   (d) It is a flow concept describing the transformation of inputs into output per unit of time.
5. A firm has a production function of the following form Q = K + 2L Where Q is output, K is the capital input and L is the labour input per time period. The wage rate and the rental rate on capital is ₹ 50 per unit. Find out the cost minimising output.
6. A firm faces the following long run cost function:

$$TC = q^3 - 40q^2 + 450q$$

   Calculate the quantity (q) and the average cost (AC), when the latter will be at its minimum.
7. If a firm moves from one point on a production isoquant to another, which of the following will not happen and why?
   (a) A change in the ratio in which the inputs are combined.
   (b) A change in the marginal products of the inputs.
   (c) A change in the rate of technical substitution.
   (d) A change in the level of output.
8. "The marginal rate of technical substitution is numerically equal to the negative of the slope of an isoquant." Comment.
9. Can isoquants be drawn in different shapes? Examine their characteristics.
10. How can you show the total cost or expenditure of the firm in a graphical manner?

Answers: Self Assessment

1.	transformation	2.	Inputs
3.	Variable Inputs	4.	short run
5.	$Q = f(X_1, X_2 \ldots\ldots\ldots\ldots X_k)$	6.	output
7.	perfect	8.	limited
9.	limited	10.	Marginal Rate of Technical Substitution

7.11 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books, Delhi.

H. Craig Patersen, *Managerial Economics,* Prentice Hall.

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford.

Sampat Mukherjee, *Microeconomics,* Prentice Hall.

Notes

Online links

ingrimayne.com/econ/TheFirm/ProductionFunct.html

faculty.lebow.drexel.edu/McCainR/top/Prin/txt/MPCh/firm4a.html

http://www.docshare.com/doc/211217/PRODUCER-EQUILIBRIUM

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Unit 8: Laws of Production

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Objectives

After studying this unit, you will be able to:

- State the law of variable proportions
- Explain the behaviour of a firm during three stages of production
- Assess how a variable input is used/ can be used optimally
- Paraphrase the law of returns to scale
- Identify the reasons for returns to scale

Introduction

In this unit, we will discuss the laws of production. In the short run, the law of diminishing returns states that as we add more units of a variable input (i.e. labour or raw materials) to fixed amounts of land and capital, the change in total output will at first rise and then fall. Diminishing returns to labour occurs when marginal product of labour starts to fall. This means that total output will still be rising – but increasing at a decreasing rate as more workers are employed. In the long run, all factors of production are variable. How the output of a business responds to a change in factor inputs is called returns to scale.

8.1 Law of Variable Proportions or Law of Diminishing Returns (Short Run)

If all inputs of a firm are fixed and only the amount of labour services differs, then any decrease or increase in output is achieved with the help of changes in the amount of labour services used. When the firm changes the amount of labour services only, it changes the proportion between the fixed input and the variable input. As the firm keeps on changing this proportion by changing the

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amount of labour, it experiences the law of variable proportion or diminishing marginal returns. This law states that,

As more and more of the factor input is employed, all other input quantities remaining constant, a point will finally be reached where additional quantities of varying input will produce diminishing marginal contributions to total product.

This underlines the short run production function. It can be shown in a Table 8.1 and Figure 8.1 as follows.

Table 8.1: Production Function with one Variable Input

Number of Labour Units (L) (1)	Total Product of Labour (TP_L) (2)	Average Product of Labour (AP_L) (3 = 1 + 2)	Marginal Product of Labour (MP_L) (4)
1	100	100	–
2	210	105	110
3	330	110	120
4	430	107.5	100
5	520	104	90
6	600	100	80
7	670	95.7	70
8	720	90	50
9	750	83.3	30
10	760	76	10

In Table 8.1 labour is assumed to be the only variable input. Columns 1 and 2 together represent the production function of the firm. Column 3 shows the average combination of labour units involved. Column 4 lists the amount of increase in output as a result of each additional unit of labour, e.g., the marginal physical product of 5th unit of labour is the total physical product of 5 units of labour minus the total physical product of 4 units. Column 4 shows that the marginal physical product starts decreasing from 4th unit of labour onward. If labour units employed increase beyond 10, the marginal physical product will become zero and later become negative. The stage from where the marginal physical product starts decreasing shows the law of diminishing returns or law of variable proportions.

MP begins to fall before the AP does. The reason is that the AP attributes the increase in TP equally to all the units of the variable factor whereas the MP, by definition, attributes the increase in TP to the marginal unit of the variable factor.

If the MP is greater than the AP, the AP rises and if the MP is less than the AP, then the AP falls.

Example: If the batsman's next (or marginal) score is greater than his average score, then his average score rises and if his next (or marginal) score is less than his average score, the average score falls.

From this it follows, that when the MP is equal to the AP, the AP is at its maximum. The reason is that when AP is increasing, MP is above AP, pulling it up; when the AP is at its maximum and constant, AP is equal to MP; when AP is falling, MP is below AP, pulling it down.

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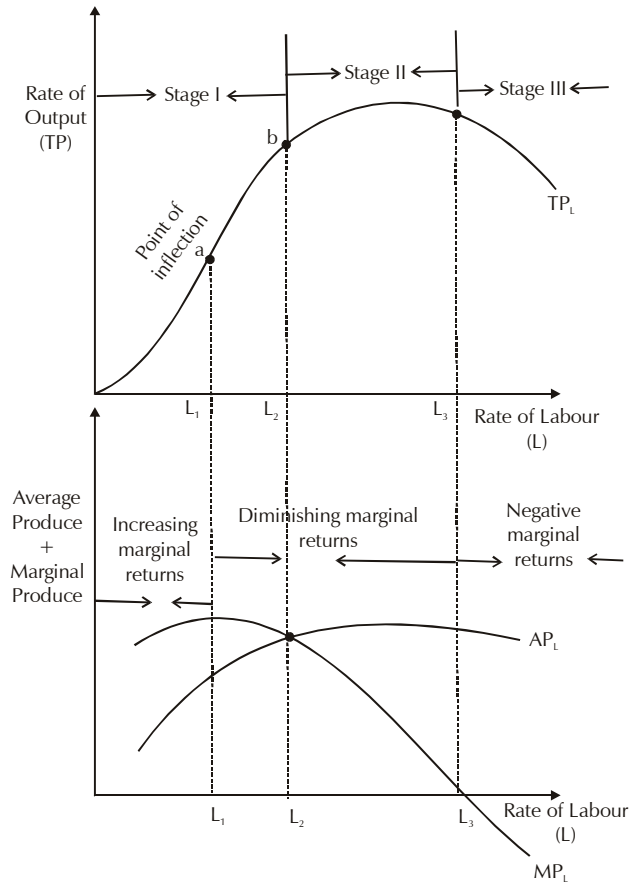
Figure 8.1



8.1.1 Three Stages of Production

Diminishing returns to a factor can be graphically understood with the help of total and marginal product curves. In Figure 8.1, the TPP curve rises first to an increasing rate in stage I and later at a diminishing rate in stage II. At stage II, the TPP remains constant. Thus, the total output increases more than proportionately until X units of labour are employed; between X units and Y units of labour used, the total output rises with every additional unit of labour but this increase is less than proportionate. If labour units increase beyond level Y, the total output eventually starts decreasing. Correspondingly when TPP is rising at an increasing rate, MPP and APP curves are rising; and when total product is rising at a diminishing rate, the MPP and APP curves are declining. At Y, where TPP becomes constant, the MPP becomes zero, and additional labour beyond Y makes MPP negative. These three phases of TPP curve are called the three stages of production and are summarized in Table 8.2.

No firm will choose to operate either in Stage I or Stage III. In Stage I the marginal physical product is rising, i.e., each additional unit of the variable factor is contributing to output more than the earlier units of the factor; it is therefore profitable for the firm to keep on increasing the use of labour. In Stage III, marginal contribution to output of each additional unit of labour is negative; it is therefore, not advisable to use any additional labour. Even if cost of labour used is

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zero, it is still unprofitable to move into Stage III. Thus, Stage II is the only important range for a rational firm in a competitive situation. However, the exact number of labour units hired can be found only when the corresponding data on wage rates is available.

Table 8.2: Stages of Production

Total Physical Product	Marginal Physical Product	Average Physical Product	Additional Information
Stage I Increases at an increasing rate	Increases and reaches its maximum	Increases (but slower than MPP)	Fixed inputs grossly under utilised, specialisation and team work cause APP to increase when additional input is used
Stage II Increases at a diminishing rate and becomes maximum	Starts diminishing and becomes equal to zero	Starts diminishing	Specialisation and teamwork continue and result in greater output when additional input is used, fixed input is being properly utilised
Stage III Reaches its maximum, becomes constant and then starts declining	Keeps on declining and becomes negative	continues to diminish but must always be greater than zero	Fixed inputs capacity is reached, additional input causes output to fall

8.1.2 Optimal use of Variable Input

It is important for the firm to decide how much labour it should use in order to maximize profits. The firm should employ an additional unit of labour as long as the extra revenue generated from the sale of the output produced exceeds the extra cost of hiring the unit of labour, i.e., until the extra revenue equals the extra cost.

Thus, if an additional unit of labour generates ₹ 300/- in extra revenue and costs an extra ₹ 200/- then it pays for the firm to hire this unit of labour as its total profit increases. This is an example of application of the general optimization principle.

The extra revenue generated by the use of an additional unit of labour is called the Marginal Revenue Product of Labour (MRP_L). This equals the Marginal Product of Labour (MP_L) times the Marginal Revenue (MR) from the sale of the extra output produced. Thus,

$$MRP_L = (MP_L)\ (MR)$$

The extra cost of hiring an additional unit of labour or Marginal Resource Cost of Labour (MRC_L) is equal to the increase in the total cost to the firm resulting from hiring the additional unit of labour. Thus,

$$MRC_L = \frac{\Delta TC}{\Delta L}$$

A firm should continue to hire labour as long as $MRP_L > MRC_L$ and until

$$MRP_L = MRC_L$$

This is applicable to any variable input and not just labour.

Notes

Case Study

Productivity Side of Indian Industries

Companies that attend to productivity and growth simultaneously manage cost reductions very differently from companies that focus on cost cutting alone and they drive growth very differently from companies that are obsessed with growth alone. It is the ability to cook sweet and sour that undergrids the remarkable performance of companies like Intel, GE, ABB and Canon.

In the slow growth electro-technical business, ABB has doubled its revenues from $17 billions to $35 billions, largely by exploiting new opportunities in emerging markets. For example, it has built up a 46,000 employee organisation in the Asia Pacific region, almost from scratch. But it has also reduced employment in North America and Western Europe by 54,000 people. It is the hard squeeze in the north and the west that generated the resources to support ABB's massive investments in the east and the south.

Everyone knows about the staggering ambition of the Ambanis, which has fuelled Reliance's evolution into the largest private company in India. Reliance has built its spectacular rise on a similar ability to cook sweet and sour. What people may not be equally familiar with is the relentless focus on cost reduction and productivity growth that pervades the company.

Reliance's employee cost is 4 per cent of revenues, against 15-20 per cent of its competitors. Its sales and distribution cost, at 3 per cent of revenues, is about a third of global standards. It has continuously pushed down its cost for energy and utilities to 3 per cent of revenues, largely through 100 per cent captive power generation that costs the company 4.5 cents per kilowatt-hour; well below Indian utility costs, and about 30 per cent lower than the global average.

Similarly, its capital cost is 25-30 per cent lower than its international peers due to its legendary speed in plant commissioning and its relentless focus on reducing the Weighted Average Cost of Capital (WACC) that, at 13 per cent, is the lowest of any major Indian firm.

A Bias for Growth

Comparing major Indian companies in key industries with their global competitors shows that Indian companies are running a major risk. They suffer from a profound bias for growth. There is nothing wrong with this bias, as Reliance has shown. The problem is most look more like Essar than Reliance. While they love the sweet of growth, they are unwilling to face the sour of productivity improvement.

Nowhere is this more amply borne out than in the consumer goods industry where the Indian giant Hindustan Lever has consolidated to grow at over 50 per cent while its labour productivity declined by around 6 per cent per annum in the same period. Its strongest competitor, Nirma, also grew at over 25 per cent per annum in revenues but maintained its labour productivity relatively stable. Unfortunately, however, its Return on Capital Employed (ROCE) suffered by over 17 per cent. In contrast, Coca Cola, worldwide, grew at around 7 per cent, improved its labour productivity by 20 per cent and its return on capital employed by 6.7 per cent.

The story is very similar in the information technology sector where Infosys, NIIT and HCL achieve rates of growth of over 50 per cent which compares favourably with the world's best companies that grew at around 30 per cent between 1994-95. NIIT, for example, strongly believes that growth is an impetus in itself. Its focus on growth has helped it

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double revenues every two years. Sustaining profitability in the face of such expansion is an extremely challenging task.

For now, this is a challenge Indian infotech companies seem to be losing. The ROCE for three Indian majors fell by 7 per cent annually over 1994-96. At the same time IBM Microsoft and SAP managed to improve this ratio by 17 per cent.

There are some exceptions, however. The cement industry, which has focused on productivity rather than on growth, has done very well in this dimension when compared to their global counterparts. While Mexico's Cemex has grown about three times fast as India's ACC, Indian cement companies have consistently delivered better results, not only on absolute profitability ratios, but also on absolute profitability growth. They show a growth of 24 per cent in return on capital employed while international players show only 8.4 per cent. Labour productivity, which actually fell for most industries over 1994-96, has improved at 2.5 per cent per annum for cement.

The engineering industry also matches up to the performance standards of the best in the world. Companies like Cummins India has always pushed for growth as is evidenced by its 27 per cent rate of growth, but not at the cost of present and future profitability. The company shows a healthy excess of almost 30 per cent over WACC, displaying great future promise.

BHEL, the public sector giant, has seen similar success and the share price rose by 25 per cent despite an indecisive sensex. The only note of caution: Indian engineering companies have not been able to improve labour productivity over time, while international engineering companies like ABB, Siemens and Cummins Engines have achieved about 13.5 per cent growth in labour productivity, on an average, in the same period.

The pharmaceuticals industry is where the problems seem to be the worst, with growth emphasised at the cost of all other performance. They have been growing at over 22 per cent, while their ROCE fell at 15.9 per cent per annum and labour productivity at 7 per cent.

Compare this with some of the best pharmaceutical companies of the world – Glaxo Wellcome, SmithKline Beecham and Pfizer –who have consistently achieved growth of 15-20 per cent, while improving returns on capital employed at about 25 per cent and labour productivity at 8 per cent. Ranbaxy is not an exception; the bias for growth at the cost of labour and capital productivity is also manifest in the performance of other Indian pharma companies. What makes this even worse is the Indian companies barely manage to cover their cost of capital, while their competitors worldwide such as Glaxo and Pfizer earn an average ROCE of 65 per cent.

In the Indian textile industry, Arvind Mills was once the shining star. Like Reliance, it had learnt to cook sweet and sour. Between 1994 and 1996, it grew at an average of 30 per cent per annum to become the world's largest denim producer. At the same time, it also operated a tight ship, improving labour productivity by 20 per cent.

Despite the excellent performance in the past, there are warning signals for Arvind's future. The excess over the WACC is only 1.5 per cent, implying it barely manages to satisfy its investors expectations of return and does not really have a surplus to re-invest in the business. Apparently, investors also think so, for Arvind's stock price has been falling since Q4 1994 despite such excellent results and, at the end of the first quarter of 1998, is less than ₹ 70 compared to ₹ 170 at the end of 1994.

Unfortunately, Arvind's deteriorating financial returns over the last few years is also typical of the Indian textile industry. The top three Indian companies actually showed a decline in their return ratios in contrast to the international majors. Nike, VF Corp and Coats Viyella showed a growth in their returns on capital employed of 6.2 per cent, while

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the ROCE of Grasim and Coats Viyella (India) fell by almost 2 per cent per annum. Even in absolute returns on assets or on capital employed, Indian companies fare a lot worse. While Indian textile companies just about cover their WACC, their international rivals earn about 8 per cent in excess of their cost of capital.

Questions

1. Is Indian companies running a risk by not giving attention to cost cutting?
2. Discuss whether Indian Consumer goods industry is growing at the cost of future profitability.
3. Discuss capital and labour productivity in engineering context and pharmaceutical industries in India.
4. Is textile industry in India performing better than its global competitors?

8.2 Law of Returns to Scale (Long Run)

If all inputs are changed at the same time (possible only in the long run), and suppose are increased proportionately, then the concept of returns to scale has to be used to understand the behaviour of output. The behaviour of output is studied when all factors of production are changed in the same direction and proportion.

In the long run, output can be increased by increasing the 'scale of operations'. When we speak of increasing the 'scale of operations' we mean increasing all the factors at the same time and by the same proportion.

Example: In a factory, in the long run, the scale of operations may be increased by doubling the inputs of labour and capital. The laws that govern the scale of operation are called the laws of returns of scale.

Caution The laws of returns to scale always refer to the long run because only in the long run are all the factors of production variable. In other words, only in the long run is it possible to change all the factors of production. Thus the laws of returns to scale refer to that time in the future when changes in output are brought about by increasing all inputs at the same time and in same proportion.

Returns to scale are classified as follows:

1. ***Increasing Returns to Scale (IRS):*** If output increases more than proportionate to the increase in all inputs.
2. ***Constant Returns to Scale (CRS):*** If all inputs are increased by some proportion, output will also increase by the same proportion.
3. ***Decreasing Returns to Scale (DRS):*** If increase in output is less than proportionate to the increase in all inputs.

For example, if all factors of production are doubled and output increases by more than two times, then the situation is of increasing returns to scale. On the other hand, if output does not double even after a cent per cent increase in input factors, we have diminishing returns to scale.

The general production function is

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

If land, K, and labour, L, is multiplied by h and Q increases by λ, we get,

$$\lambda Q = f(hL, hK)$$

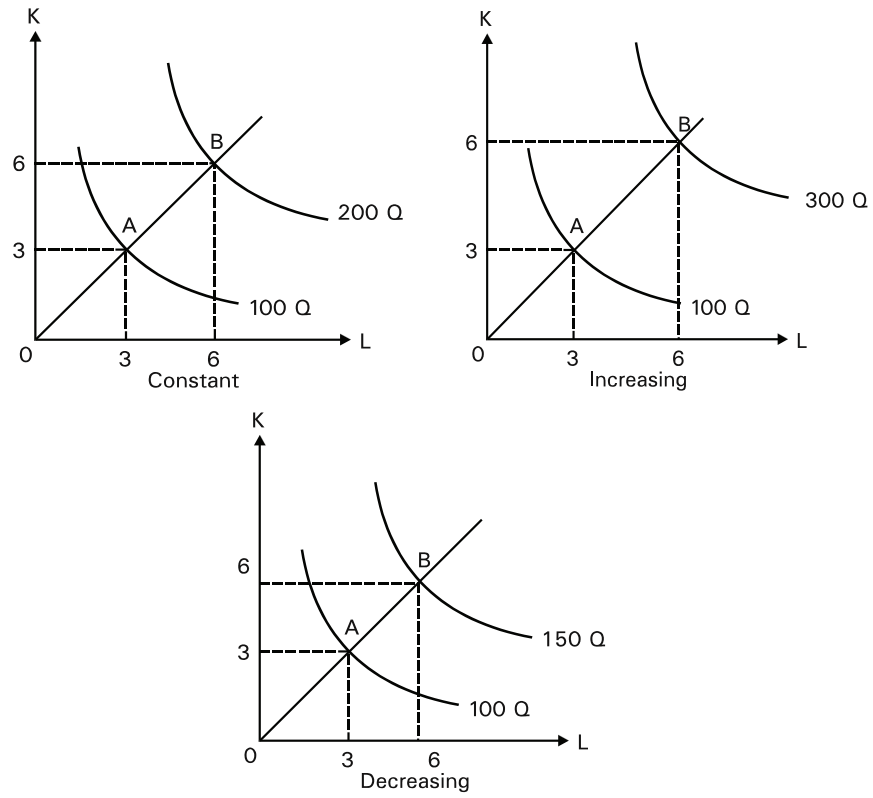
Notes

We have constant, increasing or decreasing returns to scale, respectively depending upon, whether $\lambda = h$, $\lambda > h$ or $\lambda < h$.

For example, if all inputs are doubled, we have constant, increasing or decreasing returns to scale, respectively, if output doubles, more than doubles or less than doubles.

The firm increases its inputs from 3 to 6 units (K, L) producing either double (point B), more than double (point C) or less than double (point D) output (Q) as shown in Figure 8.2.

Figure 8.2: Returns to Scale



Increasing returns to scale arise because as the scale of operation increases, a greater division of labour and specialization can take place and more specialised and productive machinery can be used. Decreasing returns to scale arise primarily because as the scale of operation increases, it becomes more difficult to manage the firm. In the real world, the forces for increasing or decreasing returns to scale often operate side by side, with the former usually overpowering the latter at small levels of output and the reverse occurring at very large levels of output.

If all the factors of production are increased in a particular proportion and the output increases in exactly that proportion then the production function is said to exhibit CRS. Thus if labour and capital are increased by 10% and the output also increases by 10% then the production function is CRS.

If you look at Figure 8.3, to produce X units of output, L units of labour and K units of capital are needed (point a). If labour and capital are now doubled (as is possible in the long run), so that there are 2L units of labour and 2K units of capital, the output is exactly doubled i.e., equals 2X (point b). Similarly, trebling input achieves treble the output and so on.

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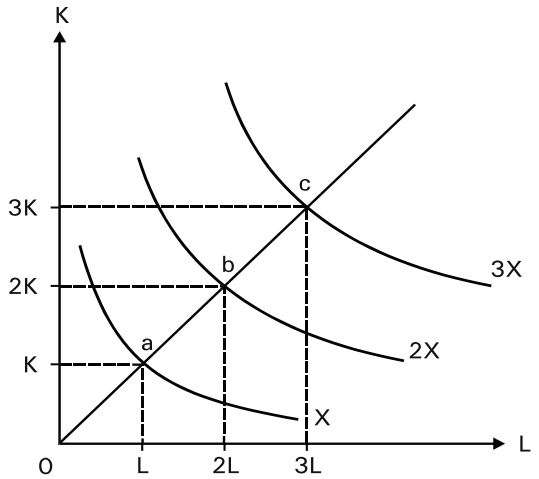
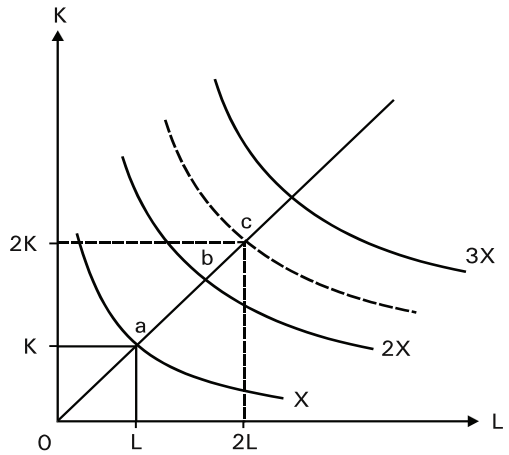
Figure 8.3: CRS Production Function



If all the factors of production are increased in a particular proportion and the output increases by more than that proportion then the production function is said to exhibits IRS. For example, in many industrial processes if all inputs are doubled, factories can be run in more efficient and effective ways, there by actually more than doubling output. This is shown in Figure 8.4. To produce X units of output, L units of Labour and K units of output are needed. If labour is doubled to 2L units and capital to 2K units, an output greater than 2X is produced (point c lies on a higher isoquant than point b).

If the factors of production are increased in a particular proportion and the output increases by less than that proportion than the production function is said to exhibit DRS. For example, if capital and labour are increased by 10% and output rises by less than 10% the production function is said to exhibit decreasing returns to scale.

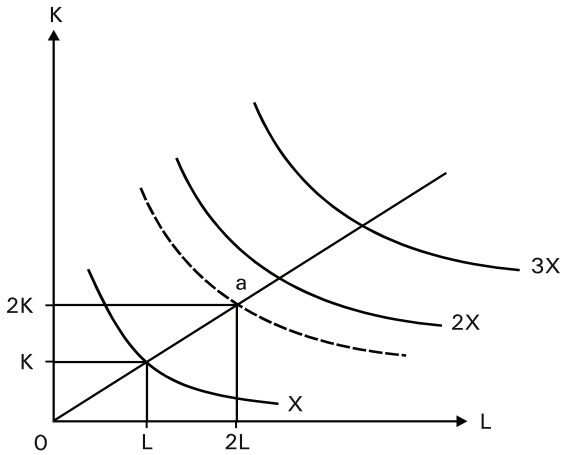
Figure 8.4: IRS Production Function



If you look at Figure 8.5, to produce X units of output L units of labour and K units of capital are required. By doubling the input, the output increases by less than twice its original level. For example, if inputs are 2L and 2K, output level 'a' is reached, which lies below the one showing 2X.

Notes

Figure 8.5: DRS Production Function



It is also necessary for students to know the causes for increasing and decreasing returns to returns to scale.

Notes

Causes of Increasing Returns to Scale

Increasing returns to scale are due to technical and/or managerial indivisibilities. One of the basic characteristics of advanced industrial technology is the existence of mass production methods. Mass production methods (like the assembly line car industry) are processes available only when the level of output is large. They are more efficient than the best available processes for producing small levels of output. For example, increasing returns of scale may happen because each worker has specialised in performing a simple repetitive task rather than many different tasks. As a result labour productivity increases. In addition, a larger scale of operation may permit the use of more productive specialised machinery, which was not practically possible on a lower scale of operation.

Cause of Decreasing Returns to Scale

The most common causes are "diminishing returns to management". The management is responsible for the coordination of the activities of the various sections of the firm. Even when authority is given to individual managers (production manager, sales manager, etc.) the final decisions have to be taken by the board of directors. As the output grows, top management becomes finally overburdened and hence less efficient in its role as coordinator and ultimate decision-maker. Although advances in management science have developed endless management techniques, it is still a commonly observed fact that as firms grow beyond the appropriate optimal, management diseconomies come in. These may result because as the scale of operations increases, communication difficulties make it more and more difficult to run the business effectively.

Another cause for decreasing returns may be found in the exhaustible natural resources: doubling the fishing fleet may not lead to a doubling of the catch of fish; or doubling the plant in mining or an oil extraction field may not lead to a doubling of output.

Notes

Tasks Production managers of a company estimate that their production process is currently characterised by the following short run production function:

$$Q = 72X + 15X^2 - X^3$$

where,

Q = Tonnes of boxes produced per production period and

X = units of variable input employed per production period.

1. Graphically illustrate the production function, indicating the following:
   (a) the range of increasing returns
   (b) the range of decreasing returns.
2. Determine the equation for the MP and AP of the variable factor.
3. What is the marginal product when seven units of the variable input are employed?
4. What is the maximum output capability per period?

Caselet

Apache Aims to Double Adidas Shoe Production

Apache Footwear India, the manufacturer for Adidas shoes in India, aims to double production of shoes from its special economic zone (SEZ) here to 8 lakh pairs a month by 2014.

At present, about four lakh pair of shoes are produced every month from the SEZ, located in Mambattu village of Nellore district.

"We have a target to double the production of shoes to 8 lakh pairs per month by 2014," Apache Footwear General Manager Phillip Chen said.

The company's SEZ, spread over 314 acres, recorded a turnover of ₹ 240 crore in 2010 and provides employment to about 6,300 people.

The company also plans to set up a development centre and supply centre in the state. These centres would help reduce the time taken for production of shoes.

"We are expecting that the turnover will increase to ₹ 300 crore this year," Chen said, adding that a proposed supplier park will help the firm bring down the lead time for production from two months at present to just five days.

Apache exports its shoes mainly to Europe, the US and Russia.

Chen said the firm is also trying to convince Adidas to buy raw material from India. "We are importing the entire raw material mainly from China, Vietnam and Indonesia," he added.

Germany-based Adidas is a leading sports apparel and equipment manufacturer.

Source: www.business-standard.com

Notes

8.3 Summary

- 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.
- The law of variable proportion of says that as more and more of the factor input is employed, all other input quantities remaining constant, a point will eventually be reached where additional quantities of varying input will yield diminishing marginal contributions to total product.
- Returns to scale are classified as: Increasing Returns to Scale (IRS), Constant Returns to Scale (CRS) and Decreasing Returns to Scale (DRS).
- Increasing Returns to Scale occurs if a proportional increase in all inputs under the control of a firm results in a greater than proportional increase in production.
- Decreasing Returns to Scale occurs if a proportional increase in all inputs under the control of a firm results in a less than proportional increase in production.
- Constant Returns to Scale occurs if a proportional increase in all inputs under the control of a firm results in an equal proportional increase in production.

8.4 Keywords

Law of variable proportions: refers to how the marginal production of a factor of production starts to progressively decrease as the factor is increased, in contrast to the increase that would otherwise be normally expected

Law of returns to scale: it explains the changes in production that occur when all resources are proportionately changed in the long run

Long-run: The time period when all inputs become variable.

Production function: A function that states the maximum amount of an output that can be produced with a certain combination of inputs, within a given period of time and with a given level of technology.

Short-run: The time period during which at least one input is fixed.

Variable inputs: Inputs that can be varied easily and on very short notice.

8.5 Self Assessment

Fill in the blanks:

1. As per Law of Variable Proportions, when MP is equal to AP, AP is at its .....
2. In the third stage of Law of Diminishing Returns, there are ..... marginal returns.
3. A sensible firm would like to operate in the ..... stage of production.
4. In ..... stage of production, any additional input employed would lead to a fall in output.
5. In ..... returns to scale, the proportionate increase in input is not equal to the proportionate change in output.
6. As we added more and more of variable input to a fixed input, the amount of extra product will .....

Notes

7. Under decreasing return to scale increase in output is ..... than proportionate to the increase in input.
8. Increasing return to scale are due to ..... and/or managerial indivisibilities.
9. Technical indivisibilities cause ..... returns to scale.
10. In the long run, output can be ..... by increasing the scale of operations.

8.6 Review Questions

1. Comment on the role of specialization in increasing returns to scale.
2. Examine the importance of the law of diminishing returns. What do you think to be its causes and effects?
3. Are diminishing returns to a factor inevitable? Give reasons.
4. From the information given below calculate the average and marginal product of labour.

Land (acres)	:	5	5	5	5	5	5	5	5
Labour (number of men)	:	0	1	2	3	4	5	6	7
Total product (kg.)	:	0	3	8	12	15	17	17	16

5. Give your comment on second stage of production.
6. Can labour productivity never increase when total production is falling? Discuss.
7. Analyse the day to day situations around you and provide evidence against the hypothesis of constant returns to scale.
8. Suppose the production function for widgets has the form

   $Q = q(K,L) = 50K^{0.3}L^{0.7}$

   Where q is the quantity of tools per day, K is the quantity of capital input, and L is the quantity of labor input per day.

   (a) Does this production function have increasing, constant, or decreasing returns scale?

   (b) What is the marginal product of capital when the firm is suing 5 units of capital and 1 unit of labour?

   (c) What is the marginal product labor when the firm is using 5 units of labor and 1 unit of capital?

   (d) What is the total output when the firm is using 5 units of capital and 5 units of labor? Draw an isoquant representing this level of output.

   (e) What additional information would you need to determine which of the combinations on your isoquant is "best"? That is what would you want to know to choose the best combination of labor and capital to use in your production process?
9. "Technical and/or managerial indivisibilities cause increasing return to scale." Give your opinion.
10. Discuss returns to scale with the help of examples.

Notes

Answers: Self Assessment

1.	maximum	2.	negative
3.	second	4.	third
5.	increasing and decreasing	6.	fall off
7.	less	8.	technical
9.	increasing	10.	increased

8.7 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books, Delhi.

H.Craig Patersen, *Managerial Economics,* Prentice Hall.

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford.

Sampat Mukherjee, *Microeconomics,* Prentice Hall.

Online links

ingrimayne.com/econ/TheFirm/ProductionFunct.html

faculty.lebow.drexel.edu/McCainR/top/Prin/txt/MPCh/firm4a.html

http://www.docshare.com/doc/211217/PRODUCER-EQUILIBRIUM

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Unit 9: Cost Concepts

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Objectives

After studying this unit, you will be able to

- List the types of cost
- Explain the behaviour of cost curves in short run
- Describe the behaviour of cost curves in the long run
- Discuss the linkage between cost, revenue and output through optimisation
- State the concept of economies of scale

Notes

Introduction

Cost is one of the most important considerations for suppliers or producers.

Example: For producing a motorcycle, producer needs spare parts, labour, transport etc... All of them have their own price which is the cost for the producer.

Costs play a very important role in decisions involving a selection between alternative courses of action.

Costs enter into almost every economic decision and it is important to use the right analysis of cost. Even in your routine decisions, analysis of cost is involved.

Example: You might choose to buy clothes from Shop A because the clothes there are cheaper than anywhere else and since, it is near your house, you save your time and energy too. So, you save on monetary as well as time and energy costs.

Hence, it is important to understand what these various concepts of costs are, how these can be defined and used.

9.1 Types of Costs

Cost is something of value, usually an amount of money, given up in exchange for something else, usually goods or services. In other words, Cost is the value that must be given up to acquire or produce a good or service. All expenses are costs, but not all costs are expenses. (An expense is the cost of resources used to produce revenue.) As a verb, cost means to estimate the amount of money needed to produce a product or perform a service.

There are many different types of costs, as discussed in following subsection.

9.1.1 Future and Past Costs

Future is uncertain and it is an important consideration of all business decisions. Future costs are the estimates of time adjusted past or present costs and are reasonably expected to be incurred in some future period or periods. Their actual incurrence is a forecast and their management is an estimate. They are the only costs that matter for managerial decisions because they are subject only to management control. The major managerial uses where future costs are relevant are: cost control, projection of future profit and loss statements, appraisal of capital expenditure, introduction of new products, expansion programmes and pricing.

Past costs are actual costs incurred in the past and they are always contained in the income statements. Their measurement is essentially a record keeping activity. These costs can only be observed and evaluated in retrospect. Past costs are, therefore, those unadjusted historical cost data which have been recorded in the books.

9.1.2 Incremental and Sunk Costs

Incremental costs are defined as the change in overall costs that result from particular decisions being made. Incremental costs may include both fixed and variable costs. In the short period, incremental cost will consist of variable cost – costs of additional labour, additional raw materials, power, fuel, etc. – which is the result of a new decision being taken by the firm. Since these costs can be avoided by not bringing about any change in the activity, incremental costs are also called avoidable costs or escapable costs. Moreover, since incremental costs may also be regarded as the difference in total costs resulting from a contemplated change, they are also called differential costs.

Notes

Sunk cost is one which is not affected or altered by a change in the level or nature of business activity. It will remain the same whatever the level of activity. The most important example of sunk cost is the amortisation of past expenses, e.g., depreciation. Sunk costs are irrelevant for decision making as they do not vary with the changes considered for future by the management.

9.1.3 Replacement and Historical Costs

Historical cost of an asset states the cost of plant, equipment and materials at the price paid originally for them, while the replacement cost states the cost that the firm would have to incur if it wants to replace or acquire the same asset now.

Example: If the price of bronze at the time of purchase, say, in 1974, was ₹ 15 a kg and if the present price is ₹ 18 a kg, the original cost of ₹ 15 is the historical cost while ₹ 18 is replacement cost. Replacement cost means the price that would have to be paid currently for acquiring the same plant.

9.1.4 Explicit Costs and Implicit or Imputed Costs (Accounting Concept of Cost and Economic Concept of Cost)

Explicit costs are those expenses which are actually paid by the firm (paid-out-costs). These costs appear in the accounting records of the firm. On the other hand, implicit costs are theoretical costs in the sense that they go unrecognised by the accounting system. These costs may be defined as the earnings of those employed resources which belong to the owner himself. The examples of such costs are opportunity cost of the owner's services, say, as the manager of the firm, opportunity cost of land belonging to the owner of the firm and normal return equal to the market rate of interest on the owner's own capital invested in the business. These implicit costs are not included by the accountant of the firm in its accounting statements. However, these costs are considered relevant by economists while calculating the economic profits of the firm.

9.1.5 Actual Costs and Opportunity Costs

Actual costs mean the actual expenditure incurred for acquiring or producing a good or service. These costs are the costs that are generally recorded in books of account, for example, actual wages paid, cost of materials purchased, interest paid, etc. These costs are also commonly called absolute costs or outlay costs.

The concept of opportunity cost occupies a very important place in modern economic analysis. The opportunity costs or alternative costs are the returns from the second best use of the firm's resources which the firm forgoes in order to avail itself of the returns from the best use of the resources.

Example: A farmer who is producing wheat can also produce potatoes with the same factors. Therefore, the opportunity cost of a quintal of wheat is the amount of the output of potatoes given up.

Thus, we find that the opportunity cost of anything is the next best alternative that could be produced instead by the same factors or by an equivalent group of factors, costing the same amount of money. Two points must be noted in this definition. Firstly, the opportunity cost of anything is only the next best alternative foregone. Secondly, in the above definition it is the addition of the qualification "or by an equivalent group of factors costing the same amount of money".

The alternative or opportunity cost of a good can be given a money value. In order to produce a good the producer has to employ various factors of production and has to pay them sufficient

prices to get their services. These factors have alternative uses. The factors must be paid at least the price they are able to obtain in the alternative uses.

Example: Suppose a businessman can buy either a washing machine or a press machine with his limited resources and suppose that he can earn annually ₹ 40,000 and ₹ 60,000 respectively from the two alternatives. A rational businessman will certainly buy a press machine which gives him a higher return. But, in the process of earning ₹ 60,000, he has forgone the opportunity to earn ₹ 40,000 annually from the washing machine. Thus, ₹ 40,000 is his opportunity cost or alternative cost.

The difference between actual and opportunity costs is called economic rent or economic profit.

Example: Economic profit from press machine in the above case is ₹ 60,000 – ₹ 40,000 = ₹ 20,000. So long as economic profit is above zero, it is rational to invest resources in press machine.

9.1.6 Direct (or Separable or Traceable) Costs and Indirect (or Common or Non-traceable) Costs

There are some costs which can be directly attributed to the production of a unit of a given product. Such costs are direct costs and can easily be separated, ascertained and imputed to a unit of output. This is because these costs vary with the output units. However, there are other costs which cannot be separated and clearly attributed to individual units of production. These costs are, therefore, classified as indirect costs in the accounting process.

Example: Electricity charges may not be separable department-wise in a single product firm or even product-wise in a multiple product firm. In a university, the salary of a vice-chancellor is not traceable department-wise while that of a professor may be traceable department-wise.

Since all the direct costs are linked to a particular product/process/department, they vary with changes in them. In other words, all direct costs are variable. On the other hand, indirect costs may or may not be variable. Common costs may or may not change as a result of the proposed changes in production level, production process or marketing process. So, indirect costs are both variable and fixed types.

9.1.7 Shut-down and Abandonment Costs

Shut-down costs are required to be incurred when the production operations are suspended and will not be necessary if the production operations continue.

Example: If the production is suspended, the plant, machinery or equipment will have to be protected by putting up sheds, using tarpaulin, plastic sheets, etc. Such costs are called shut-down costs.

When any plant is to be permanently closed down, some costs are to be incurred for disposing off the fixed assets. These costs are called abandonment costs.

9.1.8 Fixed and Variable Costs

There are some inputs or factors which can be adjusted with the changes in the output level.

Example: If a shirt manufacturer who produces 500 shirts per day wants to produce 1000 shirts per day now, can readily employ more labour and buy more raw materials. Thus, labour, machinery, raw materials are the factors which can be readily varied with the change in output. Such factors are called variable factors.

Notes

On the other hand, there are factors such as capital equipment, building, top management personnel which cannot be readily varied – it requires a comparatively long time to make variations in them. It takes time to expand a factory building or to build a new factory building with larger area or capacity. Similarly, it also takes time to order and install new machinery.

Fixed costs are those which are independent of output, i.e., they do not change with changes in output. These costs are a "fixed" amount which must be incurred by a firm in the short run, whether the output is small or large. Fixed costs are also known as overhead costs and include charges such as contractual rent, insurance fee, maintenance costs, property taxes, interest on the capital invested, minimum administrative expenses such as manager's salary, watchman's wages, etc. Thus, fixed costs are those which are incurred in hiring the fixed factors of production whose amount cannot be altered in the short run.

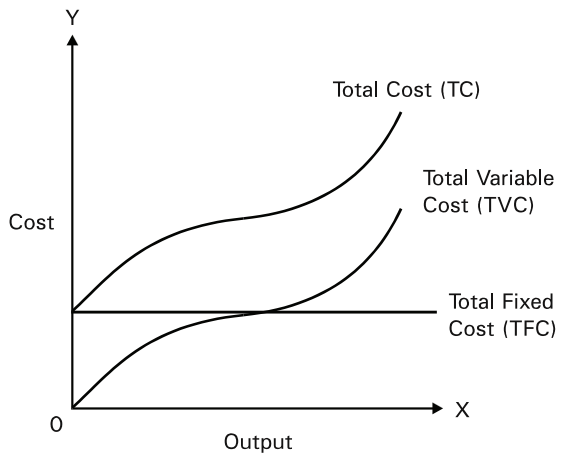
Variable costs, on the other hand, are those costs which are incurred on the employment of variable factors of production whose amount can be altered in the short run. Thus, the total variable costs change with changes in output in the short run. These costs include payments such as wages of labour employed, the price of the raw material, fuel and power used, the expenses incurred on transporting and the like. Variable costs are also called prime costs.

Total cost of a business firm is the sum of its total variable costs and total fixed costs.

Thus, $$TC = TFC + TVC$$

In Figure 9.1, output is measured on the X-axis and cost on Y-axis. Since the total fixed cost remains constant whatever the level of output, the total Fixed Cost Curve (TFC) is parallel to the X-axis. This curve starts from a point on the Y-axis meaning thereby that the total fixed cost will be incurred even if the output is zero.

Figure 9.1: Total Cost Curves



On the other hand, the Total Variable Cost (TVC) Curve rises upward showing thereby that as the output is increased, the total variable costs also increase. The Total Variable Cost (TVC) starts from the origin which shows that when output is zero the variable costs are also zero. It should be noted that total cost is a function of the total output, the greater the output, the greater will be the total cost. In symbols, we can write

$$TC = f(q), \text{ where q is the output}$$

Total Cost (TC) Curve has been obtained by adding up 'vertically' the total fixed cost curve and total variable cost curve because the total cost is a sum of total fixed cost and total variable cost. The shape of the total cost curve is exactly the same as that of total variable cost curve because the same vertical distance always separates the two curves.

Notes

Caselet **Input Costs and Profit Levels of Maruti Udyog Ltd (MUL)**

Maruti currently dominates India's small car market and has a share of more than 80 per cent in its overall car market. MUL, a 50:50 joint venture between the Indian government and Japan's Suzuki Motors Corporation posted net profit of ₹ 6510 crores in 1997-98 (April - March) compared with ₹ 5,100 crores in the previous year. But MUL could find it difficult to maintain its profit levels because of soaring input costs and a slowdown in the market. Input costs had risen substantially due to the imposition of a special additional duty, an increase in levies on cold rolled steel and a restriction on reclaims of value-added tax to 95 per cent of the amount. Due to the slowdown in the market and increasing competition, it will be very difficult to pass on the cost increase to customers, thus, leading to a squeeze on margins.

9.2 Short Run and Long Run Costs

The short run is a period of time in which the output can be increased or decreased by changing only the amount of variable factors such as labour, raw materials, chemicals, etc. In the short run the firm cannot build a new plant or abandon an old one. If the firm wants to increase output in the short run, it can only do so by using more labour and more raw materials.

Long run, on the other hand, is defined as the period of time in which the quantities of all factors may be varied. All factors being variable in the long run, the fixed and variable factors dichotomy holds good only in the short run. In other words, it is that time-span in which all adjustments and changes are possible to realise.

Short run costs are those costs that can vary with the degree of utilisation of plant and other fixed factors. In other words, these costs relate to the variation in output, given plant capacity. Short run costs are therefore, of two types: fixed costs and variable costs. In the short run, fixed costs remain unchanged while variable costs fluctuate with output.

Long run costs in contrast are costs that can vary with the size of the plant and with other facilities normally regarded as fixed in the short run. In fact, in the long run there are no fixed inputs and therefore, no fixed costs, i.e., all costs are variable.

9.2.1 Costs in Short Run

The short run cost-output relationship refers to a particular scale of operation or to a fixed plant. That is, it indicates variations in cost over output for the plant of a given capacity and their relationship will vary with plants of varying capacity.

For decision-making, one needs to know not only the relationship between total cost and output but also separately between various types of costs and output. Thus, the short run cost-output relationship needs to be discussed in terms of:

1. Total cost and output
2. Average costs and output
3. Marginal cost and output.

Notes

Average Fixed Cost (AFC)

Average fixed cost is the total fixed cost divided by the number of units of output produced. Therefore,

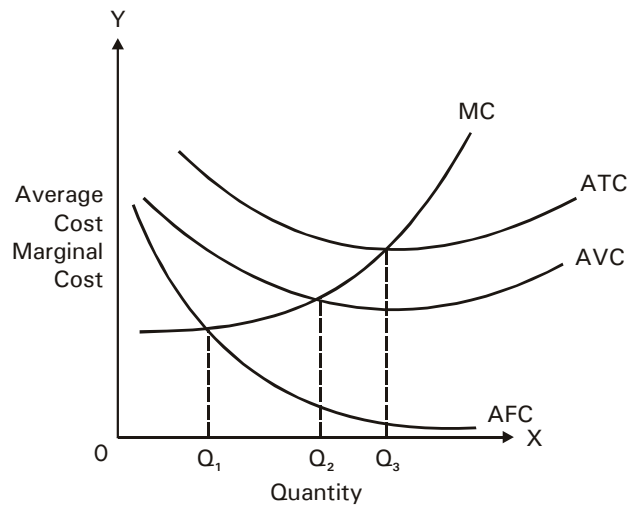
$$AFC = \frac{TFC}{Q}$$

Where,

Q represents the number of units of output produced.

Thus, average fixed cost is the fixed cost per unit of output. Since total fixed cost is a constant quantity, average fixed cost will steadily fall as output increases. Therefore, average fixed cost curve slopes downward throughout its length. As output increases, the total fixed cost spreads over more and more units and, therefore, average fixed cost becomes less and less. When output becomes very large, average fixed cost approaches zero. Average fixed cost curve, which is a rectangular hyperbola, showing at all its points, the same magnitude, is shown in Figure 9.2.

Figure 9.2: Per Unit Output Cost Curve



Average Variable Cost (AVC)

Average variable cost is the total variable cost divided by the number of units of output produced. Therefore,

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

Thus, average variable cost is the variable cost per unit of output.

We know that the Total Variable Cost (TVC) at any output level consists of payments to the variable factors used to produce that output. Therefore TVC = $P_1V_1 + P_2V_2 + \ldots P_nV_n$ where P is the unit price and V is the amount of the variable input. Average variable cost for a level of output (Q), given P is

$$AVC = \frac{TVC}{Q} = \frac{PV}{Q} = \left[P\frac{V}{Q}\right]$$

Notes

Since the Average Product (AP) of an input is the total output divided by the number of units of input (V), so we can write

$$\frac{V}{Q} = \frac{1}{Q/V} = \frac{1}{AP}$$

$$AVC = P\left[\frac{V}{Q}\right] = P\left[\frac{1}{AP}\right]$$

That is, average variable cost is the price of the input multiplied by the reciprocal of the average product of the input. We know that due to first increasing and then decreasing marginal returns to the variable input, average product initially rises, reaches a maximum and then declines. Since average variable cost is 1/AP, the average variable cost normally falls, reaches a minimum and then rises. It first declines and then rises for reasons similar to those operating in case of TVC. This is shown in Figure 9.2. (You will learn more about Average Product in the next unit.

Average Total Cost (ATC)

The average total cost or what is called simply average cost is the total cost divided by the number of units of output produced. Therefore,

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

Since the total cost is the sum of total variable cost and total fixed cost, the average total cost is also the sum of average variable cost and average fixed cost.

This can be proved as follows:

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

Since $TC = TVC + TFC$

Therefore,

$$ATC = \frac{TVC + TFC}{Q}$$

$$= \frac{TVC}{Q} + \frac{TFC}{Q}$$

$$= AVC + AFC$$

Caution Average total cost is also known as unit cost, since it is cost per unit of output produced.

The behaviour of the average total cost curve will depend on the behaviour of the average variable cost curve and average fixed cost curve. In the beginning both AVC and AFC curves fall. The ATC curve, therefore, falls sharply in the beginning. When AVC curve begins rising, but AFC curve is falling steadily, the ATC curve continues to fall. But as output increases, there is a sharp rise in AVC which more than offsets the fall in AFC. Therefore, the ATC curve rises after a point. This is shown in Figure 9.2.

Short Run Marginal Cost (MC) and Output

Marginal cost is the addition to the total cost caused by producing one more unit of output. In other words, marginal cost is the addition to the total cost of producing n units instead of n-1 units.

$$MC_n = TC_n - TC_{n-1}$$

Notes

In symbols, marginal cost is rate of change in total cost with respect to a unit change in output, i.e.,

$$MC = \frac{d(TC)}{dQ}$$

Where,

d in the numerator and denominator indicates the change in TC and Q respectively.

It is worth pointing out that marginal cost is independent of the fixed cost. Since fixed costs do not change with output, there are no marginal fixed costs when output increases in the short run. It is only the variable costs that vary with output in the short run. Therefore, marginal costs are, in fact, due to the changes in variable costs.

The independence of the marginal cost from the fixed cost can be proved algebraically as follows:

$$\begin{aligned} MC_n &= TC_n - TC_{n-1} \\ &= (TVC_n + TFC) - (TVC_{n-1} + TFC) \\ &= TVC_n + TFC - TVC_{n-1} - TFC \\ &= TVC_n - TVC_{n-1} \end{aligned}$$

Hence, marginal cost is the addition to the total variable costs when output is increased from n-1 units to n units of output. It follows, therefore, that the marginal cost is independent of the amount of fixed costs.

In Table 9.1, MC is the slope of the TC curve. As TC curve first rises at a decreasing rate and later on at an increasing rate, MC curve will also, therefore, first decline and then rise.

Table 9.1: The Relationship between MC, AC and TC

Unit of goods produced (1)	Total Cost TC (2)	Average Cost AC = TC/units produced (3 = 2/1)	MC = {(TC_n) – (TC_{n-1})} (4)
10	5000	500	-
11	5300	481.82	300
12	5550	462.5	250
13	5700	438.46	150
14	5950	425.0	250
15	6350	423.33	400

Advantage of TC: break-even analysis profit of firm

Advantage of AC: calculating per unit profit of a firm

Advantage of MC: to decide whether a firm needs to expand or not

The properties of the average costs (AVC, AFC, ATC) and marginal costs can briefly be described as follows:

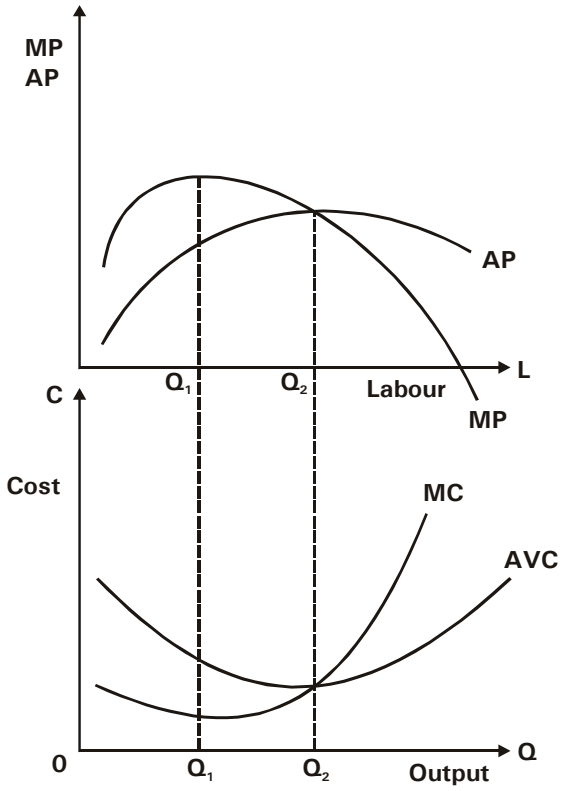
1. AFC declines continuously, approaching both axes asymptotically.
2. AVC first declines, reaches a minimum and rises thereafter. When AVC attains minimum, MC equals AVC.
3. As AFC approaches asymptotically the horizontal axis, AVC approaches ATC asymptotically.

Notes

4. ATC first declines, reaches a minimum and rises thereafter. When ATC attains its minimum, MC equals ATC.

5. MC first declines, reaches a minimum and rises thereafter – MC equals AVC and ATC when these curves attain their minimum values. Furthermore, MC lies below both AVC and ATC when they are declining; it lies above them when they are rising.

Figure 9.3: The Cost Curves are the Mirror Image of the Shape of Corresponding Productivity Curves



The average total cost curve is the vertical summation of the average fixed cost curve and average variable cost curve so it is always higher than both of them.

Average total cost initially falls faster and then rises more slowly than average variable cost. If one increased output enormously, the average variable cost curve and the average total cost curve would almost meet.

The average and marginal productivity curves, when drawn with corresponding cost curves, show that they are the mirror image of each other. The minimum point of the average variable cost curve is at the same level of output as the maximum point of the average productivity curve; the minimum point of the marginal cost curve is for the same level of output as the maximum point on the marginal productivity curve. When the productivity curves are falling, the corresponding cost curves are rising because as productivity falls, cost per unit increases; and as productivity increases, costs per unit decrease.

In Figure 9.4, when output is between Q and Q_1, the marginal cost curve is above the average variable cost curve, so average variable cost is rising but the MC curve is below the average total cost curve, so average total cost is falling.

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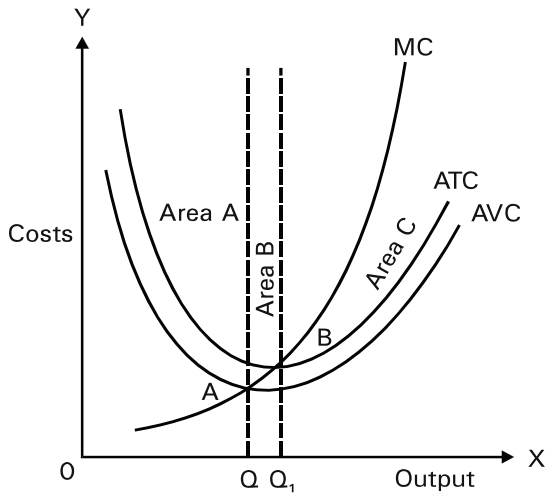
Figure 9.4: Relation between MC and AC Curves



The reason is that average total cost includes average variable cost, but it also includes average fixed cost, which is falling. As long as short run marginal cost is only slightly above average variable cost, the average total cost will continue to fall. Or, once marginal cost is above average variable cost, as long as average variable cost doesn't rise by more than average fixed cost falls, average total cost will still fall.

Task An economic consultant is presented with the following table on average productivity and asked to derive a table for average variable cost. The price of labour is ₹ 15 per hour.

Labour	1	2	3	4	5
TP	5	15	30	36	40

Help him to do so.

9.2.2 Costs in the Long Run

The long run is a period of time during which the firm can vary all its inputs. None of the factors is fixed and all can be varied to expand output. Long run is a period of time sufficiently long to permit changes in the plant, that is, in capital equipment, machinery, land, etc., in order to expand or contract output. The long run cost of production is the least possible cost of production of producing any given level of output when all inputs are variable including the size of the plant. In the long run there is no fixed factor of production and hence there is no fixed cost.

If $Q = f(L, K)$

$TC = L.P_L + K.P_K$

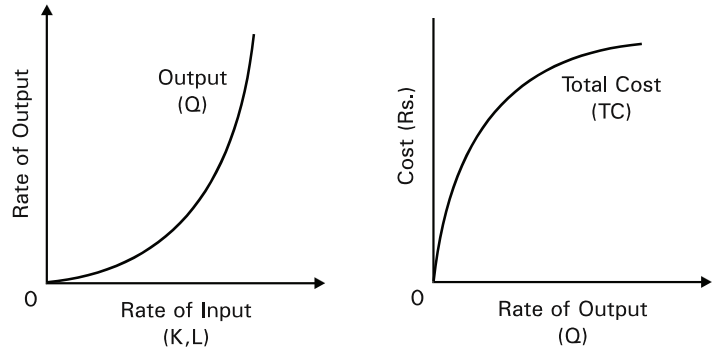
Given factor prices and a specific production function, one can draw an expansion path which gives the least costs associated with various levels of output which in fact yields the long run total cost schedule/curve. LTC is an increasing function of output. The rates of change in these

Notes

two variables are not known unless the qualitative relationship is quantified. If one recalls the concept of returns to scale and assumes fixed factor prices, one could see three things:

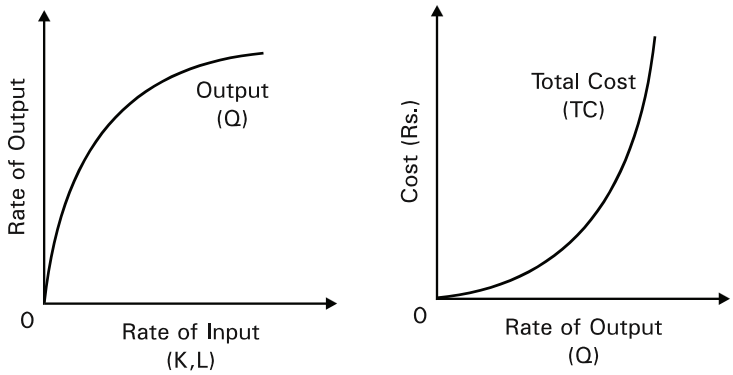
1. When returns to scale are increasing, inputs are increasing less than in proportion to increases in output. It follows that total cost also must be increasing less than in proportion to output. This relationship is shown in Figure 9.5(a).

Figure 9.5(a): Increasing Returns to Scale



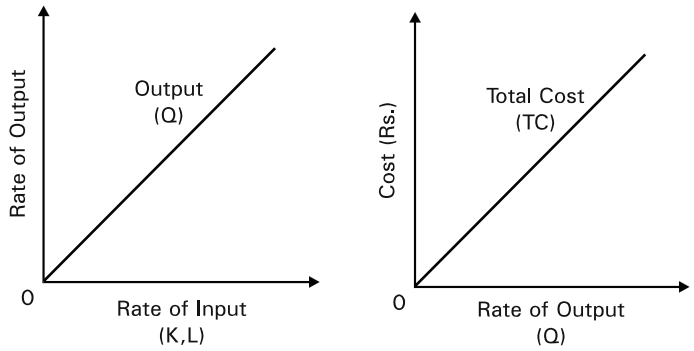
2. When returns to scale are decreasing, total cost increases at a faster rate than does output. This relationship is shown in Figure 9.5(b).

Figure 9.5(b): Decreasing Returns to Scale



3. When returns to scale are constant, total cost and output move in the same direction and same proportion. This is also shown in Figure 9.5(c).

Figure 9.5(c): Constant Returns to Scale



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Thus, depending upon the nature of returns to scale, there will be a relationship between LTC and output, given factor prices. It is generally found that most industries and firms reap increasing returns to scale to start with which are followed by constant returns to scale which give place to decreasing returns to scale eventually. In this case, the long run total cost function first would increase at a decreasing rate and then increase at an increasing rate as shown in Figure 9.6. Such a total cost function would be associated with a U-shaped long run average cost function.

From LTC curve we can derive the firm's Long run Average Cost (LAC) curve. LAC is the Long run Total Cost (LTC) divided by the level of the output (Q). That is,

$$LAC = \frac{LTC}{Q}$$

Similarly, from the LTC curve we can also derive the Long run Marginal Cost (LMC) curve. This measures the change in LTC per unit change in output and is given by the slope of the LTC curve. That is,

$$LMC = \frac{\Delta TC}{\Delta Q} \text{ or } \frac{d(LTC)}{dQ}$$

The relationships among the long run total cost, long run marginal cost with respect to output are explained in the following Table 9.2 and Figure 9.6.

Figure 9.6

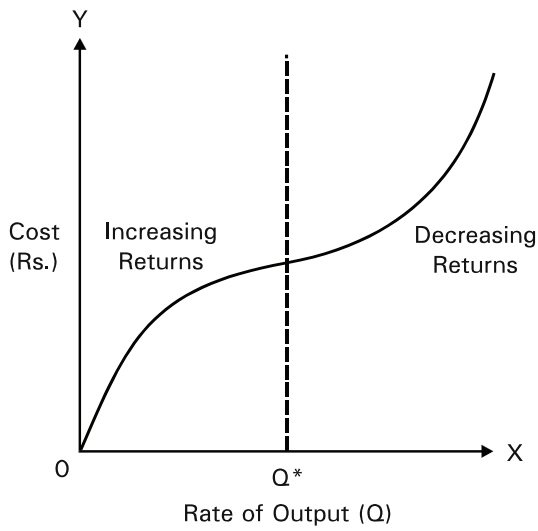


Table 9.2

Q	LTC	LAC	LMC
0	0	-	-
5	25	5.00	5
10	45	4.50	4
15	60	4.00	3
20	85	4.25	5
25	120	4.85	7
30	180	6.00	12

The graphs of above relationships are provided in Figure 9.7.

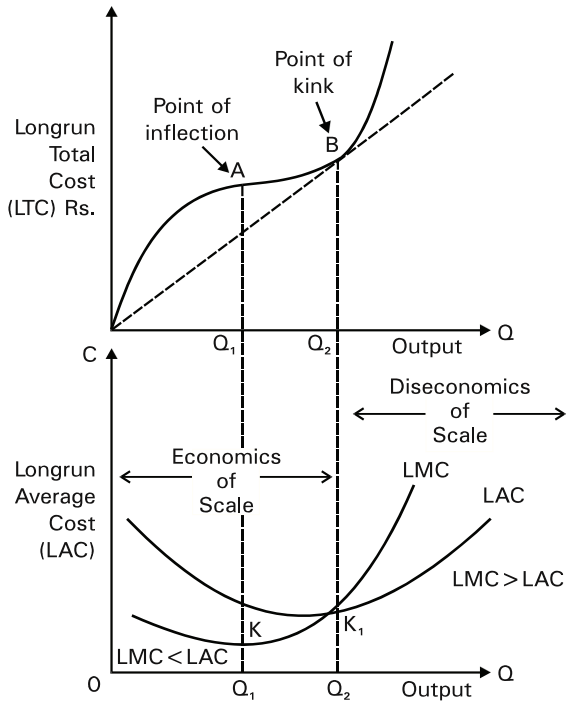
Notes

The LTC curve gives the least total cost for various levels of output when all the factors of production are variable. Its shape is such that the curve is first concave and then convex as looked from the output axis. As seen above its shape follows from the operations of the varying degrees of returns of scale, given the factor prices.

The relationship between LAC and LMC follow from that of LTC curve. Both LAC and LMC are U-shaped. Further, the following relationships hold good

1. At the point of inflection on LTC curve (A), LMC takes the minimum value.
2. At the point of kink of LTC curve (B) – where the slope of the straight line from origin to the LTC curve is the minimum – LAC assumes the minimum value.
3. LAC is the least when LMC = LAC.
4. LAC curve is falling when LMC < LAC.
5. LAC curve is rising when LMC > LAC.

Figure 9.7



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Case Study

PSEs: You Decide

There has been much debate about Public Sector Enterprises (PSEs) ever since Chidambaram set up the Disinvestment Commission under G V Ramakrishna. Some speak of restructuring before disinvestment, others the reverse, and yet others hang on to their socialist shibboleths. This column is no place to evaluate the debate, except to say that the raison d'etre for State intervention — externalities and market failure — have been long debased by having PSEs in hotels, textiles, cement, bread, aerated water, leather, bicycles, tyres, photo-films and virtually everywhere else where markets work perfectly well. Instead, let us discuss some incontrovertible evidence about the performance of PSEs so that readers can come to their own conclusions.

Facing the Facts

The facts about centrally owned PSEs that are presented here are culled from two reputable sources (i) the Public Enterprises Survey, which is published annually and covers 240 odd PSEs excluding banks, financial institutions and insurance companies, and (ii) the annual accounts of 500 top private sector manufacturing companies, ranked by sales. The analysis is from research that was undertaken for the Organisation for Economic Cooperation and Development.

Fact Number 1

In the last 10 years, these 240 PSEs have never earned returns exceeding 5 per cent of capital employed. In other words, a taxpayer is better off putting hard-earned money in one-year fixed deposits (see Chart A). Indeed, compared to the government's 365 day treasury bills, the PSEs have consistently given negative returns that exceed 6 percentage points.

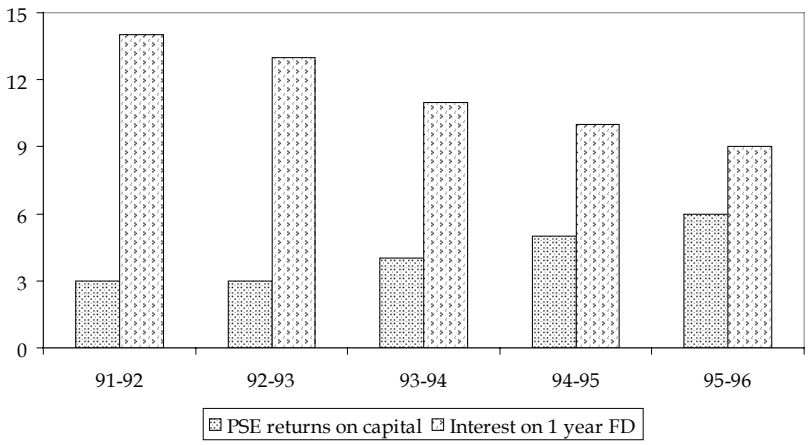

Chart A: PSEs don't give much, do they?

Fact Number 2

On the whole, these PSEs are far less profitable than comparable private sector companies. In the last five years, the difference in net profits as a percentage of sales between PSEs as a whole and the private sector has been substantial, as Chart B shows.

The divergence is even more dramatic if one nets out of the 14 PSEs which form the state-owned petroleum monopoly. Today, the difference in profitability between the private sector and non-petroleum PSEs is a staggering 6 percentage points.

"So what?" comrades Surjeet and Yechuri would say. After all, PSEs were set up to augment the capital stock of the nation, promote balanced economic growth, foster employment and

Contd...

Notes

create centres of technical and managerial excellence. These involve social benefits, and only a benighted, Western-trained economist to the right Genghis Khan could use private profit calculus to evaluate the contribution of our PSEs. Fair enough. Let us not look at profitability, that base capitalist concept. Instead, let us look at costs, which even Enver Hoxha would have desired to minimise.

Fact Number 3

PSEs as a whole are worse off even in terms of cost per rupee of sales. Chart C shows that PSEs suffer from an almost eight-point disadvantage in terms of fixed costs as a percentage of sales; the non-petroleum PSEs are worse off to the tune of almost 20 points.

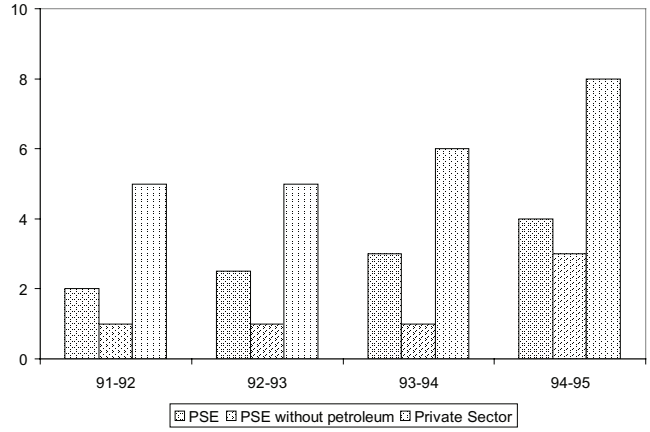

Chart B: Net Profit as % of Sales

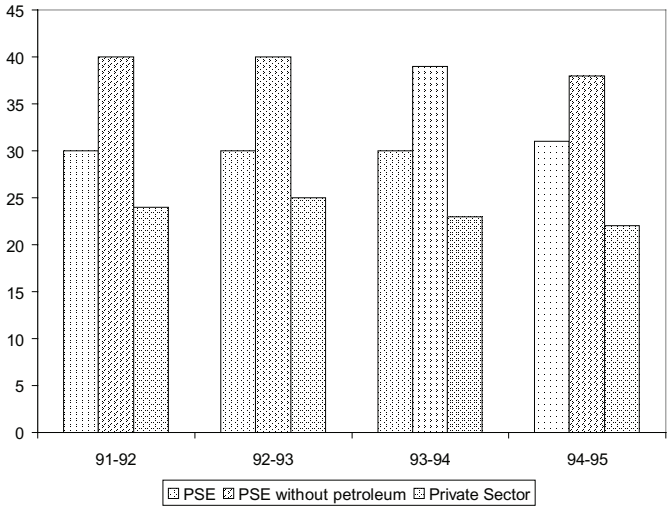

Chart C: Fixed Cost as % of Sales

Thanks to higher fixed costs (over-staffing, greater interest costs, etc.), PSEs fare poorly in average total costs. They are at least 5 points off compared to the private sector companies and over 9 points off if one excludes the petroleum monopolies. How long can most of these firms survive competition in such a state? Isn't it a crime not to take a decision one way or the other? You decide.

Question

What is the reason of U-shaped average cost curve in this case?

Source: Business India, 97

Notes

9.3 Linkage between Cost, Revenue and Output through Optimisation

We need to understand the concept of revenue and who it is related to cost. First, let's discuss the various types of revenues.

Total Revenue (TR)

Total revenue is the total money received from the sale of any given quantity of output.

The total revenue is calculated by taking the price of the sale times the quantity sold, i.e.

TR = Price × Quantity.

Example: If price is ₹ 10 and quantity sold is 100, then total revenue would be ₹ 1000.

Average Revenue (AR)

Average revenue is the revenue received for selling a good per unit of output sold. It is calculated by dividing total revenue by the quantity of output, i.e.

AR= TR/Quantity

Average revenue often goes by a simpler and more widely used term- price. Using the longer term average revenue rather than price provides a connection to other related terms, especially total revenue and marginal revenue. When compared with average cost, average revenue shows the amount of profit generated per unit of output produced.

Marginal Revenue (MR)

Marginal revenue is the change in total revenue resulting from a change in the quantity of output sold. Marginal revenue indicates how much extra revenue a firm receives for selling an extra unit of output. It is found by dividing the change in total revenue by the change in the quantity of output. Marginal revenue is the slope of the total revenue curve and is one of two revenue concepts derived from total revenue. The other is average revenue. To maximize profit, a firm equates marginal revenue and marginal cost.

MR= Change in TR/Change in Quantity

Now in order to have maximum total revenue, two conditions have to be fulfilled:

The first order derivative or the MR function should be zero.

The second order derivative or the slope of the MR function should be negative

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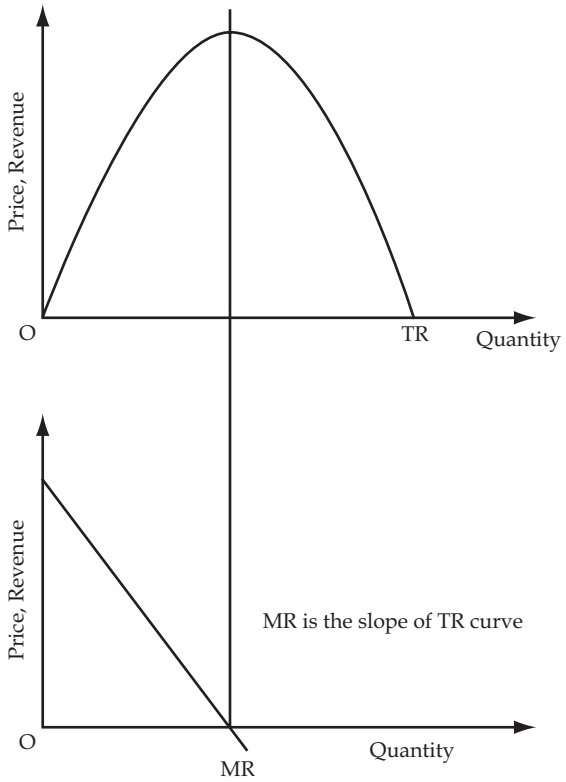
Figure 9.8: Relationship between MR and TR



As you can see, figure 9.8 depicts the relationship between TR and MR. TR can be zero in two situations- when no quantity of the commodity is sold or when any amount of commodity is sold at a zero price. Therefore, it has an inverted U shape curve. It starts from the origin, rises and reaches maximum and then falls. The slope of TR curve is the change in total revenue per unit of output, which is nothing but the marginal revenue.

Notes The first order derivative of the function which is to be optimised should be zero. The second order derivative of the function to be optimised should be positive for minimisation and negative for maximisation.

It is also relevant to the relation between AR and MR. AR curve can be:

1. A straight line, or
2. Convex to the origin, or
3. Concave to the origin

Now we will determine the relation of MR to AR with respect to all the three situations.

Caution

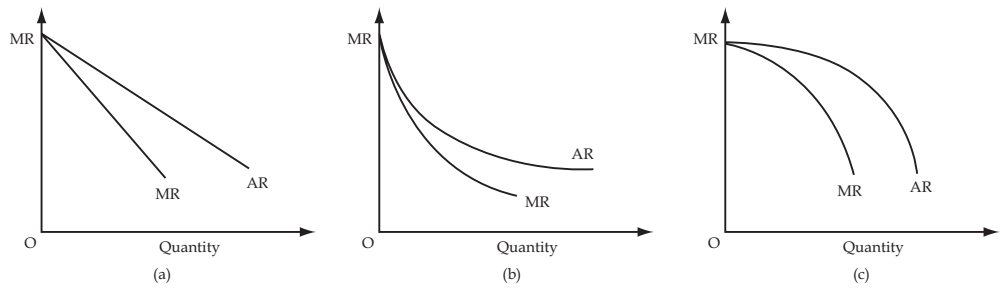
When AR is a straight line, MR will lie midway to AR (figure 9.9 (a))

Notes

When AR is convex to the origin, MR will lie less then midway to AR (figure 9.9 (b))

When AR is concave to the origin, MR will lie more than midway to AR (figure 9.9 (c))

Figure 9.9: Relationship between MR and AR

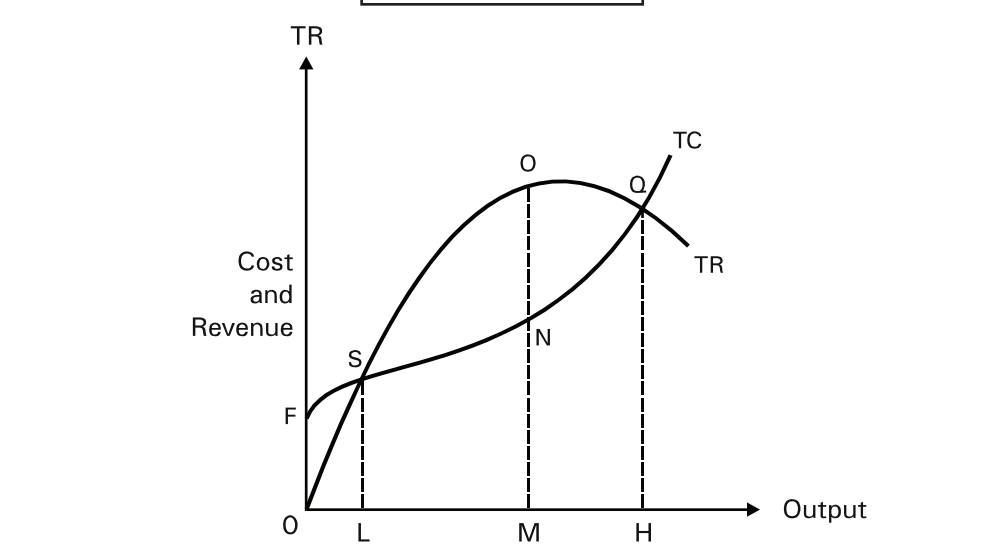


Taking Costs into Account and Calculating Profits

Profits are the excess of total revenue over total costs, where total costs include both explicit and implicit costs.

1. Equilibrium of the firm by curves of total revenue and total cost profit is the difference between TR and TC. Thus the firm will be at equilibrium at the level of output where the difference between TR and TC is greatest (at OM output in Figure 9.10). S and Q are break even points.

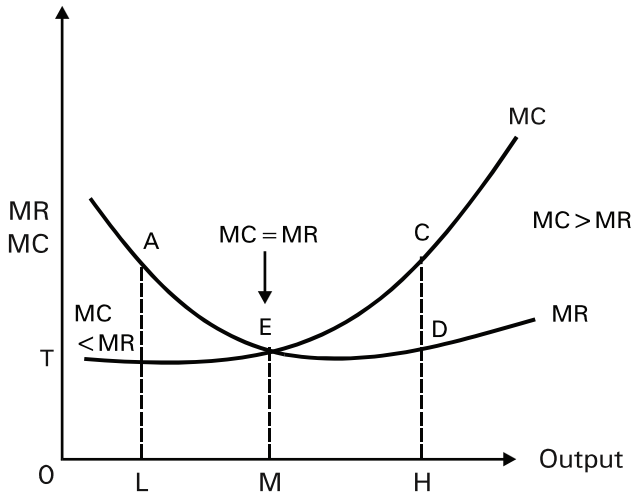
Figure 9.10



2. Equilibrium of the firm by marginal revenue and marginal cost. The firm will be making maximum profits by expanding output to the level where MR = MC (at OM output in Figure 9.11).

Notes

Figure 9.11



Mathematical Derivation of the Equilibrium of the Firm

The firm aims at maximisation of its profit $\pi = R - C$

π = Profit

R = TR, C = TC

Then $R = f_1(X)$

$C = f_2(X)$, given the price P

The first order condition for maximisation of a function is that its 1st derivative (with respect to X here) be equal to zero. Differentiating the total profit function and equating to zero

$$\frac{\delta\pi}{\delta X} = \frac{\delta R}{\delta X} - \frac{\delta C}{\delta X} = 0 \text{ or } \frac{\delta R}{\delta X} = \frac{\delta C}{\delta X}$$

the $\frac{\delta R}{\delta X}$ term is the slope of the TR curve, i.e., the MR. The term $\frac{\delta C}{\delta X}$ is slope of TC curve or the MC. Thus the first order condition for profit maximisation is, MR = MC.

Task

Suppose, you are a businessman facing the following TR function:

$$TR = 150Q - 12Q^2$$

Find the AR and MR of your firm.

9.4 Economies of Scale

The term 'economies' refers to the cost advantages. Such advantages may result from either extending the scale of production or exploring the scope of production. Economies and diseconomies of scale are concerned with the behaviour of average cost curve as the plant size

Notes

is increased. Economies of scale explain the down sloping part of the long run AC curve. As the size of the plant increases, LAC typically declines over some range of output for a number of reasons. The most important is that, as the scale of output is expanded, there is greater potential for specialisation of productive factors. This is most notable with regard to labour but may apply to other factors as well. Other factors contributing to declining LAC include ability to use more advanced technologies and more sophisticated capital equipment, managerial specialisation, opportunity to take advantage of lower costs for some inputs by purchasing larger quantities, effective utilisation of by-products, etc.

9.4.1 Internal Economies and Diseconomies of Scale

When a firm expands in size by increasing the scale of its output, certain cost advantages accrue to the firm, those are called internal economies. Internal economies to the firm may be of various types: technical, commercial, financial, managerial and risk spreading. As the firm expands in its size, it may profitably employ a big machine, capacity under-utilisation may be held in check, an economic volume of by-product may be turned out – these are technical economies. Similarly, an expanding firm may arrange the bulk purchase of its materials and the bulk sale of its product, it may save some transport costs, distribution costs and procurement costs – these are commercial economies. A growing firm can also furnish good security and can, therefore, float funds easily from internal as well as external sources at economic terms – these are financial economies. Likewise, a large firm can undertake product diversification and can spread risks.

However, from the standpoint of our subject, the most important internal economies are managerial economies. When a firm expands its business, the recruitment of managerial personnel need not be increased in the same proportion. To manage additional volume of output produced and marketed, an additional manager is not always required. An efficient manager can manage a growing business so long as the business does not grow very large. When the scale of firm increases, the average costs of production fall because of a number of internal economies. When these internal economies are fully exploited, the LAC reaches the minimum. However, if the firm continues to increase in size indefinitely, soon several bottlenecks emerge and the results are internal diseconomies of scale. The point at which the long run average costs are at a minimum, is the optimum size of the firm. This optimum size is the outcome of the interplay of various optima – technical, financial, managerial, etc. Beyond the point of technical optimum, technical diseconomies occur. Beyond the point of financial/commercial/managerial/risk optimum, financial/commercial/managerial/risk diseconomies occur. In other words, as a firm grows large and larger, all sorts of cost disadvantages occur and therefore, the long run average costs start rising. There can be no question about the fact that costs rise and that diseconomies do exist. But they are mostly the diseconomies of bad management rather than of scale. An efficient manager, by way of his foresight and planning, should be able to avoid technical and non-technical diseconomies which are internal to the firm.

9.4.2 External Economies and Diseconomies of Scale

In addition to internal economies and diseconomies of scale, there are external economies and diseconomies. The external economies are the physical and cost advantages which result from the general development of the industry. When the industry expands, there are advantages from occupational division labour and cross-fertilisation of ideas. When the industry expands, it offers scope for specialisation and skill formation and for lateral and vertical integration. As the growing industry gets localised in a geographical area, facilities are attracted to that area. Simultaneous investments in other industrial activities are induced. These are "external economies in the market sense". Special technical schools for training skilled labour are established, research institutions are set up; equipment manufacturers build their plants. Ancillary units grow. Interchange of technical information and ideas occurs through both formal (professional societies) and informal (golf clubs, etc.) channels. Such external economies are very general in character, all firms

within the industry have equal access to them. The external economies do not, therefore, distort competitive elements. In contrast, the internal economies may drive a firm to enjoy monopoly power.

As internal economies may get transformed into internal diseconomies, the external economies may also get converted into external diseconomies. This happens when the industry expands in size indefinitely and the control of industry becomes a problem. Environmental pollution is a good example of external diseconomies as a result of which private as well as social costs of production may increase. In modern times when in most of the countries, industrial development is a planned activity, the responsibility of creating external diseconomies may be largely fixed on the government, particularly its planning unit. The objective of planned industrialisation is to maximise the net externalities (= external economies – external diseconomies).

9.5 Summary

- Costs enter into almost every business decision and it is important to use the right analysis of cost. Different business problems call for different kinds of costs such as future and past costs, incremental and sunk cost, out of pocket and book costs, replacement and historical cost etc.
- Fixed costs are those costs which do not very with the change in the level of output in the short run. Variable costs change with output levels.
- The short run is a period of time in which the output can be increased or decreased by changing only the amount of variable factors such as labour, raw materials, chemicals, etc. Long run, on the other hand, is defined as the period of time in which the quantities of all factors may be varied.
- There are short run average fixed cost and variable cost as well as long run average costs.
- Total cost is the sum of total of the explicit plus implicit expenditure. Average cost is the cost per unit of output. Marginal cost is the extra cost of producing one additional unit.
- In order to maximise TR, the first order condition is that the MR should be zero and the second order condition is that slope of MR curve should be negative.

9.6 Keywords

Actual costs: Actual expenditure incurred for acquiring or producing a good or service.

Direct costs: Costs which can be directly attributed to the production of a unit of a given product.

Explicit costs: Expenses which are actually paid by the firm (paid-out-costs).

Fixed factors: Factors such as capital equipment, building, top management personnel which cannot be readily varied with the change in output.

Implicit costs: Theoretical costs which go unrecognized by the accounting system.

Indirect costs: Costs which cannot be separated and clearly attributed to individual units of production.

Opportunity costs: The return from the second best use of the firm's resources which the firm forgoes in order to avail itself of the return from the best use of the resources.

Variable costs: Costs which are incurred on the employment of variable factors of production whose amount can be altered in the short-run.

Variable factors: Factors such as labour, raw materials, chemicals which can be readily varied with the change in output.

Notes

9.7 Self Assessment

State whether the following statements are true or false:

1. Past costs are unadjusted historical cost data which have been recorded in the books.
2. Incremental costs include only variable cost.
3. Replacement cost means the price that would have to be paid currently for acquiring the same plant.
4. Explicit costs cannot be regarded as paid out costs.
5. Actual costs are also called absolute costs or outlay costs.
6. Average cost is obtained by dividing the total cost by the total quantity produced.
7. Fixed costs can be altered in short run.
8. Social cost is the total cost to the society on account of production of a good.

Fill in the blanks:

9. Shut-down costs are required to be incurred when the production operations are ..... .
10. Economic costs can be calculated at two levels ..... .
11. Marginal cost is the extra cost of producing ..... .
12. AVC first ..... , reaches a minimum and rises thereafter.
13. Implicit costs are the costs which go unrecognized by the ..... .
14. Capital equipment is a ..... factor.
15. The total cost concept is useful in ..... analysis.
16. Direct costs are ..... costs.

9.8 Review Questions

1. What type of cost is depreciation – Direct cost or Indirect cost? Support your argument with reasons.
2. What types of costs would you incur if you have to organise a musical concert in your city?
3.

Output (units)	2,000	4,000	5,000
Cost per unit	Rs 100	£100	£80

   Explain which type of cost the above figures represent.

4. A liberal arts college created a new business school. The overhead items – library, registrar, classrooms and offices – were already in place or substantially so. No additional central administration personnel had to be added at first, only faculty and staff for the new school. The cost of these positions, plus the modest marketing budget, were more than offset by the new b-school's tuition income in the second year of operation. There was every indication that enrollment, and tuition, would grow.

   Shortly after the school's creation, the college's provost decided it would be a good idea to embark on a cost-allocation exercise. Provost and CFO decided on a "fair" formula that allocated central administration overhead according to each school's use of office, classroom, and laboratory square footage. Suddenly, the business school, still ramping up

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its enrollment, didn't look so good. It more than covered its incremental cost, but barely paid back its allocated cost in the current year. Its newly hired dean had been promised the full attention of the college's fundraising office. After all, the b-school's revenue was "free" in terms of incremental cost, and who wouldn't want more of that? After the cost-allocation project, however, the college's president decided one of its older, better-established schools deserved a higher fundraising priority.

What do you think was the problem with the college? How can it be rectified?

5. Raman has a widget producer with one widget producing machine that costed him ₹ 1000 last year. He wants to see if he should buy an appliance that paints the widgets yellow, fetching ₹ 100 more per widget. But he has no idea if this is a good investment. In your evaluation of the investment, do you include the cost of the widget machine? Why/why not?
6. Why do increasing opportunity costs exist? Illustrate with examples.
7. Why are variable costs more relevant than fixed costs in short-term decision-making?
8. With the increase in output of the firms, their average total cost and average variable cost curves come closer and closer to each other but never meet. Why?
9. Show the circumstances where the marginal cost is constant throughout but the average cost is falling.
10. Can the short run average total cost ever be less than the long run average total cost?
11. The output and total cost data for a firm are given below. Work out the following costs: TFC, TVC, AFC, AVC, ATC and MC at various levels of output.

Units of output	0	1	2	3	4	5	6
Total Cost (₹)	120	180	200	210	225	260	330

12. Suppose that the short run costs for a paintbrush manufacturer are given by the expression:

$$TC = 100+2Q+0.01\ Q^2$$

(a) What are the fixed costs of this manufacturer?

(b) What are the total costs, average cost, average variable cost and marginal cost at 50 and 100 units of output?

(c) At what output is average cost the minimum?

13. Suppose that labour costs ₹ 10 per unit and capital costs ₹ 5 per unit. The least cost combinations of capital and labour are as follows:

Output	100	200	300	400	500	600	700
Labour	5	6	8	10	13	18	24
Capital	10	12	14	20	28	38	54

Prepare the table showing long run total cost, long run average cost and long run marginal cost.

14. If machines were variable and labour fixed, how would the general shapes of the short run average cost curve and marginal cost curve change?
15. If average productivity falls, will marginal cost necessarily rise? How about average cost?
16. Discuss the concept of economies of scale and economies of scope. Give suitable examples.

Notes

17. If firm's total revenue function is given as, TR = 110Q – 5Q^2 and the total cost function is, TC = 10Q – Q^2 – 0.33Q^3, then find:
    (a) MR and AR
    (b) MC and AC
    (c) The output level that maximises TR
    (d) The output level that minimises AC

Answers: Self Assessment

1.	True	2.	False
3.	True	4.	False
5.	True	6.	True
7.	False	8.	True
9.	suspended	10.	micro level and macro level
11.	one additional unit	12.	declines
13.	accounting system	14.	fixed
15.	break even	16.	traceable

9.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

Dornbusch, R., Stanley Fisher and Richard Startz (2001), *Microeconomics,* Tata McGraw-Hill.

Boulding, K. E. (1966), *Economics Analysis: Microeconomics,* Vol. I, 4th ed., (New York, Harpar and Row).

Boumal, William J. (1977), *Economic Theory and Operations Analysis* (Printice - Hall Englewood Cliffs).

Petersen, H. Craig and Lewis, W. Cris (2001), *Managerial Economics,* Pearson Education Asia.

Online links

http://economicswebinstitute.org/glossary/costs.htm

http://www.referenceforbusiness.com/management/De-Ele/Economies-of-Scale-and-Economies-of-Scope.html

http://economics.about.com/cs/studentresources/a/short_long_run.htm

Unit 10: Market Structure – Perfect Competition

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Objectives

After studying this unit, you will be able to:

- State the features of perfect competition
- Explain the behaviour of a perfectly competitive firm in short run
- Describe the behaviour of a firm under perfect competition in long run
- Discuss the existence of perfect competition in real world

Introduction

The function of a market is to enable an exchange of goods and services to take place. A market is any organisation whereby buyers and sellers of a good are kept in close touch with each other. It is precisely in this context that a market has four basic components (i) consumers (ii) sellers (iii) a commodity (iv) a price. Price determination is one of the most crucial aspects in micro-economics. Business managers are expected to make perfect decision based on their knowledge and judgment. Since every economic activity in the market is measured as per price, it is important to know the concepts and theories related to pricing under various market forms.

Perfect competition is a market structure characterised by a complete absence of rivalry among the individual firms. Thus, perfect competition in economic theory has a meaning diametrically opposite to the everyday use of this term. In practice, businessmen use the world competition as synonymous to rivalry. In theory, perfect competition implies no rivalry among firms.

In a perfectly competitive market structure there is a large number of buyers and sellers of the product and each seller and buyer is too small in relation to the market to be able to affect the price of the product by his or her own actions. This means that a change in the output of a single firm will not perceptibly affect the market price of the product. Similarly, each buyer of the product is too small to be able to extract from the seller such things as quantity discounts and special terms.

Notes

10.1 Features of Perfect Competition

The model of perfect competition is based on the following features:

1. ***Large numbers of sellers and buyers:*** The industry in perfect competition includes a large number of firms (and buyers). Each individual firm, however large, supplies only a small part of the total quantity offered in the market. The buyers are also numerous so that no monopolistic power can affect the working of the market. Under these conditions each firm alone cannot affect the price in the market by changing its output.

2. ***Product homogeneity:*** The technical characteristics of the product as well as the services associated with its sale and delivery is identical. There is no way in which a buyer could differentiate among the products of different firms. If the products were differentiated the firm would have some discretion in setting its price. This is ruled out in perfect competition.

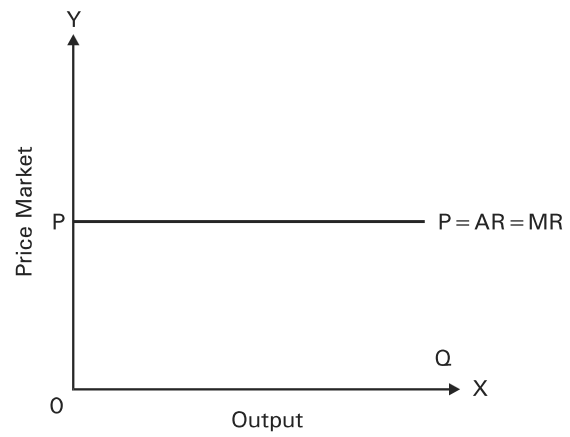
   The assumption of large number of sellers and of product homogeneity implies that the individual firm in pure competition is a price-taker: its demand curve is infinitely elastic, indicating that the firm can sell any amount of output at the prevailing market price.

3. ***Free entry and exit of firms:*** There is no barrier to entry or exit from the industry. Entry or exit may take time but firms have freedom of movement in and out of the industry. If barriers exist, the number of firms in the industry may be reduced so that each one of them may acquire power to affect the price in the market.

4. ***Profit maximisation:*** The goal of all firms is profit maximisation. No other goals are pursued.

5. ***No government regulation:*** There is no government intervention in the market (tariffs, subsidies, rationing of production or demand and so on are ruled out).

Figure 10.1



The above assumptions are sufficient for the firm to be a price-taker and have an infinitely elastic demand curve. The market structure in which the above assumptions are fulfilled is called pure competition. It is different from perfect competition, which requires the fulfilment of the following additional assumptions.

6. ***Perfect mobility of factors of production:*** The factors of production are free to move from one firm to another throughout the economy. It is also assumed that workers can move between different jobs. Finally, raw materials and other factors are not monopolised and labour is not organised.

Notes

7. ***Perfect knowledge:*** It is assumed that all the sellers and buyers have complete knowledge of the conditions of the market. This knowledge refers not only to the prevailing conditions in the current period but in all future periods as well. Information is free and cost less.

Example: By design, a stock exchange resembles a perfect competition, not as a complete description (for no markets may satisfy all requirements of the model) but as an approximation. The flaw in considering the stock exchange as an example of Perfect Competition is the fact that large institutional investors (e.g. investment banks) may solely influence the market price. This, of course, violates the condition that "no one seller can influence market price".

Free software works along lines that approximate perfect competition. Anyone is free to enter and leave the market at no cost. All code is freely accessible and modifiable, and individuals are free to behave independently. Free software may be bought or sold at whatever price that the market may allow.

Another very near example of perfect competition would be the fish market and the vegetable or fruit vendors who sell at the same place.

1. There are large number of buyers and sellers.
2. There are no entry or exit barriers.
3. There is perfect mobility of the factors, i.e. buyers can easily switch from one seller to the other.
4. The products are homogenous.

Source: www.wikipedia.com

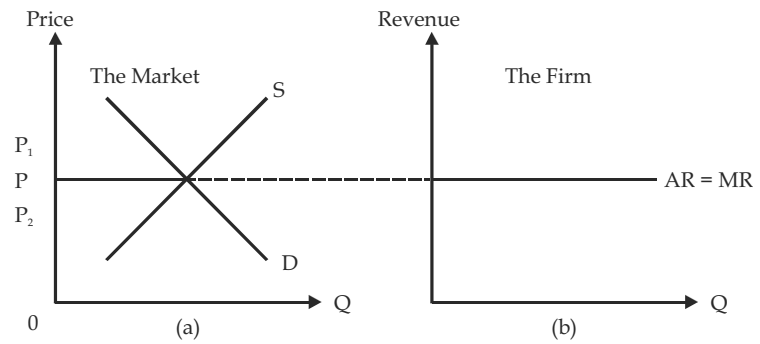
Task Analyze stock market on the basis of the features of perfect market. Do you find it close to the perfect market?

Market Condition

The assumptions of perfect competition imply that a particular relationship exists between the firm and its market.

Figure 10.2(a) shows the market demand curve for a product. It shows the total amount of this product demanded by consumers at different prices. It is a normal downward sloping demand curve showing that for the industry as a whole quantity demanded increases as price falls.

Figure 10.2: Relationship between the Market and the Firm in Perfect Competition



Notes

Figure 10.2(b) shows the seller perceived demand curve which is horizontal, i.e., it is perfectly elastic demand with respect to price. It hits the vertical axis at the current market price, P. Two factors are stopping the producer from charging a price such as P_1, which is higher than P-perfect knowledge and homogeneous product. If a higher price is charged, customers would know immediately that a lower price is available elsewhere, and that the product for sale at the lower price is a perfect substitute for the more expensive product. The producer is also not undercutting its rivals and charging a price, P_2 which is lower than P. The firm's output is small compared to the industry as a whole and so its entire output can be sold at the current market price of P. At a price lower than P the firm would not maximise its profit. Thus, over any feasible range of output, the demand curve for the product of the individual firm is perceived to be horizontal.

Notes

Equilibrium of the Firm

Firms aim to maximise profit and they can be in equilibrium only when they achieve this. For all firms, profit maximisation is achieved when Marginal Revenue (MR), equals Marginal Cost (MC). If MR>MC, the firm adds more to revenue than it does to costs by increasing output and sales. When this happens profits will rise. On the other hand, if MR<MC, the firm adds more to costs than it does to revenue by expanding output and sales. When this happens profits will fall. It follows thus, that the firm is in equilibrium when MC=MR.

Equilibrium of the Industry

The industry is in long run equilibrium when a price is reached at which all firms are in equilibrium (producing at the minimum point of their LAC curve and making just normal profits). Under these conditions, there is no further entry or exit of firms in the industry, given the technology and factor prices. At the market price P, the firms produce at their minimum cost, earning just normal profits. The firm is in equilibrium because at the level of output Q

$$LMC = SMC = P = MR$$

This equality ensures that the firm maximises its profit.

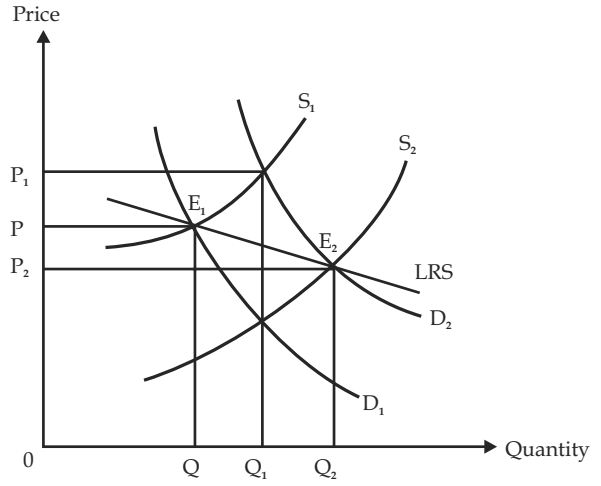
At the price P, the industry is in equilibrium because profits are normal and all costs are covered so that there are no incentives for entry or exit.

10.2 Short Run Equilibrium of a Perfectly Competitive Firm

The aim of a firm is to maximise profits. In the short run some inputs are fixed and these give rise to fixed costs which have to be incurred whether the firm produces or not. Thus, it pays for the firm to stay in business in the short run even if it incurs losses. Thus, the best level of output of the firm in the short run is the one at which the firm maximises profits or minimises losses.

Notes

Figure 10.3: Long Run Supply Curve: Decreasing Cost Industry



This is possible when the Marginal Revenue (MR) of the firm equals its short run Marginal Cost (MC). As long as MR exceeds MC, it pays for the firm to expand output because by doing so the firm would add more to its total revenue than to its total costs. On the other hand, as long as MC exceeds MR, it pays for the firm to reduce output because by doing so the firm will reduce its total cost more than its total revenue. Thus, the best level of output of any firm is the one at which MR=MC.

Caution Since, a perfectly competitive firm faces a horizontal or infinitely, elastic demand curve, P=MR, so that the condition for the best level of output can be restated as one of which P=MR =MC. This can be seen in Figure 10.3 diagrammatically and with calculus as follows.

A firm usually wants to produce the output that maximises its total profits. Total profits (T) are Equal to Total Revenue (TR) minus Total Costs (TC). That is,

$$\pi = TR - TC \qquad \text{..... (1)}$$

where TR And TC are all functions of output (Q).

Taking the first derivative of p with respect to Q and setting it equal to zero gives

$$\frac{d\pi}{dQ} = \frac{d(TR)}{dQ} - \frac{d(TC)}{dQ} = 0 \qquad \text{..... (2)}$$

so that

$$\frac{d(TR)}{dQ} = \frac{d(TC)}{dQ} \qquad \text{..... (3)}$$

Equation (3) indicates that in order to maximise profits, a firm produces where Marginal Revenue (MR) equals Marginal Cost (MC). Since for a perfectly competitive firm, P is constant and TR = (P).(Q) so that

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

The first order condition for profit maximisation for a perfectly competitive firm becomes P = MR = MC.

Notes

The second order condition for profit maximisation requires that the second derivative of p with respect to Q be negative. That is

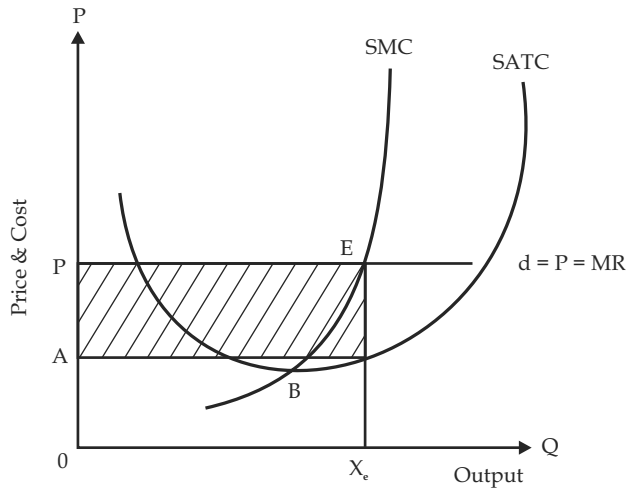
$$\frac{d^2\pi}{dQ^2} = \frac{d^2(TR)}{dQ^2} - \frac{d^2(TC)}{dQ^2} < 0 \qquad \text{..... (4)}$$

$$\frac{d^2(TR)}{dQ^2} < \frac{d^2(TC)}{dQ^2} \qquad \text{..... (5)}$$

According to equation (5) the algebraic value of the slope of the MC function must be greater than the algebraic value of the MR function. Under perfect competition, MR is constant (MR curve is horizontal). So that equation (5) requires that the MC curve be rising at the point where MR=MC for the firm to maximise its total profits.

The top panel of Figure 10.4 shows d which is the demand curve for the output of a perfectly competitive firm. The marginal cost cuts the SATC at its minimum point. The firm is in equilibrium (maximises its profits) at the level of output defined by the intersection of the MC and the MR curves (point E in Figure 10.4). To the left of E profit has not reached its maximum level because each unit of output to the left of X_e brings revenue greater than its marginal cost. To the right of X_e each additional unit of output costs more than the revenue earned by its sale so that a loss is made and total profit is reduced.

Figure 10.4



The fact that a firm is in short run equilibrium does not necessarily mean that it makes excess profits – whether the firm makes excess profits or losses depends on the level of the ATC at the short run equilibrium. If the ATC is below the price at equilibrium (Figure 10.5), the firm earns excess (equal to the area PABE). If, however, the ATC is above the price (Figure 10.6), the firm makes a loss (equal to the area FPE_eC). In the latter case the firm will continue to produce only if it covers its variable costs. Otherwise it will close down, since by discontinuing its operations the firm is better off: it minimises its losses. The point at which the firm covers its variable costs is called "the closing down point". In Figure 10.7 the closing down point of the firm is denoted by point W. If price falls below P_w the firm does not cover its variable costs and is better off if it closes down.

Notes

Figure 10.5

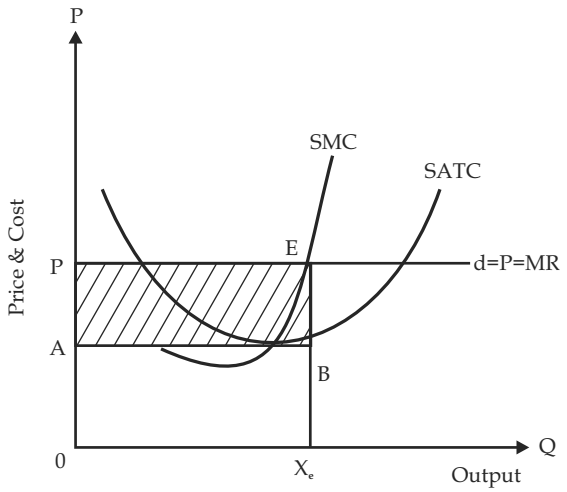


Figure 10.6

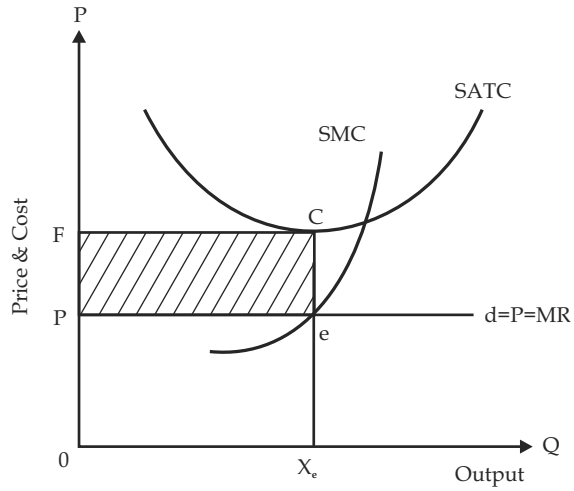
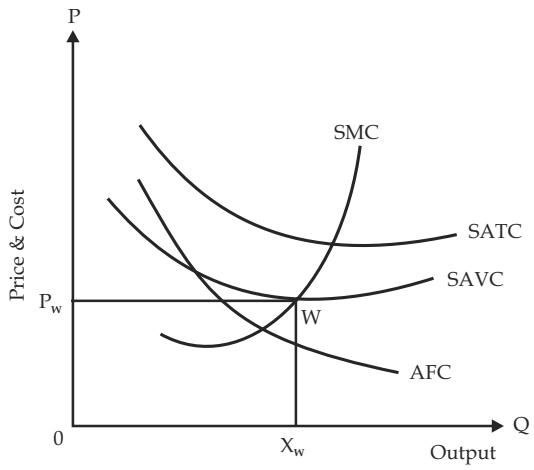


Figure 10.7



Notes

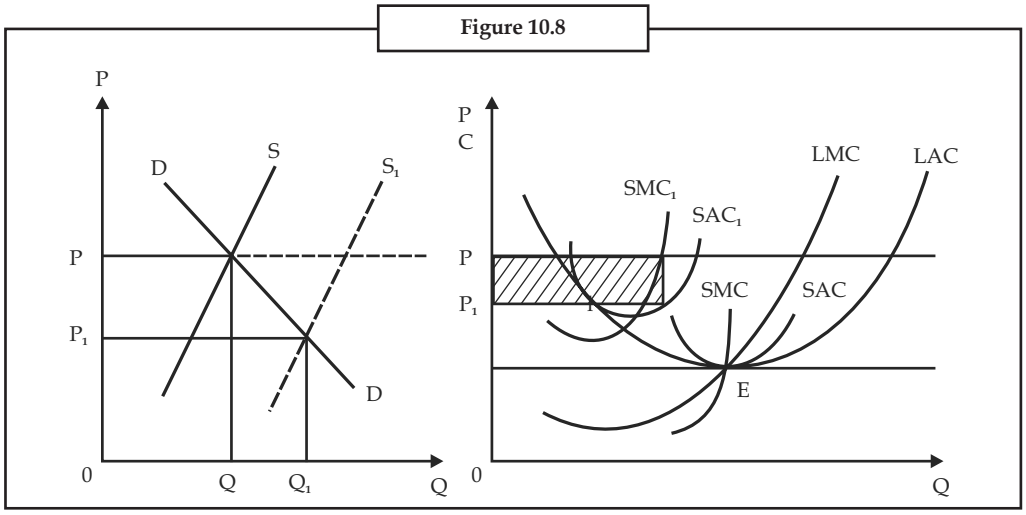
Did u know? All firms in the industry have the same minimum long run average cost. This, however, does not meant have all firms have the same efficiency.

10.3 Long Run Equilibrium of a Perfectly Competitive Firm

In the long run, all inputs and costs of production are variable and the firm can construct the optimum or most appropriate scale of plant to produce the best level of output. The best level of output is one at which price P=LMC equals the Long run Marginal Cost (LMC) of the firm. The optimum scale of the plant is the one in which Short run Average Total Cost (SATC) curve is tangent to the long run average cost of the firm at the best level of output. If existing firms earn profits, however, more firms enter the market in the long run. This increases the market supply of the product and results in a lower product price until all profits are squeezed out. On the other hand, if firms in the market incur losses, some firms will leave the market in the long run. This reduces the market supply of the product until all firms remaining in the market just break-even. Thus, when a competitive market is in long run equilibrium, all firms produce at the lowest point on their Long run Average Cost (LAC) curve and break-even. This is shown by point E in Figure 10.8.

In Figure 10.8 we show how firms adjust to their long run equilibrium position. If the price is P, the firm is making excess profits working with the plant whose cost is denoted by SAC_1. It will, therefore, have an incentive to build new capacity and it will move along its LAC. At the same time new firms will be entering the industry attracted by the excess profits. As the quantity supplied in the market increases the supply curve in the market will shift to the right and price will fall until it reaches the level P_1 at which the firms and industry are in long run equilibrium. The LAC in the figure is the final cost curve.

Figure 10.8



The condition for the long run equilibrium of the firm is that the marginal cost be equal to the price and to the long run average cost.

$$LMC = LAC = P$$

At equilibrium the short run marginal cost is equal to the long run marginal cost and the short run average cost is equal to the long run average cost. Thus, given the above equilibrium condition, we have

$$SMC = LMC = LAC = SAC\ P = MR$$

Notes

This implies that at the minimum point of the LAC the corresponding (short run) plant is worked at its optimal capacity so that minimum of LAC and SAC coincide. On the other point, the LMC cuts the LAC at its minimum point and the SMC cuts the SAC at its minimum.

Example: For a firm operating in a perfectly competitive market, the following data are available

Price P = AR = MR = ₹ 20/- unit

Total cost function is $C = 8 + 17Q - 4Q^2 + Q^3$

Let us find out the profit maximising output and the maximum profit.

Marginal cost will be available if the first derivative of the total cost function is obtained. Thus,

$$MC = \frac{d(C)}{dQ} = 17 - 8Q + 3Q^2$$

Maximum profit will be earned when

MC and MR are equal:

$$20 = 17 - 8Q + 3Q^2$$

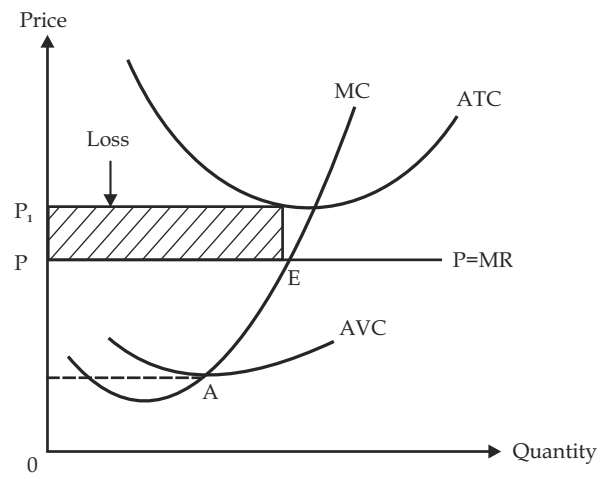
Solving this equation gives two values for Q as –1/3 and 3. Obviously, negative output cannot be produced; hence at Q = 3, the firm will maximise profits. Total revenue will be ₹ 60 and total cost ₹ 50. The maximum profit at the output of 3 units is ₹ 10.

Shut-down Decision

The supply curve of a competitive firm is its marginal curve. It is that part of the marginal cost curve which is above the average variable cost curve.

At a price P, the firm is incurring a loss, but it does not shut down because of fixed costs (Figure 10.9). In the short run, a firm knows it must pay these fixed costs regardless of whether or not it produces. The firm only considers the costs it can save by stopping production and those costs are its variable costs. As long as a firm is covering its variable costs, it pays to keep on producing. It makes a smaller loss by producing. If it stopped producing, its loss would be the entire fixed costs.

Figure 10.9



Notes

However, once the price falls below AVC it will pay to shut down (point A). In that case, the firm's loss from producing temporarily and save the variable cost. Thus, the point at which MC = AVC is the shut-down point (that point at which the firm will gain more by temporarily shutting down than it will by staying in business. When price falls below the shut-down point, the average variable costs the firm can save by shutting down exceed the price it would get for selling the good. When price is above AVC, in the short run, a firm should keep on producing even though it is making a loss. As long as a firm's total revenue is covering its total variable cost, temporarily producing at a loss is the firm's best strategy because it is making less of a loss than it would make if it were to shut down.

Case Study

Economic Analysis of Agriculture

Irony is the nature of the economics of agriculture; even as many in America still struggle with hunger, the government has been offering subsidies to the American farmer to artificially raise the price of produce, in some cases since 1933.

History of Subsidies

Because a typical farmer is so small compared to the entire market for the good he or she offers, they cannot affect the price of the good, or try to affect the price of good too efficaciously. Instead, they are referred to as 'price takers', who are forced to accept the market price. However, subsidies alter this economic situation to occasionally illogical results. At the end of World War I, farmers were rewarded by high prices as the government spent millions to rebuilt war-torn Europe. In fact, a small farmer who might have been almost forced to sell the farm before the war was in fact currently quite successful. However, in 1921, the nation fought through a recession as the farm goods they fervently produced outpaced demand, probably due to Europe's quick agricultural recovery. American farmers now suffered, and continued to do so into 1922, where virtually every industry had recovered except for agriculture. Large lands that had been opened up to feed Europe's millions pumped out more and more crops, but prices went lower and lower, and a surplus quickly accumulated that prevented prosperity.

Rising Anger of Farmers

Farmers could no longer meet the cost of production, and many were forced to leave their farms. Under neo-classical theory, this could be considered a frictional unemployment situation; as each farm increases production until it doesn't take as many to cover the market, some of them should switch to other tasks. This 'message of the market' was a message of sadness for many farmers. During the Great Depression, farmers were especially hurt. For example, low dairy prices due to increased production meant that Midwestern dairy farmers were earning less than ever. Milk, as a highly spoilable good, is a good example of 'perfect competition,' when farmers can only earn the price the market tells them. Even dairy farm strikes were ineffective, like those as a part of the Farmer's Holiday Association Strike of 1932 in Wisconsin and Iowa (some of these became violent as milk haulers and milkmen scuffed on the picket lines).

Since the 1930s

FDR worked to create a national program to guarantee income to farmers by enacting a significant number of measures to raise prices, beginning with the creation of the Agricultural Adjustment Administration in May 1933, which began the subsidy system that continues to this day, even though the AAA was declared unconstitutional in 1936. The AAA measures paid landowners to leave part of their land fallow. This did raise farmers' incomes, but consumers were forced to endure high food prices during the worse years of

Contd...

Notes

the Depression. Subsidies to farmers have been a part of the American agricultural system ever since. Bill Clinton attempted to reduce payments and increase diversity of crops with the Freedom to Farm Act in 1994. In 2000, however, the Farm Security and Rural Investment Act restored the farming subsidies. While it is true that some farmers struggle, the government spent $30 billion dollars in subsidies yearly, even though it is estimated that it would only cost $10 billion dollars in crop insurances and other measures to bring the poorest farmers in America up to middle class. On May 14, 2002, President Bush signed a farm subsidy estimated to cost $190 billion dollars over ten years, rekindling a national debate about subsidies. Today, large commercial farms dominate the agricultural market; 8% dominate 72% of sales.

Farm policies are sometimes more the product of politics than economics. While security of the food supply and preservation of small family-owned farms are good goals, well-intentioned programs might be hugely inefficient. There are cost-effective ways of helping small farmers, including crop insurance, but today some of these measures are still not used.

Questions

1. Compare the earlier global agricultural scenario with the recent scenario (as depicted in the case)
2. Do you agree that agriculture is a perfectly competitive industry?

Source: www.ehow.com

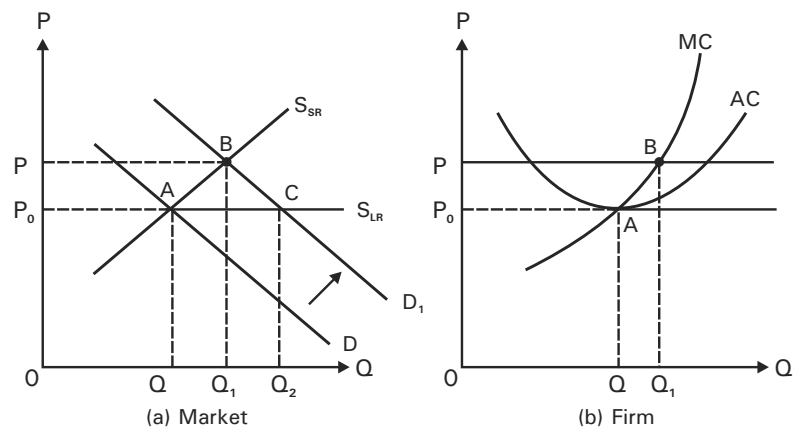
10.4 Supply and Demand Together

The following three conditions exhibit how adjustment is likely to take place in the firm and in the market under different situations.

Market Response to an Increase in Demand

Faced with an increase in demand which it sees as an increase in price and hence profits, a competitive firm will respond by increasing output (from A to B) in order to maximise profit (Figure 10.10). As all firms increase output and as new firms enter, price will fall until all profit is competed away. Thus the long run supply curve will be perfectly elastic as is S_{LR} in (a). The final equilibrium will be at the original price but a higher output. The original firms return to their original output (A) but since there are more firms in the market the market output increases to (C).

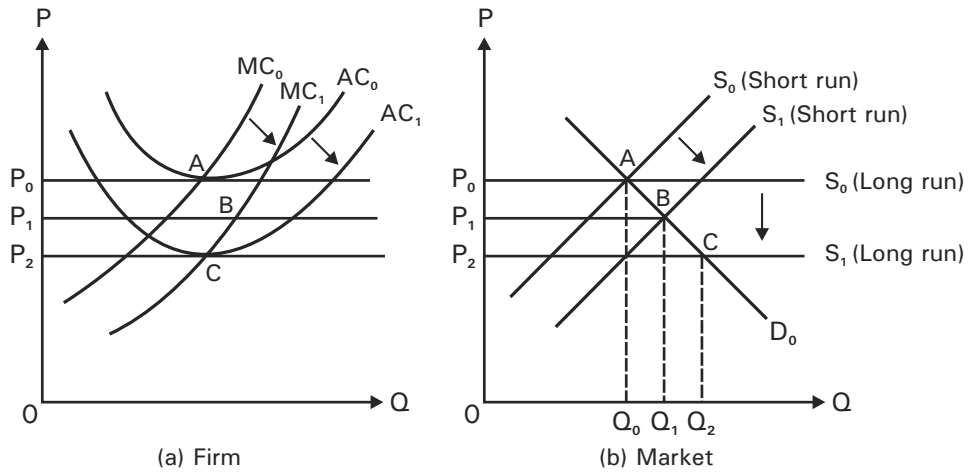
Figure 10.10



Notes

Market Response to a Technological Improvement

Figure 10.11

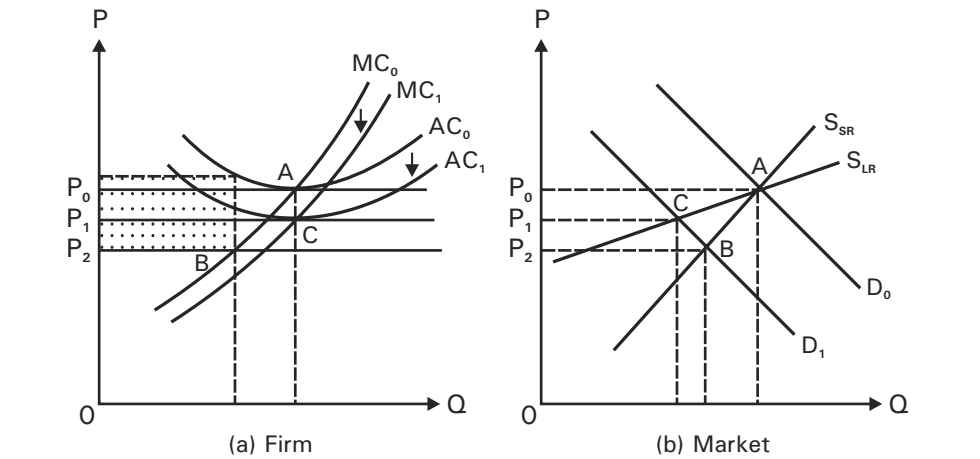


A technological improvement will shift AC and MC curves down, creating short run profits. As existing firms expand output and as new firms enter, these profits will be competed away until the price has once again fallen to equal average total costs (initially point B in the short run) and ultimately point C in the long run (Figure 10.11).

Market with Specialised Inputs Response to a Decrease in Demand

Faced with a decrease in demand which it sees as fall in price and hence profit, a competitive firm will respond by decreasing output in order to minimise losses. Firm output and market output will fall. Figure 10.12 is the market response: as all firms decrease output, the demand for specialised inputs will fall, causing the firm's cost in (a) to fall from AC_0 to AC_1. The long run equilibrium price will be lower than the original price, and the long run supply curve S_{LR} will be upward sloping, rather than perfectly elastic.

Figure 10.12



Notes

10.5 Perfect Competition: Existence in Real World

We have already discussed the features of perfect competition, but let's summarise them once again. These are the conditions that must be present in an industry with perfect competition:

1. All firms sell an identical product.
2. All firms are price-takers.
3. All firms have a relatively small market share.
4. Buyers know the nature of the product being sold and the prices charged by each firm.
5. The industry is characterised by freedom of entry and exit.

The above five requirements rarely co-exist in any one industry. Therefore it can be said that perfect competition is rarely (if ever) practiced in the real world. Most of the products available in the market have some degree of differentiation.

Example: Let's take an example of bottled water. Producers vary in the methodology of purification, product size, brand identity, etc. Besides Commodities such as raw agricultural products, though they differ in terms of quality, are almost alike. When a product does come to have zero distinction or differentiation, its industry is usually consolidated into a small number of large firms, or an oligopoly.

There are many barriers to entry which restrict firms from entering several industries. Factors such as, high startup costs (as seen in the auto manufacturing industry) or strict government regulations (as seen in the utilities industry) limit the ability of firms to enter and exit such industries. With the advancement in technology and media education, though consumer awareness has increased, there there are still few industries where the buyer remains unaware of all available products and prices.

Thus, it can be said that there are significant obstacles preventing perfect competition from appearing in today's economy. The agricultural industry probably comes closest to exhibiting perfect competition. This is owing to many small producers with virtually no ability to alter the selling price of their products due to market regulation and pricing policies. The commercial buyers of agricultural commodities are generally very well communicated. Agricultural production involves some barriers to entry, but it is not difficult to enter the marketplace as a producer.

Caselet

The Stock Market

The stock market is very close to a perfect competitive market. The price of a stock usually is determined by the market forces of demand and supply of the stock and individual buyers and sellers of the stock have little effect on price (they are price-takers). Resources are mobile as stock is bought and sold frequently. Information about prices and quantities is readily available. Funds flow into stocks and resources flow into uses in which the rate of return. Thus stock prices provide the signal for efficient allocation of investment in the economy. However, imperfections occur here also though the stock market is very close to a perfect competition, for example, sale of huge amount of stocks by a large corporation will certainly affect (depress) the price of its stocks.

Notes

Case Study

Perfect Competition: The U.S. Bicycle Industry

– J Townley

I had an epiphany, as in a sudden insight into reality, in May at a meeting where a long time friend in the industry offered the opinion that the U.S. bicycle industry is in a classic state of perfect competition. My immediate response was "...that sounds like a good thing!" My friend, who went back to graduate school after working in a bike shop, for a major component manufacturer and prominent bicycle brand quickly responded with "...no, you don't understand." He went on to explain that when he studied economics in graduate school he became aware of perfect competition which is a term of art in economics for the most competitive market imaginable - one where the companies and businesses realize the bare minimum profit necessary to keep them in business.

At the time we were in a meeting together with six other people from the bicycle industry - and the room went silent for a time. As the group started to discuss the notion of perfect competition it became apparent that no one strongly disagreed, and in fact there seemed to be more agreement than not that our industry was indeed in perfect competition.

We ended our meeting, and went our separate ways, but the concept of perfect competition stayed with me, kind of like the dull pain of a toothache. When I got back to my office I did a search on the web and found quite a lot about this subject. Here is a summary of what I learned.

Perfect competition according to economists, is the most competitive market imaginable. In the real world, it is rare, and there are even some economists that feel it may not even exist in its purest (I take this as worst) form. The example of a market in perfect competition that is referenced by those economists that believe it does exist - is agriculture.

Competition is ... competition, so what makes perfect competition different from all other forms or kinds of competition? According to economists - because it is so competitive that any individual buyer or seller has a negligible impact on the market price. Products are homogeneous, or composed of parts that are all of the same kind. Product and pricing information is also perfect in that everyone, including the ultimate purchaser knows everything about the products, including the best prices available in the market.

In a market in perfect competition everybody is a price taker, producing and selling essentially identical products and each seller has little or no effect on market price, and is unable to sell any output at a price greater than the market price.

Firms earn only normal profit, or the bare minimum profit necessary to keep them in business.

If firms do earn more than normal profit, which is called excess profit, the absence of barriers to entry mean that other firms will enter the market and drive the price level down until there are only normal profits to be made. Manufacturing output will be maximized and price minimized.

This sounds very familiar to me - and I am sure you can also relate to real world examples of the U.S. bicycle industry as you read through this explanation of perfect competition.

Component manufacturers scramble to get the latest designs and functionality to market in a timely fashion. Bicycle suppliers struggle mightily to craft and specify bicycle products that have more value than the competition and sweat over the timing and dealer programs to introduce them. Bicycle retailers lose sleep over how much to commit for and what

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to bring to market - and whether to become a concept store or remain independent, and which suppliers to do business with. And with all this activity, no buyer or seller has a negligible impact on the market price, and everybody in the channel of trade is a price taker, earning the bare minimum profit necessary to stay in business.

Last year and this season are good examples. In 2005 we had our best year ever for the sale of high-end road 700c bicycles selling above $1,000. And in 2005 the typical bike shop lost 5 margin points on the sale of new bicycles, continuing an unfortunate trend of losing money on the sale of new bicycles that has plagued our channel of trade for over a decade.

High-profit bike shops, while they performed much better than the typical shop, also came in just below their cost of doing business on the sale of new bicycles in 2005, the first actual loss for high-profit shop on the sale of new bicycles in a decade.

Despite the continuing, and apparently growing losses on the sale of new bicycle, the U.S. bicycle industry posted one of its best years for apparent market consumption in 2005 - second only to the record set in 2000.

2006 started off well enough, but now as we enter the 3rd quarter of the year, some bicycle brands are reporting overstocks from last season, and retailers are reporting some 2006 models already are out of stock as the brands introduce and start to deliver 2007 models.

History does matter, and in economics, path dependence refers to the way in which apparently insignificant events and choices can have huge consequences for the development of a market or an economy. In the case of the specialty bicycle retail channel of trade, the collective choice not to adopt Uniform Product Codes, or UPC's has come back to blind the industry again, and again over the last twenty five to thirty years.

The seemingly insignificant, competitive based choice of not adopting UPC's has made bar coding technology, and the full power of its inventory and sales tracking efficiency uniformly unavailable across all levels of our channel of trade, making real channel efficiency impossible. Simply stated - brands and manufactures don't know what is selling at retail and retailers have little or no input or influence on what is reordered and manufactured to refill the supply pipeline. As most economists will tell you...where we have been in the past determines where we are now, and where we can go in the future. This, in turn, leads to the importance of information.

Economic and channel efficiency is likely to be greatest when information is comprehensive, accurate, and readily and cheaply available. As evidenced by the specialty bicycle retail channels recurring pattern of having too much or not enough, many of the problems facing economies and markets arise from making decisions without all the information that is needed.

Currently our channel of trade operates on the premise that if a brand or company can acquire or gather more information than its competitors it is a good thing. However, economists will tell you that asymmetric information, when one channel player knows more than the other channel players, can be a serious source of inefficiency and market failure.

Uncertainty can also impose large economic costs. The power of the Internet has greatly increased the availability of certain information. However, even with all its information power, there are specialty bicycle retail channel inefficiencies, like not knowing what is actually selling at retail, that the Internet will not be able to solve. Accordingly, uncertainty - literally not knowing, will remain a huge source of specialty bicycle retail channel inefficiency.

And this inefficiency makes our channels blindness complete. Potentially the most useful information, about what will happen in the future...or the ability to more accurately forecast

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future demand, replenishment, inventory and sales will simply never be available under our channels current state of perfect competition.

The best example of perfect competition that I have heard recently is in my own backyard... Madison Wisconsin, one of the best specialty bicycle retail markets in the country. As most of the industry knows there are two Trek company stores in Madison, and one of them, located on the East side has been identified as the company's flagship store. Erik's Bike Shop is a successful multi-store retailer headquartered in the Minneapolis-St. Paul Minnesota market. Erik's established a store in Madison several seasons ago, and carries Specialized, as what I understand is its marquee brand.

Several weeks ago, according to the buzz among bicycle dealers, Specialized announced to its dealers in Madison that Erik's will open a second store, reportedly directly across the street from the Trek flagship store on the city's East side. By the way, both the Trek flagship and the new Erik's that will carry Specialized are both in direct competition with an established bicycle dealer that has carried both the Trek and Specialized brands for many years - and is just one-mile away!

To make this market situation even more "perfect," the Trek flagship and new Erik's store are located almost within sight of a large new Dick's Sporting Goods that opened last year.

This is, I suggest to you, much more than just two brand competitors going head-to-head in one of the best specialty bicycle markets in the country. It is also a clear example of perfect competition at its best, or should I say worst. The most competitive market imaginable... where output will be maximized and price minimized. Consumers, particularly adult enthusiast cyclists have been and will continue to be the clear beneficiaries of this most competitive of markets.

The retailers, including the two backed by deep pocket bicycle brands, will beat on each other and will become more efficient to survive, and as a result prices in the market will be kept surprised. Keep in mind that in a state of perfect competition a firm that earns excess profits will experience other firms entering the market and driving the price level down until there are only normal profits to be made - the bare minimum profit necessary to keep them in business. All of the retailers in this scenario, when it comes to full fruition, including those backed by the big brands, will still only have a negligible impact on the market, including the market pricing.

This all raises the question - at least in my mind, of the big guy that was there first, Trek Bicycle, erecting or creating some type of barrier to entry. I am sure they will think about such a thing - and they may actually try several potential barriers to another new store, which might very well also be a brand "concept," entering their geography, and market space. At the end of the day...there is no real barrier to entry that can be put in place, or actually exists for that matter, because the largest brand seller in our channel of trade still doesn't have enough mass or leverage to dominate through a monopoly, and I am not talking about the board game.

Most markets exhibit some form of imperfect or monopolistic competition. There are fewer firms in this imperfect competition than in a perfectly competitive market and each can to some degree create barriers to entry. Such barriers would allow the existing firms to earn some degree of excess profits without a new entrant being able to compete to bring prices down.

So far, the consolidation in the U.S. specialty bicycle retail channel of trade hasn't reached a point where there are a small enough number of brands and /or manufacturers with enough product differentiation to allow the creating of barriers to market entry. The

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number of bike shops has kept falling over the last seven years, but here again, no retail organization has grown to the point that it can create barriers to market entry.

And what about the current independent bicycle retailer that has been in the market the longest? He is clearly at a dangerous place, but is the only one of the players who can break away from the state of perfect competition that has a strangle hold on the rest of the industry and the specialty bicycle retail channel of trade. By the way, this retailer was made aware in advance by the brands, first that the Trek flagship store was going in a mile from him, and next that Erik's Bike Shop was going to locate a new store within about the same distance from him. He has reacted by remodeling the interior of his current location. I have not spoken with this particular retailer since the news about the location for the new Erik's store, but I have E-mailed, and when I do talk to him, here is what I am going to suggest.

1. Hyper-differentiate your store. This is a term coined by Mike Basch, former CEO of YaYa! Bike, and it means differentiate your store totally from any other bike shop or bicycle retailer in your market so that you stand out as the brand in your market. It will be important to keep the adult enthusiast cyclists that are now customers - but the key will be crafting and marketing features and benefits to retain them as clients for life. The battle between the two big bicycle brands is going to test the "loyalty" of the adult enthusiasts in the market - but their loyalty is a question of personal attachment, relationships and the deal they got most recently, so there is marketing room for the independent to establish client loyalty programs and establish ongoing communications so the relationship is maintained and strengthened. Items 7, 8 and 9 discussed below become very important here.

2. Market to and really welcome casual cyclists, women, minorities, baby boomers seniors - everyone that is now underserved by all-the-other bike shops and concept stores. This is a key strategy for growth. It involves a product selection that will give all the non-enthusiast adults a truly enjoyable bicycle riding experience while not forgetting about the kids. Proactive market outreach in the form of demographics within zip codes and direct-response is essential, along with a formal referral-marketing program to drive word-of-mouth.

3. Focus totally on the consumer. Our channel of trade is now very product focused, and we think everyone that walks in the door is also product focused. This is a false premise. Shoppers, all shoppers are looking for an enjoyable experience, and that experience includes focusing on their wants and needs, while making them comfortable in the store. Adult enthusiast cyclists want and seek out product orientation, but also appreciate a more enjoyable experience. Casual cyclists and non-cyclists, where the growth potential is, are seeking the shopping experience and want to be comfortable with and develop a relationship with a consultant who's expert advice about bicycle products will best meet their wants and needs.

4. Educate your whole organization to focus totally on shoppers and customers. Because of the current product focus of our channel of trade, we don't educate our employees about the vital importance of focusing totally on the shopper, and not making any snap judgments about who a cyclist or customer is, or isn't. Hiring and educating customer service naturals is way more important than in-depth product knowledge. Educating them to really listen to shoppers and customers wants and needs is vital to building lasting, lifetime relationships.

5. Make it all about them and an extraordinary shopping experience. There is no retail selling today - everything a retailer does, everything retail employees do is marketing. The whole store, and the whole attitude has to make it all about them from the parking lot to the windows to the front door to the greeting - through

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Notes

making the bicycle buying process easy and fun, and the whole visit to the store extraordinary. Making it all about them and providing an extraordinary shopping experience is the path to increased transaction values and increased close rates.

6. Make your store the brand. Work with, stock and sell products that will provide the features and value your customers want and need, and the margins and inventory turns you need to grow your business. Present a uniform brand image in everything you do and that your staff does and says - one outward brand face. And develop and promote formal word-of-mouth customer referral programs to leverage your store brand in the market.

7. Create individual client solutions. You and your staff - your whole store, your brand and the shopping experience you provide are for one purpose. To create individual solutions for your customers wants and needs. In doing so you will create clients for life.

8. Become an efficient database manager. Educate your staff to the importance to your business of utilizing all the features built into to your computerized point of sale system and any other retail shopping systems you incorporate into your retail process and shopping experience. The uniform entry of shopper, customer and client information is as important to your business as a uniform and consistent new bicycle assembly process and check list.

9. Become an efficient direct-response marketer. Staying connected to prospects, shoppers, customers and clients utilizing a regular direct-response marketing plan, is essential to growing the number of transactions generated by the business, and it is reliant upon a clean and current database.

10. Follow the Phillips Rule of never ever selling anything in your retail store below your cost of doing business. This will lead to consistently earning excess profits.

All ten of these suggestions together create the foundation for a new level of specialty bicycle retailing that changes the paradigm and has the potential to take the retailers that follow it out from under the state of perfect competition that the rest of the channel of trade is trapped in.

Question

Comment on the suggestions made by the writer.

Source: http://www.jaytownley.com/the-bicycle-industry-competition?page=4

10.6 Summary

- In theory, perfect competition implies no rivalry among firms.
- In a perfectly competitive market structure there is a large number of buyers and sellers of the product and the product is homogeneous.
- There is free mobility of factors of production and the buyers and sellers have perfect knowledge of the market.
- In the short run the best level of output of the firm is the one at which the firm maximises profits or minimises losses. This is possible at P = MR = MC. The point at which the firm covers its variable costs is called "the closing down point".
- In long run the best level of output is one at which price P=LMC. At equilibrium the short run marginal cost is equal to the long run marginal cost and the short run average cost is equal to the long run average cost. Thus, given the above equilibrium condition, we have

$$SMC = LMC = LAC = SAC\ P = MR$$

Notes

10.7 Keywords

Differentiation: Result of efforts to make a product or brand stand out as a provider of unique value to customers in comparison with its rivals.

Equilibrium: Condition when the firm has no tendency either to increase or to contract its output.

Homogeneous products: The product of an industry in which the outputs of different firms are indistinguishable.

Minimum price: Price at which the sellers refuse to supply the goods at all and store it with themselves.

Perfect competition: A market structure characterized by a complete absence of rivalry among the individual firms.

Perfect mobility: The absence of any barriers to movement of factors of production

Profit: Difference between total revenue and total cost Market period: A very short period in which the supply is fixed, that is no adjustment can take place in supply conditions.

10.8 Self Assessment

State whether the following statements are true or false:

1. In a perfect market there are large number of sellers.
2. In a perfect market there is products differentiation.
3. In a perfect market a change in the output of a single firm will affect the market price of the product.
4. In perfect market, market agents are not fully aware of market.
5. In a perfect market there is perfect mobility of resources.
6. Under perfect competition the price curve and the marginal revenue curve are the same.
7. Industry has no role in the determination of price under perfect competition.
8. When the supply of a commodity decreases and its demand remains constant then it leads to decrease in price.
9. For equilibrium MC curve should cut the MR curve from below.

Fill in the blanks:

10. A perfectly competitive firm faces an ..... elastic demand curve.
11. The closing down point is at which the firm covers its ..... cost.
12. In the long run all costs are ..... .
13. In the long run the best level of output is, where P = ...
14. The LMC cuts the LAC at its ..... point.
15. The ..... LRS is generally a feature of rapid growth.
16. The ..... of an industry might lead to a fall in prices of some of its input.
17. The factors of production are ..... to move in perfect competition.

Notes

10.9 Review Questions

1. In which condition under perfect competition, would a firm maximize profit in the short run?
2. A firm can sell its product for ₹ 20 each in a perfectly competitive output market. Its total cost of production for the production range of 200 units to 205 units is given below:

200	201	202	203	204	205
₹ 3600	₹ 3615	₹ 3634	₹ 3658	₹ 3688	₹ 3720

   What is the profit maximising level of production?
3. To maximize the profit in the short run, a perfectly competitive firm produces the output for which price is equal to average variable cost- Why/ Why not?
4. Why are firms operating under conditions of perfect competition depicted as having a horizontal demand curve?
5. What will happen to the demand curve of a perfectly competitive firm if:
   (a) new sellers are attracted to the industry by the existence of supernormal profits?
   (b) there is an increase in market demand for the firm's output?
6. Why is it inappropriate to refer to a perfectly competitive firm as 'earning supernormal profit in the long-run'?
7. Under what conditions will a firm operating in a perfectly competitive industry choose to leave the industry?
8. For a perfectly competitive firm, why is it insufficient to say that profit maximisation takes place at the output where marginal cost equals marginal revenue?
9. In the perfect market, if individuals are enjoying consumers' surplus, does it mean that, as a consequence, producers are not receiving producers' surplus?
10. The case of perfect competition is sometimes referred to as a 'benchmark' industrial structure. In this context, what do you think commentators mean by the term 'benchmark'?
11. Taking a real life example, discuss the features of the perfect competition.
12. Why is a firm under perfect competition described as a price-maker? Deduce its equilibrium conditions in the short run.
13. Assume that firms in the short run are earning above normal profits. Explain what will happen to these profits in the long run for a market having perfect competition.
14. How and when will you determine the closing down point in the short run?
15. Explain LMC= LAC= P. Comment.
16. Examine the shut down decision in the long run.

Answers: Self Assessment

1.	True	2.	False
3.	False	4.	False
5.	True	6.	True
7.	False	8.	False

Notes

9. True
10. infinitely
11. variable
12. variable
13. LMC
14. minimum
15. rising
16. expansion
17. free

10.10 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

N. Gregory Mankiw, *Principles of Microeconomics,* Harcourt College Publications

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford

Online links

http://ayushveda.com/blogs/business/perfect-competition-the-root-of-market-analysis/

http://tutor2u.net/economics/content/topics/competition/competition.htm

http://www.amosweb.com/cgi-bin/awb_nav.pl?s=wpd&c=dsp&k=perfect+competition

http://www.buzzle.com/articles/perfect-competition-characteristics.html

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Unit 11: Monopoly

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Objectives

After studying this unit, you will be able to:

- State the features of monopoly
- Identify the types of monopoly
- Discuss the price and output determination in short run
- Describe the price and output determination in long run
- Explain the economic inefficiency of monopoly

Introduction

Monopoly is exactly opposite to the perfect competition. We can define a Monopolist as a sole supplier to particular market. In fact, after going through this unit you will realise that monopoly is an extreme case and it is rarely found in practice. However, we may also understand the case of monopoly by analysing two different cases – one that is presented in textbooks which says that in a monopoly there is only one firm producing the good. And other, the real world case such as the operating system monopoly, that says that in monopoly there is one firm that provides the overwhelming majority of sales (say, for example Microsoft), and a handful of small companies that have little or no impact on the dominant firm. In this unit, we will stress more on the former case.

11.1 Meaning and Features of Monopoly

Monopoly is said to exist when one firm is the sole producer or seller of a product which has no close substitutes. According to this definition, there must be a single producer or seller of

a product. If there are many producers producing a product, either perfect competition or monopolistic competition will prevail depending upon whether the product is homogeneous or differentiated. On the other hand, when there are few producers, oligopoly is said to exist. A second condition which is essential for a firm to be called a monopolist is that no close substitutes for the product of that firm should be available.

From the above discussion it follows that for monopoly to exist, following conditions are essential:

1. One and only one firm produces and sells a particular commodity or a service.
2. There are no rivals or direct competitors of the firm.
3. No other seller can enter the market for whatever reasons — legal, technical or economic.
4. Monopolist is a price maker. He tries to take the best of whatever demand and cost conditions exist without the fear of new firms entering to compete away his profits.

In the case of monopoly one firm constitutes the whole industry. Therefore the entire demand of the consumers for that product faces the monopolist; which slopes downward. Monopolist can lower the price by increasing his level of sales and output and he can raise the price by reducing his level of sales. Demand curve facing the monopolist will be his average revenue curve, which also slopes downward. Since average revenue curve slopes downward, marginal revenue curve will be below it.

Example: Examples of monopolies can be public utilities such as gas, electric, water, cable TV, and local telephone service companies, professional sports teams, DeBeers, and Alcoa.

Microsoft settled anti-trust litigation in the U.S. in 2001; fined by the European Commission in 2004 for 497 million Euros which was upheld for the most part by the Court of First Instance of the European Communities in 2007. The fine was 1.35 Billion USD in 2008 for noncompliance with the 2004 rule.

Monsanto has been sued by competitors for anti-trust and monopolistic practices. They hold between 70% and 100% of the commercial seed market.

Market Conditions

In perfect competition, there is a difference between the market demand curve and the demand curve for the output of an individual firm; when the firm acts as a price taker it views its demand curve as being horizontal with average revenue equal to marginal revenue. However, under monopoly, there is only one firm in the industry and so there is no difference between the demand curve for the industry and the firm. Since a normal demand curve is assumed, it is necessary for the monopolist to reduce price in order to increase the quantity sold. In other words, in order to increase sales the monopolist must reduce the price of all goods sold and therefore marginal revenue will always be less than average revenue under monopoly.

Table 11.1: Market Condition and Monopoly

Output Sales	Price (AR)	Total Revenue	Marginal Revenue
1	20	20	20
2	18	36	16
3	16	48	12
4	14	56	8

Notes

Notes **Sources of Monopoly**

1. ***Legal Restrictions:*** Some public sector services are statutory monopolies, which means their position is protected by law.

   A monopoly position might also be protected by a patent which prevents other firms from producing an identical good during the life of the patent. However, similar products can often be produced and it is easy to exaggerate the protection afforded by patents.

2. ***Capital Costs:*** Certain businesses, such as international airlines and chemical companies, have relatively high set-up costs. In such cases the minimum efficient scale of production might be very high indeed and this creates a formidable barrier to entry.

3. ***Natural Factor Endowments:*** Sometimes firms, within a particular country, between them control a major proportion of the world output of a commodity: nitrates from Chile, coffee from Brazil and gold from South Africa are cases in point. A particular country has a monopoly in the supply of a particular commodity due to natural factor endowments and it is impossible to obtain supply of the commodity from any other source.

4. ***Tariffs and Quotas:*** It can happen that a firm has a dominant position in its home country, but faces competition internationally. A tariff raises the price of goods imported into the domestic economy and a quota restricts the volume that can be imported. They, therefore, protect domestic industry from international competition.

11.2 Types of Monopoly

Economists differentiate between different types of monopolies based on why the monopoly exists, such as where the barrier to entry for new companies comes from, which could be high entry costs or legal restrictions.

1. ***Natural monopoly:*** A natural monopoly occurs when the type of industry makes it financially impractical, if not impossible, for multiple companies to engage in the business.

   Example: If you had multiple companies attempting to offer sewage services, that would require multiply sewer lines running to homes which is financially – and likely spatially – impossible. This makes the sewage industry a natural monopoly.

2. ***Private monopoly:*** The monopoly firm owned and operated by private individuals is called the private monopoly. Their main motive is to make profit.

3. ***Absolute monopoly:*** It is a type of monopoly, where a single seller controls the entire supply of market without facing competition. It is also known as pure monopoly. His product does not have even any remote substitute also.

4. ***Imperfect monopoly:*** It is a type of monopoly in which a single seller controls the entire supply of the market which does not have a close substitute. But there might be remote substitute for the product available in the market.

5. ***Geographic monopoly:*** Geographic monopolies occur when there is only one company that offers a particular good or service in an area.

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Example: In a small town there may only one general store, which has a monopoly on the goods it sells. Because of the small size of the town, it may not be financially feasible for another company to come in – if the profits were split neither business would make money.

6. ***Government monopoly:*** Sometimes a government will pass laws reserving a specific trade, product or service for government agencies.

   Example: Many times a government agency will be in charge of running water. The legal barriers that are put up prevent other companies from competing with the government. The entire operation is controlled either by central or state government. Their main motive is to provide welfare to the public.

7. ***Simple or single monopoly:*** It is a type of monopoly in which a single seller controls the entire market, by selling the commodity at a single price for all the consumers. There is no price discrimination in the market.

8. ***Technological monopoly:*** When a firm enjoys monopoly power due to technical superiority over other products in the market, then it is called as technological monopoly.

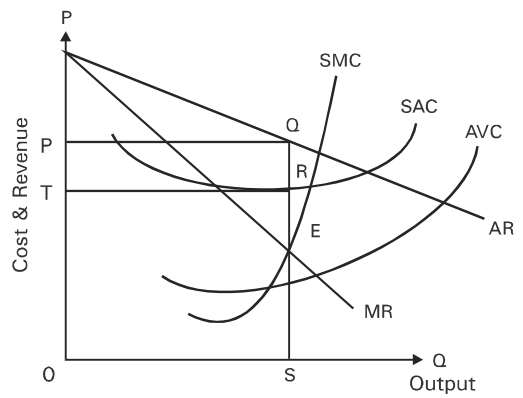
   Example: Products produced by L & T, Godrej etc. are technological monopoly.

11.3 Price and Output Determination in Short Run

In the short run the monopolist maximises his short run profits or minimises his short run losses if the following two conditions are satisfied:

1. MC = MR and
2. The slope of MC is greater than the slope of MR at the point of their intersection (i.e., MC cuts the MR curve from below).

Figure 11.1

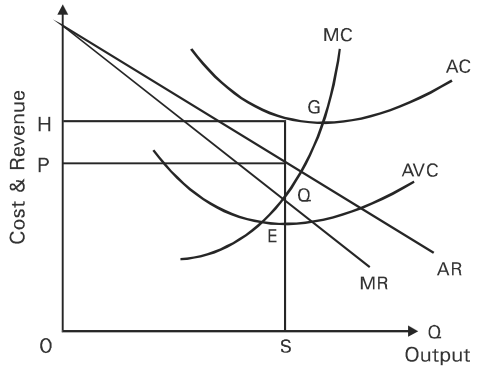


In the short run a monopolist has to work with a given existing plant. He can expand or contract output by varying the amount of variable factors but working with a given existing plant. Maximisation of profits in the short run requires the fixation of output at a level at which marginal cost with a given existing plant is equal to marginal revenue. In Figure 11.1, SAC and SMC are short run average and marginal cost curves. Monopolist is in equilibrium at E where marginal revenue is equal to marginal cost. Price set by him is SQ or OP. He is making profits equal to TRQP.

Notes

But in the short run he will continue working so long as price is above the average variable cost. If the price falls below average variable cost the monopolist would shut down even in the short run. In case of losses, monopoly equilibrium is shown in Figure 11.2. The monopolist is in equilibrium at OS level of output with price OP. Since price (or AR) is smaller than average cost, he is making losses which are equal to area of the rectangle PQGH.

Figure 11.2

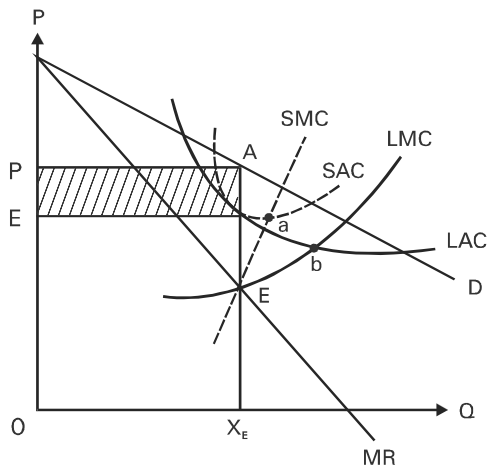


11.4 Price and Output Determination in Long Run

In the long run, the monopolist has the time to expand his plant or to intensively use his existing plant which will maximise his profits. Since there will be no new entry, it is not necessary for the monopolist to reach an optimal scale. It means that monopolist will not stay in business if he makes losses in the long run. The size of his plant and the degree of utilisation of any given plant size depend entirely on market demand.

Caution He may reach the minimum point of LAC or remain at falling part of his LAC and expand beyond the minimum LAC depending on the market conditions. In Figure 11.3 we depict the case in which the market size does not permit the monopolist to expand to the minimum point of LAC. This is because to the left of the minimum point of the LAC the SAC is tangent to the LAC at its falling part and also because the short run MC must be equal to the LMC. This occurs at E, while the minimum LAC is at b and the optimal use of the existing plant is at a: since it is utilised at the level E, there is excess capacity.

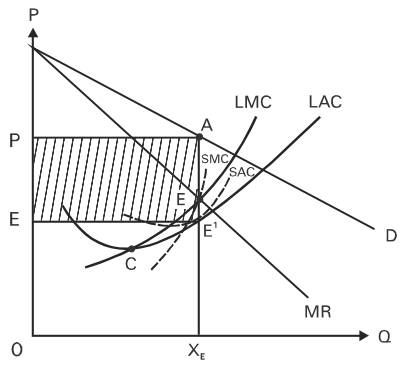
Figure 11.3: Monopolist with Suboptimal Plant and Excess Capacity



Notes

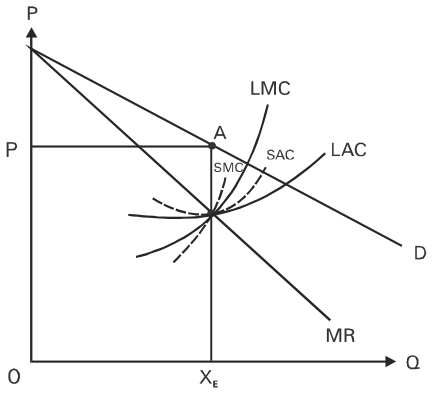
In Figure 11.4, we depict the case where the size of the market is so large that the monopolist, in order to maximise his output, must build a plant larger than the optimal and over utilise it. This is because to the right of the minimum point of the LAC the SAC and the LAC are tangent at a point of their positive slope and also because the SMC must be equal to the LAC. Thus, the plant that maximises the monopolist's profits leads to higher costs for two reasons: firstly, because it is larger than the optimal size and secondly because, it is over utilised.

Figure 11.4



Finally, in Figure 11.5 we show the case in which the market size is just large enough to permit the monopolist to build the optimal plant and use it at full capacity.

Figure 11.5



It should be clear as to which of the above situations will emerge in any particular case depends on the size of the market (given the technology of the monopolist).

Task Try to find out the organisations closer to monopoly competition in the real world.

Did u know? **What is Herfindhal Index?**

It is commonly used by government bodies while measuring the degree of competition in a market. It takes into account the size distribution of firms.

Notes

Case Study

Medical Monopoly

Non-physician providers of medical care are in high demand in the United States. But licensure laws and federal regulations limit their scope of practice and restrict access to their services. The result has almost unavoidably been less choice and higher prices for consumers.

Safety and consumer protection issues are often said to be the reasons for restricting non-physician services. But the restrictions appear not to be based on experimental findings. Studies have repeatedly shown that qualified non-physician providers – such as midwives, nurses, and chiropractors – can perform many health and medical services traditionally performed by physicians – with comparable health outcomes, lower costs, and high patient satisfaction.

Licensure laws appear to be designed to limit the supply of health care providers and restrict competition to physicians from non-physician practitioners. The primary result is an increase in physician fees and income that drives up health care costs.

At a time government is trying to cut health spending and improve access to health care, it is important to examine critically the extent to which government policies are responsible for rising health costs and the unavailability of health services. Eliminating the roadblocks to competition among health care providers could improve access to health services, lower health costs, and reduce government spending.

Question

Analyse the possible factors that have lead to this kind of situation.

Source: www.cato.org/pub_display.php?pub_id=1105

11.5 Price Discrimination under Monopoly

A seller indulges in price discrimination when he sells the same product at different prices to different buyers. Price discrimination is 'personal' when different prices are charged from different persons, 'local' when different prices are charged from people living in different localities, and 'according to use' when, for example, higher rates are charged for commercial use of electricity as compared to domestic use.

Price discrimination is possible when the seller is able to distinguish individual units bought by single buyer or to separate buyers into classes where resale among classes is not possible.

Thus, price discrimination is possible in case of personal services of doctors and lawyers. It is also possible when markets are too distant or are separated by tariff barriers. There may be a legal sanction for price discrimination as in the case of electricity charges from domestic and industrial users. It is also possible when some people are prejudiced against a particular market and prefer a posh market or when some people are too lethargic to move away from the nearest shopping centre.

Case 1: Equilibrium under Price Discrimination

A monopolist firm sells a single product in two different markets either different elasticities of demand. Resale among the customers is not possible. The firm has to decide how much total output should be produced and how it should be distributed between sub-markets and what prices should be charged in the two sub-markets. It is assumed that production takes place at the same point.

Notes

Figure 11.6: Equilibrium of Monopolist under Price Discrimination

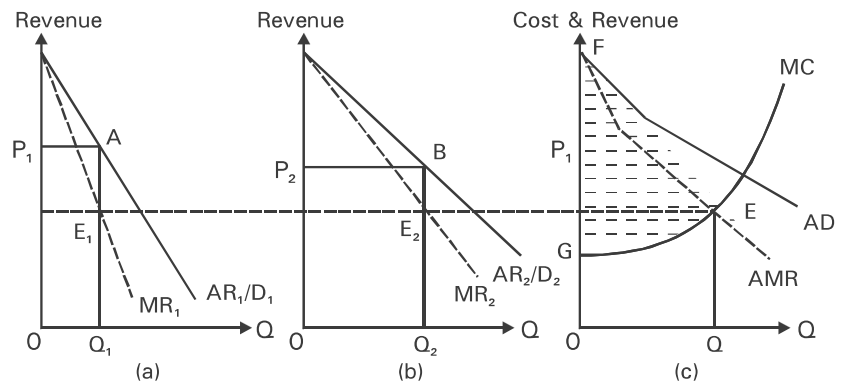
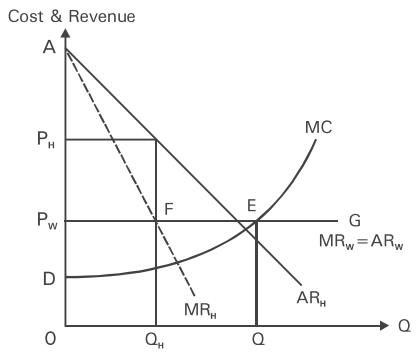


Figure 11.6 shows the equilibrium of a monopolist under the two sub-markets. It may be observed that the monopolist faces a less elastic demand curve in sub-market 1 as compared to 2. The aggregate demand and MR curves are shown in part (c). Profits are maximised where MC curve meets the MR curve from below, i.e., at point E. The total profits are represented by the shaded area EFG lying between the MR and MC curves. The monopolist would produce Q units of output. In order to know the distribution of Q in two sub-markets the equilibrium aggregate MR is equated to MR_1 and MR_2 at points E_1 and E_2 respectively. The monopolist would sell amount Q_1 in sub-market 1 at a price P_1. He would sell amount Q_2 at a price P_2 in sub-market 2. It should be noted that $Q = Q_1 + Q_2$.

Case 2: Dumping

This is a special case when the firm is a monopolistic in the domestic market but faces perfect competition in the world market. Figure 11.7 shows the equilibrium of such a firm. AR_H and MR_H are the average and marginal revenue curves respectively which the firm faces in the home market. AR_W or MR_W is horizontal straight line at the level of prices P_w, prevailing in the world market. MC denotes the marginal cost curve. The aggregate MR curve is given by the curve AFEG which is the lateral summation of MR_W and MR_H. The profits are maximised when aggregate MR=MC, i.e., at point E. The firm would sell total output Q. In the home market, the firm would equate MR_H to the equilibrium MC. Thus, the firm would sell Q_H units in the domestic market at a price P_H which is higher than the international price P_W. The remaining amount ($Q-Q_H$) would be sold in the world market at price P_W. The area AFED denotes the total profits of this firm. The producer is said to be 'dumping' in the world market since he is charging less price in the world market than in the home market.

Figure 11.7: Disequilibrium of a Monopolist under Price Discrimination



Notes

Case Study

In Curbing Anti-Dumping, Chinese Companies Sued For Monopoly in US.

In a closely watched case that could test the reach of U.S. antitrust law, four Chinese companies face powerful evidence that they colluded to limit production and fix prices of vitamin C in the United States. The evidence is so convincing, in fact, that the defendants have not contested the allegations.

But they still have a potentially solid legal defense: the Chinese Government made them do it. It's a position that has been bolstered by the Chinese government itself, which made an official appearance in the case -- believed to be its first ever in a U.S. court -- to file briefs in support of the defendants. After more than six years of litigation, a Brooklyn federal judge is expected to decide soon whether the case can be decided without a trial.

The legal theory underpinning the defendants' argument is known as the foreign sovereign compulsion doctrine, which protects foreign companies that were compelled by their own government to break U.S. law. As Chinese companies increasingly become the target of antitrust lawsuits in the United States, the doctrine is expected to undergo more legal scrutiny. In addition to the vitamin C case, Chinese companies have raised the sovereign compulsion defense in two other price-fixing cases.

The outcomes of those cases are not expected to have an immediate impact on U.S. trade relations with China, the largest supplier of goods imported into the United States. As China's economic power continues to grow, however, the disputes could be a sign of more trade fights ahead.

Shanker Singham, a partner at Squire, Sanders & Dempsey and the chairman of the International Roundtable on Trade and Competition Policy, said that a ruling for the defendants would undermine global competition. "It would be a declaration of war on the market system where business competition on the merits is the organizing economic principle," Singham said.

Pact Limits Export Volumes

Until recently, Chinese companies have been known for low production costs that have benefited consumers worldwide, and only in the last five years have they been accused of coordinating production in an effort to raise prices. "The appearance of Chinese cartels that are hiding behind the state is a disturbing trend," said John Connor, a professor at Purdue University specializing in antitrust law enforcement.

Among the documents in the vitamin C case is a 2001 written production and price agreement among the four Chinese manufacturers, which together controlled around 60 percent of the world's vitamin C market. The pact explicitly limited each company to a specific volume for export. According to the plaintiffs, after the agreement was made, spot prices for vitamin C shot to as high as $7 per kilogram in December 2002 from $2.50 per kilogram in December 2001.

In an amicus brief filed in support of the defendants, China's Ministry of Commerce argued that the vitamin C manufacturers were compelled by Chinese law to coordinate their production and pricing. It also argued that a ruling against the manufactures would "improperly penalize" them for "the sovereign acts of their government and would adversely affect implementations of China's trade policy."

Contd...

Notes

The foreign sovereign compulsion defense has rarely been litigated and it has only been successful once, according to antitrust law experts. But the presence of the Chinese government in the vitamin C case could cause Judge Brian Cogan to look for a way to dismiss the case. "You can see why a judge would be reluctant to keep the case when it's about foreign affairs and trade policy," said Spencer Waller, director of the Institute for Consumer Antitrust Studies at Loyola University Chicago School of Law.

No U.S. Action

The Chinese government's participation may explain why neither the U.S. Department of Justice nor the Federal Trade Commission has taken any action against the Chinese companies. According to enforcement guidelines that the government issued in 1995, the DOJ and FTC will not take action against a company if a foreign government makes a sufficiently detailed presentation that a specific law compelled the defendant's actions. William Isaacson, a partner at Boies, Schiller & Flexner and the co-lead counsel for the plaintiffs, said that neither the Chinese government nor the defendants have been able to point to such a law.

Isaacson and his law firm have a unique perspective on the vitamin C market. In the late 1990s, they investigated a vitamin C cartel among European and Japanese companies. Their probe led to U.S. prosecutions that resulted in more than $900 million in corporate fines and several guilty pleas. Isaacson said he is bewildered that the U.S. government has not contacted him for more information about his case against the Chinese companies. "I've never understood why they don't want to find out what's been happening." The Department of Justice's antitrust division and the FTC declined to comment.

The plaintiffs, two U.S. buyers of vitamin C, alleged in one of their briefs that the defendants fixed prices without any help from the government. It was only after the defendants were accused of price fixing that they invoked their government's involvement, according to the plaintiffs.

For their part, the Chinese manufacturers say that China's Ministry of Commerce directed an entity called the Chamber of Commerce of Medicines and Health Products Importers and Exporters to coordinate production. According to the brief submitted by the Ministry of Commerce, the action was taken in order to mitigate the exposure Chinese companies faced in potential antidumping investigations from other countries and to ensure China's orderly transition to a market-driven economy.

But that position could turn out to be problematic for China in a dispute with the United States at the World Trade Organization. In that proceeding, the United States has charged that China has played a role in limiting exports of certain raw materials, in violation of WTO rules. To bolster its case, the United States has pointed to China's admission in the vitamin C case that in fact it is involved in setting production limits.

The case is Animal Science Products and The Ranis Company v. Hebei Welcome Pharmaceutical Co. Ltd. et al, U.S. District Court for the Eastern District of New York, No. 05-00453.

Question

Do you think what China is doing is right?

Source: Reporting by Andrew Longstreth of Reuters Legal; Editing by Amy Singer and Eddie Evans; This article first appeared on Westlaw News & Insight, www.westlawnews.com

Notes

Caselet

De Beers : An Unregulated Monopoly

According to the New York Times (1986), the Central Selling Organisation, controlled by De Beers Consolidated Mines Ltd, is "probably the world's most successful monopoly." De Beers, founded in 1880 by Cecil Rhodes in South Africa, controlled over 99 per cent of world's diamond production until about 1900. At present, the firm mines only about 15 per cent of the world's diamonds, but it still controls the sales of over 80 per cent of the gem quality diamonds through its Central Selling Organisation which markets the output of other major producing countries like Zaire, the Soviet Union, Botswana, Namibia and Australia, as well as its own production. In the first half of 1989, its sales were over $2 billions.

No one doubts that De Beers controls the price of diamonds. Buyers are offered small boxes of assorted diamonds at a price set by De Beers on "take it all or leave it" basis. Those that choose not to buy may have to wait some time before getting another opportunity. If the demand for diamond fails, as it did in early 1980s (when inflation slowed and diamonds as an investment lost much of their sparkle), De Beers stands ready to buy diamonds to support the price. Between 1979 and 1984, its stockpile of diamonds increased from about $360 million to about $2 billion. In the first half of 1992, its earnings fell by about 25 per cent because global recession had reduced the demand for diamonds.

Besides limiting the quantity supplied, De Beers also works hard and cleverly to push the demand curve for diamonds to the right. An important part of its sales campaign has been to link diamonds and romance (according to its 50-year old slogan, "A Diamond is Forever"), of course, this has also been helpful in keeping diamonds once sold, off the market. A good that is drenched with lasting sentiment is less likely to be sold when times get tough. De Beers's policies have paid off very substantial profits, but the consumer has paid higher prices than if the diamond market were competitive.

11.6 Economic Inefficiency of Monopoly

A monopolist generally produces less output and charges a higher price than in the case for perfect competition. In particular, the price charged by a monopolist is higher than the marginal cost of production, which violates the efficiency condition- i.e. P=MC. Monopoly is inefficient because it has market control and faces a negatively-sloped demand curve.

Monopoly does not efficiently allocate resources. In fact, monopoly (if left unregulated) is generally considered the most inefficient of the four market structures. The reason for this inefficiency is found with market control. As the only seller in the market, the negatively-sloped market demand curve is the demand curve facing the monopolist. If buyers want to buy, they must buy from the single seller. The negative slope of the demand curve means that the price charged by the monopoly is greater than marginal revenue. As a profit-maximizing firm that equates marginal revenue with marginal cost, the price charged by monopoly is greater than marginal cost. The inequality between price and marginal cost is what makes monopoly inefficient.

11.7 Summary

- In the case of monopoly one firm constitutes the whole industry.
- There must be a single producer or seller of a product and the product has no close substitute.

Notes

- In the short run the monopolist maximises his short run profits or minimises his short run losses if the following two conditions are satisfied: (i) MC = MR and (ii) The slope of MC is greater than the slope of MR at the point of their intersection.
- In the long run, the monopolist has the time to expand his plant or to intensively use his existing plant which will maximise his profits.
- A seller indulges in price discrimination when he sells the same product at different prices to different buyers. A monopolist firm sells a single product in two different markets either different elasticities of demand.

11.8 Keywords

Dumping: When the firm is a monopolistic in the domestic market but faces perfect competition in the world market.

Equilibrium: Condition when the firm has no tendency either to increase or to contract its output.

Imperfect competition: A market structure wherein individual firms exercise control over the price to a smaller or larger degree depending upon the degree of imperfection present in a case.

Market period: A very short period in which the supply is fixed, that is no adjustment can take place in supply conditions.

Monopoly: Existence of a single producer or seller which is producing or selling a product which has no close substitutes.

Perfect competition: A market structure characterized by a complete absence of rivalry among the individual firms.

Profit: Difference between total revenue and total cost.

11.9 Self Assessment

State whether the following statements are true or false:

1. In the case of monopoly one firm constitutes the whole industry.
2. In case of monopoly, the marginal revenue is less than the price.
3. In the short-run, a monopolist cannot be in equilibrium if MC cuts the MR curve from below, even if MC=MR.
4. Monopoly represents an efficient use of resources at the macro level.

Choose the appropriate answer:

5. Given the same cost and revenue schedules, a profit-maximizing monopolist will produce:
   (a) less output than a competitive industry
   (b) more output than a competitive industry
   (c) the same amount of output as a competitive industry
   (d) none of above.

Notes

6. The quantity supplied by a profit maximizing monopolist is:
   (a) equal to quantity demanded at competitive market price
   (b) insufficient to supply the quantity demanded at monopoly price
   (c) equal to quantity demanded when price equals marginal cost
   (d) insufficient to satisfy the quantity demanded at the competitive market price
7. Which of the following is not true of a profit maximizing monopoly firm in equilibrium?
   (a) total profit is maximum for the firm
   (b) there is less output than under competitive conditions
   (c) average costs are minimum at the equilibrium rate of output
   (d) the price is higher than under competitive conditions.

Fill in the blanks:

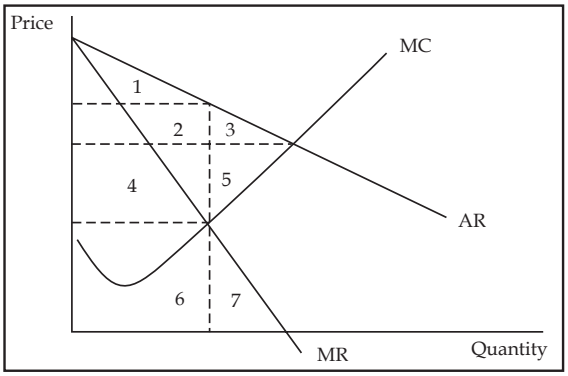
8. Under monopoly ..... firm constitutes the whole industry.
9. In monopoly the demand curve for the firm and industry is ..... .
10. In the short run monopolist will continue working so long as price is above the ..... .
11. In monopoly seller may indulge in price ..... .
12. Since there will be no new entry, it is not necessary for the monopolist to reach ..... scale.
13. If a seller is charging less price in the world market than in the home market, it is called ..... .
14. In monopoly product has no close ..... .

11.10 Review Questions

1. What perfect competitive market and pure monopoly market have in common?
2. How can a monopoly market be a disadvantage to consumers?
3. In what market did Microsoft have a monopoly in the late 1990s? What technological advances threatened that monopoly?
4. The water company is privately owned and is the only water company in town. It is licensed and franchised by the city for a 10 - year term, just renewed. They advertise on TV, enclose a newsletter with their bills, and donate to local school activities. Why do they do these things?
5. Examine the features of monopoly competition through appropriate examples.
6. Show that under monopoly P>MC at equilibrium.

Notes

7. The diagram below represents an industry that was in perfect competition that has become a monopoly. Which area on the graph shows the level of producer surplus that will exist under the monopoly?



8. Consider the following table and locate the profit maximising level of output; also estimate the "degree of monopoly" corresponding to that level of output.

Output	1	2	3	4	5
Price	5	4	3	2	1
Average costs	3	3	3	3	3

9. Why is the monopolist's MR less than AR?
10. A monopolist is selling fish. But if the fish don't sell, they rot. What will be the likely elasticity at the point on the demand curve at which the monopolist sets the price?
11. Discuss the relation between the average revenue curve and the marginal revenue curve under simple monopoly.
12. How is price determined under a simple monopoly?
13. Will a monopolist continue to produce in the short run even if production means losses? Explain.
14. A TV manufacturer produces X sets a week at a total cost of ₹ $(1/25\ X^2 + 3X + 100)$. He is a monopolist and the demand of his market is $X = 75 - 3P$, when the price is ₹ P per set. Show that the maximum net revenue is obtained when about 30 sets are produced per week. What is the monopolist's price?
15. If you are a monopolist, how will you determine the price discrimination in various markets?
16. Discuss different types of monopolies with help of suitable exmaples.
17. "Monopoly is economically inefficient". Do you agree? Justify your answer.

Answers: Self Assessment

1.	True	2.	True
3.	True	4.	False
5.	(a)	6.	(d)
7.	(a)	8.	one
9.	same	10.	average variable cost

Notes

11. discrimination
12. an optimal
13. Dumping
14. substitute

11.11 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Robert S. Pindyck, *Microeconomics,* Pearson Education

Sampat Mukherjee, *Microeconomics,* Prentice Hall

Online links

http://alpha.fdu.edu/~koppl/note19.htm

http://tutor2u.net/blog/index.php/economics/C180/

http://www.ehow.com/about_6601606_monopoly-economics_.html

Notes

Unit 12: Monopolistic Competition

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Objectives

After studying this unit, you will be able to:

- State features of monopolistic competition
- Discuss short run equilibrium of a monopolistically competitive firm
- Explain the long run equilibrium of a monopolistically competitive firm
- Realise the role of advertising in monopolistic competition

Introduction

Monopolistic competition has an element of product differentiation. We can define a monopolistic competitive market as a market in which there are a large number of firms and the products in the market are close but not perfect substitute. The real world is widely populated by monopolistic competition. Perhaps half of the economy's total production comes from monopolistically competitive firms. The best examples of monopolistic competition come can be retail trade, including restaurants, clothing stores, and convenience stores.

12.1 Meaning and Features of Monopolistic Competition

Monopolistic competition is a form of market structure in which a large number of independent firms are supplying products that are slightly differentiated from the point of view of buyers. Thus, the products of the competing firms are close but not perfect substitutes because buyers do not regard them as identical. This situation arises when the same commodity is being sold under different brand names, each brand being slightly different from the others. For example, Lux, Liril, Rexona, Hamam, etc., are brands of toilet soap, or Colgate, Cibaca, Prudent, Promise, etc., brands of toothpaste.

Notes

Each firm is, therefore, the sole producer of a particular brand or "product". It is a monopolist as far as that particular brand is concerned. However, since the various brands are close substitutes, a large number of "monopoly" producers of these brands are involved in keen competition with one another. This type of market structure, where there is competition among a large number of "monopolists" is called monopolistic competition.

The differentiation among competing products or brands may be based on real or imaginary differences in quality. Real differences among brands refer to palpable differences in quality such as shape, flavour, colour, packing, after sales service, warranty period, etc. In contrast, imaginary differences mean quality differences which are not really palpable but buyers are made to imagine or are "conditioned" to believe that such differences exist and are important. Advertising often has the effect of making buyers imagine or believe that the advertised brand has different qualities. When there is product differentiation, each firm has some degree of control over price.

As a result, under monopolistic competition, the demand or average revenue curve of an individual firm is a gradually falling curve. It is highly elastic but not perfectly so. Therefore, the marginal revenue curve of the firm is also falling and lies below the average revenue curve at all levels of output. It is in this respect that monopolistic competition differs from perfect competition.

In addition to product differentiation, the other three basic characteristics of monopolistic competition are:

1. There are a large number of independent sellers (and buyers) in the market.
2. The relative (proportionate) market shares of all sellers are insignificant and more or less equal. That is, seller concentration in the market is almost non existent.
3. There are neither any legal nor any economic barriers against the entry of new firms into the market. New firms are free to enter the market and existing firms are free to leave the market.

In other words, product differentiation is the only characteristic that distinguishes monopolistic competition from perfect competition.

Firms selling slightly differentiated products under different brand names compete not only through variations in price but also through variations in product quality (product variation) and changes in advertising or selling costs. Thus, under monopolistic competition, an individual firm has to maximise profits in relation to variations in three policy variables, namely, price, product quality, and selling costs. (In contrast, under perfect competition there is competition only through price variation).

Example: We find many examples of monopolistic competition in real world. The best examples can be found in retail trade. As we know the main characteristics for this type of market situation is that there are many producers and many customers for the services/products, yet no company has control over the market price, consumers understand that there are non-price differences among the competitors' products, and there are very few barriers to enter and exit from the market.

Food and Beverage (Restaurant) industry is an example of monopolistic competition, especially in the fast food industry in which all services are basically the same, but are marketed differently, and there exists a perception that some fast food restaurants must be better than others.

Toothpaste and soap manufacturers often engage in monopolistic competition practices. Rather than changing the products themselves, producers change the packaging, the design, or simply claim through advertising that their product is best.

Notes

Assumptions in Analysing Firm Behaviour

We analyse the conditions and process of long run equilibrium under monopolistic competition with the assumption that competing firms keep their selling costs and product quality constant and compete only through price variation. We then assume that

1. The demand curve of each individual firm has the same shape (elasticity) and position (distance from the y-axis). That is, we assume the demand curves of all firms to be symmetrical. This assumption implies that market share of every firm is the same and equal to a constant proportion of total market demand. That is, if total market demand is Q and an individual firm's demand is q then q=KQ, where K is a constant fraction for all firms.
2. The cost curves, both average and marginal, are symmetrical for each firm.

These two assumptions are 'heroic' or unrealistic but we need to make them for logical convenience in order to analyse the long run equilibrium of a typical firm under monopolistic competition.

Caselet

Market Entry and the Vanilla Syndrome

In most categories of consumer products, there is one dominant segment; glucose in biscuits, cola in soft drinks, vanilla in ice creams. These are good categories, but the same thing can be extended to other product categories.

Now the tendency is that when a new player wants to enter an established product category, he automatically looks at the dominant segment first. The MD and CEO, Ashok Jain, Cadbury Schweppes Beverages India Private Limited, calls it a "Vanilla trap". He explains this as follows:

"A trap because you, as the new entrant, can never come close to challenging the dominance of the biggest player in that vanilla segment. So what you get into is a syndrome: "Can I get two-to-three per cent market share in that segment?" The segment spells sheer volume, so this share would be larger than 15 per cent of some other segment in the category.

That's where the trap is. The segment's Goliath is so big, you'll get routed, like it or not.

So what do you do instead? I suggest the "blackcurrant route". A route where you take something else and make yourself dominant there, while getting a foot into the dominant segment as well (you can't afford not to).

And what'll happen? While people will come for your blackcurrant, they will buy your vanilla. Your volumes will still come from your vanilla. But for top-of-mind consumer, the trademark blackcurrant is what will identify you. This is theory. It's happened. I'll give you three examples.

When Cadbury India decided to extend to biscuits, it started off by challenging Parle in glucose, a segment where Parle's strength is unmatched. Cadbury didn't succeed. By the time it launched chocolate biscuits, it was too late.

There was a lesson here, which was extended to ice creams, the next category Cadbury entered. The brand, Dollops, harped on its blackcurrant ice cream, didn't talk vanilla at all, but the volumes came from vanilla anyway.

Then take Britannia. For years, it tried to break Parle's dominance in glucose biscuits, with little success. It then went in for a number of branded products that gave it an aura and

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gained it respect and attention. Little Hearts was so different, it gave Britannia distinction. And then, the company launched Tiger, a glucose biscuit. Tiger is now a very large brand in the glucose segment.

You've got to have something that's very specially your own. Otherwise, the consumer won't pay you much attention and the trade won't want to stock your products – why should it? The retailer looks Cadbury Schweppes' way because of Crush and Canada Dry. Our largest volumes come from Sport Cola. The brand sells much more than Crush.

Proves my point, doesn't it?

I say again: you can't fight the dominant guy in the dominant segment. Get into his segment's volumes indirectly, instead."

12.2 Short Run and Long Run Equilibrium of a Firm

When firms are competing only through price changes, there are three cases of long run equilibrium of a typical firm under monopolistic competition.

Case 1: When competition takes place only through the entry of new firms.

Case 2: When competition takes place only through price variation (price-cutting).

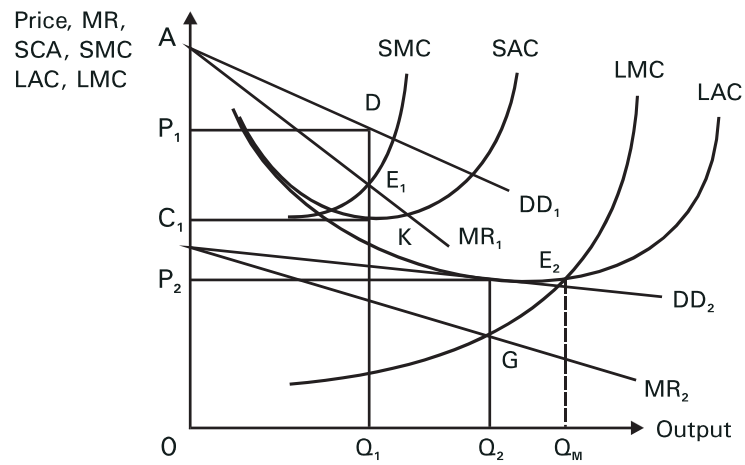
Case 3: When competition arises through price variation and new entry.

12.2.1 Equilibrium through New Entry Competition

Under monopolistic competition, the number of independent firms selling differentiated products or brands of a given commodity is large and the relative market share of every firm is insignificant. Therefore, the entry of a new firm into the market will not have any noticeable adverse effect on the sales (or demand) of any of the established firms. Established firms will have no reason to react to new entry by adopting practices to discourage this. Moreover, there are no legal or non-legal (economic) barriers against new entry. Hence, when high profits of the existing firms attract new entry, new firms will in fact enter the market.

The process by which competition from the entry of new firms leads an individual firm's long run equilibrium is explained with the aid of Figure 12.1.

Figure 12.1



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The initial downward sloping demand curve of the firm is DD_1 and MR_1 is the corresponding marginal revenue curve. SMC and SAC are the short run marginal cost and short run average cost curves. We see that the SMC curve cuts MR_1 from below at point E_1. The firm maximises profits at output Q_1 and charges price OP or Q_1D. At Q_1 output SAC = OC_1. It makes super-normal profits = area P_1DKC_1. The super normal profits of existing firms induce new firms to enter this market. As the number of firms and brands increases, the market share of each firm declines and each firm is able to sell less at the same price. Hence, the demand curve of every individual firm slides downwards, remaining parallel to itself.

This process of competition from new entry continues so long as the profits earned by a typical firm are more than normal, i.e., so long as the demand curve lies above the AC curve.

The competition from new entry will stop and every firm will reach its long run equilibrium output when profits are only normal and price is just equal to long run average cost. This happens when the demand curve of an individual firm becomes DD_2, which is at a tangent to the LAC curve at point E_2. The marginal revenue curve MR_2 corresponds to demand curve DD_2. Here LMC cuts MR_2 from below at point G at output Q_2. Thus, the maximum profit that each firm can earn is only normal profit which is included in LAC. The point of tangency E_2, is therefore the position of the long run equilibrium of a firm where output is Q_2 and price is P_2.

Caution When there is competition only from new entry, the long run equilibrium of the firm under monopolistic competition is reached under the following conditions:

1. Price = AR = LAC = OP_2 (Figure 12.1)
2. MR = LMC = GQ_2 (Figure 12.1)
3. Maximum Profit = Normal Profits

However, because the firm's demand or average revenue curve is falling, the price is higher than marginal revenue. Hence, under monopolistic competition, even though the long run equilibrium price is = LAC, it is greater than LMC. This is because, at equilibrium, MR = LMC but price is greater than MR. (Under perfect competition, price = minimum LAC = LMC).

Moreover, since the firm's demand or average revenue DD_2 is falling on account of product differentiation, it can be a tangent to the U-shaped LAC curve only when LAC is also falling. As shown in Figure 12.1, the long run equilibrium position E_2 will be at a point which is to the left of the minimum LAC. Thus, the long run equilibrium output Q_2 is less than optimum output, Q_m (where LAC is at its minimum). The difference between Q_m and Q_2 = (OQ_m – OQ_2) shows the extent of excess or under utilised capacity. Equilibrium with excess capacity is therefore the necessary consequence of product differentiation and monopolistic competition.

Task Analyse the "market entry and the vanilla syndrome" in the case of health and retirement plans of insurance companies.

12.2.2 Equilibrium when Competition is through Price Variation

For the purpose of explaining the process of competition through price changes, two demand curves for every individual firm are used.

The change in demand resulting from a change in price undertaken on the basis of assumption that its competitors will not follow suit when it reduces its price leads the firm to expect that the increase in its demand will be proportionately greater than the reduction in its price. The perceived demand curve is therefore highly, though not perfectly, elastic. It falls but falls very

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gradually and this shows why a firm is induced to cut its price. It is the decision making demand curve because the firm decides to cut price on the basis of the change in demand it perceives or assumes to occur as the result of the change in price.

However, because every firm's market share is equally insignificant, each firm acts on the assumption that when it lowers it price, the prices of its competing firms will remain constant. Each firm, therefore, reduces its price on the basis of the same assumption, and consequently all firms in the market reduce their prices simultaneously but independently (i.e., not in retaliation). Each firm acts on the basis of its perceived demand curve. As a result, the actual increase in demand resulting from a reduction in price is much less than has been 'imagined' by each firm. The actual changes in demand arising from such simultaneous reduction in price by all firms is shown by what is called the actual demand of an individual firm.

Figure 12.2

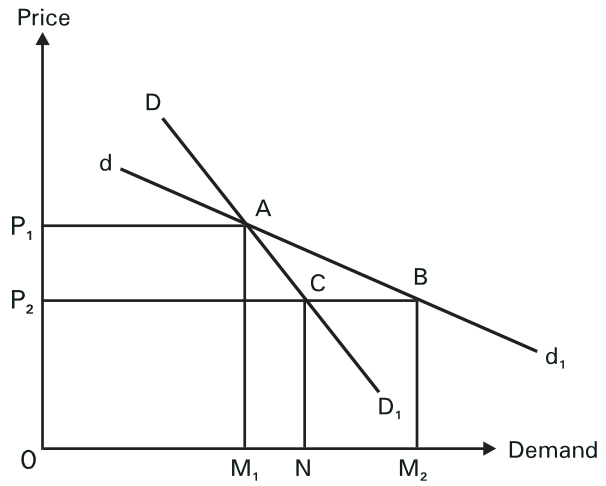

Figure 12.2 shows dd_1 as the assumed or perceived demand curve and DD_1 as the actual demand curve. When price is lowered from P_1 to P_2 the firm assumes the demand to increase from M_1 to M_2, but as is shown by DD_1, it actually increases only to M_1N.

The assumed demand curve is much more elastic than the 'actual' demand curve. This is because the former 'assumed' or 'perceived' changes in demand are based on the assumption that only one firm changes its price, while its competitors keep their prices constant. The actual demand curve, however, shows the real changes in demand when all firms simultaneously but independently change their prices acting on the basis of same assumption.

Did u know? What are species and genus demand curves? Chamberlin employed two demand curves to explain the market adjustment process. Chamberlin referred to one of the demand curve as the firm's "species" demand curve because it is specific to the particular firm; it is the one with respect to which the manager must plan most of its short-run strategies. But the manager cannot avoid giving consideration to the other type of demand curve, which Chamberlin referred to as the "genus" demand curve because it is generic to the market group.

12.2.3 Competition through Price Variation and New Entry

We have seen that the actual demand curve DD shows the absolute market share of an individual firm. Because we assume that the position and shape of demand curve are symmetrical for every firm, the market shares of all firms are assumed to be equal in terms of absolute quantity or size

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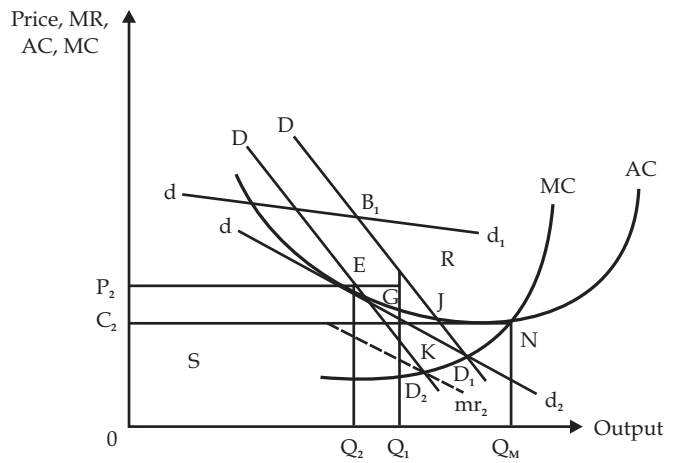
of output. It is given by a ratio of total market demand divided by the number of firms. The larger the number of firms in the market, the smaller the absolute market share of each firm. The position of DD, i.e., its distance from the Y-axis therefore depends upon the number of firms in the market. The actual demand curve DD will shift nearer to the Y-axis as the number of firms increases and will move further away from the Y-axis as the number of firms decreases. That is, DD will shift towards the left as new firms enter the industry and it will shift towards right when the existing firms leave the industry.

As shown in Figure 12.3 the initial actual demand curve is shown by DD_1. It cuts the AC curve at point J. Let dd_1 be the initial perceived demand curve cutting DD_1 at point B_1. As explained in above, competition among firms through price variation will continue until the perceived demand curve dd_1 becomes dd_2, which is tangent to AC at point E. Point E shows price to be = OP_2. However, point E is not situated on the actual demand curve DD_1. Hence, the firm finds that corresponding to point E, the actual demand on DD_1 is P_2R. Now point R on DD_1 is above the AC curve. Therefore output P_2R indicates super-normal profits shown by area P_2RGC_2. These supernormal profits induce new firms to enter the industry. As the number of firms increases the absolute market share of each decreases and the actual demand curve DD_1 shifts towards the left.

This process will continue till DD_1 shifts to the position of DD_2 which intersects the AC curve at point E where the perceived demand curve dd_2 is a tangent to AC. At this point profits are normal on the basis of perceived demand curve dd_2 as well as on the basis of actual demand curve DD_2. That is, actual demand and perceived demand are equal when profits are normal. The point of tangency between dd_2 and AC is at point E where DD_2 cuts AC. Here the long run equilibrium output is Q_2 and price is P_2.

Figure 12.3



Here the competition through price variation is shown by the downward shift in the perceived demand curve along the actual demand curve. (From position dd_1 to position dd_2, which is tangent to AC at point E). And the competition through new entry is shown by the shift in the position of actual demand curve (DD_1 shifts to the position of DD_2) which intersects AC at the point of tangency of dd_2 and AC, i.e., at point E.

Under monopolistic competition, when there is competition through price variation as well as new entry (or exit), the long run equilibrium of the firm will be reached when following conditions are satisfied.

1. Perceived demand curve dd_2 is 2 tangent to AC.
2. Price is equal to AC.

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3. Maximum profit = Normal profit (economic profit=zero).
4. MR=MC. Here the relevant marginal revenue is derived from the perceived demand curve.
5. The actual demand curve (or 'market share' demand curve) DD cuts AC at the point where perceived demand curve (dd) is a tangent to AC.
6. Price is greater than MC because price is greater than MR.
7. The equilibrium output is less than the optimum output.

Here also we find that the long run equilibrium output is determined at the level where AC is falling and therefore the equilibrium output is less than the optimum output, Q_m. That is, excess capacity exists at long run equilibrium output.

Notes Equilibrium under monopolistic competition results in sub-optimum output with excess or under utilised capacity and unexhausted economies of scale. This excess capacity is due to two reasons. First, under monopolistic competition, product differentiation by competing firms causes the demand curve of the individual firm to slope downwards. Second, since the number of competing firms is large, every firm behaves independently, with the result that competition through new entry and price variation continues until every firm earns only normal profits. The typical firm will not reach long run equilibrium until its demand curve is tangent to AC. In other words, the falling demand curve and long run tangency solution are the reasons which account for excess capacity equilibrium. (Also note that at the point of tangency the slope of demand curve is equal to the slope of the average cost curve. But the slope of falling demand curve is negative. Hence the slope of cost curve is also negative).

Case Study

The Motor Vehicle Repair and Servicing Industry

The typical British small garage is stereotyped as untidy, messy, cluttered with hoists and equipment, with a few overall-clad figures working to the clatter of tools and blaring radio.

This picture is quite different from that of the early years of the automobile. In those days, work on the car was the domain of the chauffeur or blacksmith, or the manufacturer if repairs were beyond both.

This was to change following the Second World War. As the volume of cars grew so the motor repair sector began to expand, giving employment to the many mechanically trained ex-servicemen.

The market grew so quickly that there was little chance of erecting entry barriers. For example, although there were moves to introduce specific (City and Guilds) qualifications for mechanics and thereby impose a degree of restricted entry on the industry, this was never fully established. The result is to be seen today.

The motor vehicle repair industry has developed into a good example of a monopolistically competitive industry.

In 2001, it was estimated that the MVR industry in the UK employed just over 170,000 people in about 44,000 businesses. The statistics also show that the industry is still

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dominated by small and medium-sized businesses (SMEs) with over half the workforce (~58%) employed in either zero-employee enterprises e.g. sole traders or partnerships, or businesses employing less than 10 people. Companies with less than 50 people accounted for approx. 83% of the workforce.

The vehicle repair and servicing industry is diverse, being made up of general repairers, specialist repairers (i.e. bodywork, electrics), dealers and petrol stations. With so many garages, the industry has remained a highly competitive one. However, specialism and locality enable the various garages to maintain a fairly constant degree of control over their price.

Questions

1. With reference to economic theory, explain why the motor vehicle repair industry might be regarded as "good example of a monopolistically competitive industry."
2. The motor vehicle industry has been monopolistically competitive for many years. What are the specific features of the motor vehicle repair industry that have restricted the growth of large-scale operations, which might have led to a less competitive market structure.

Source: This worksheet is based on John Sloman's case study at www.pearsoned.co.uk/sloman

12.3 Monopolistic Competition and Advertising

Advertising is common a tool used by firms operating under monopolistic competition. It is effectively used to create product differentiation and thereby acquire some degree of market control so as to be able to charge a higher price.

Advertising can be substantiated as information provided by a company about its products or services, usually through media such as television, radio, newspapers, magazines, and the Internet, to promote or maintain sales, revenue, and/or profit.

Advertising is used by these firms to accomplish two related goals:

1. Product differentiation
2. Market control

The degree to which a firm can inform buyers about physical differences or create the perception of such differences influences the product differentiation.

Product differentiation brings with it market control. If advertising convinces buyers that a good is better than the other available comparable products, then a firm can charge a higher price.

Figure 12.4 shows the demand curve facing a monopolistically competitive firm, Everest Masala for its famous Spice powders. Everest thinks that it can enhance the sales of spice powder packets and hence, profitability through advertising.

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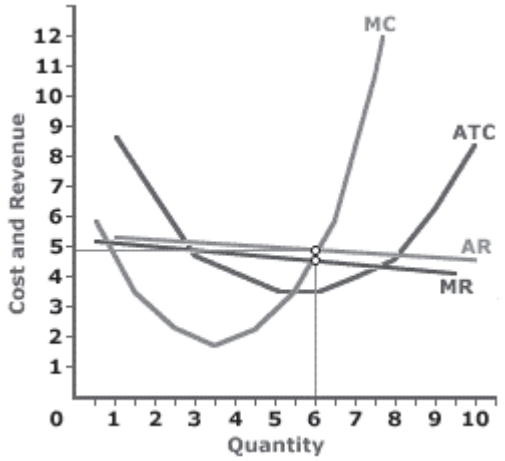
Figure 12.4: Demand Curve Facing Everest Masala for its Spice Powders

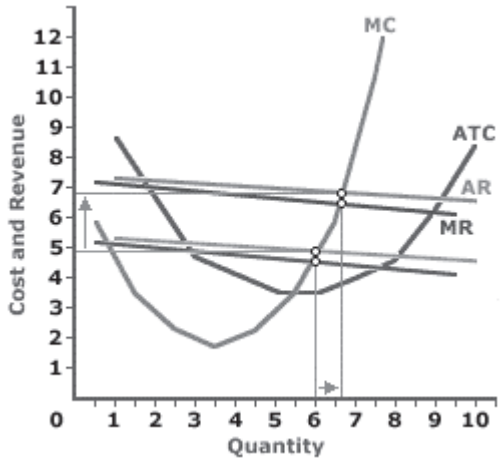


Advertising seeks to increase demand and to reduce demand elasticity.

1. ***To Increase Demand:*** The first objective of advertising is to simply increase the demand. This can be illustrated using the demand curve for Everest Masala presented in this diagram.

   Everest's current profit-maximising production is 6 types of spice powders packets, each of which is sold for a price of ₹ 4.95. Everest's advertising goal is to increase the number of buyers, who are willing and able to buy at each price, that is to shift the demand curve.

Figure 12.5: Increase in Demand due to Advertising



Everest hopes that demand will increase with advertising (shown in figure 12.5). The demand curve shifts upwards. With this new demand curve, higher prices correspond to each quantity. Everest's new profit maximising production level is 6.7 packets, each of which is sold for a price of ₹ 6.85.

2. ***To Reduce Demand Elasticity:*** The second objective of advertising is to reduce the price elasticity of demand. As a monopolistically competitive firm, Everest faces a relatively elastic demand and therefore there is a limit as regards the pricing.

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Figure 12.6: Reduction in Demand Elasticity due to Elasticity

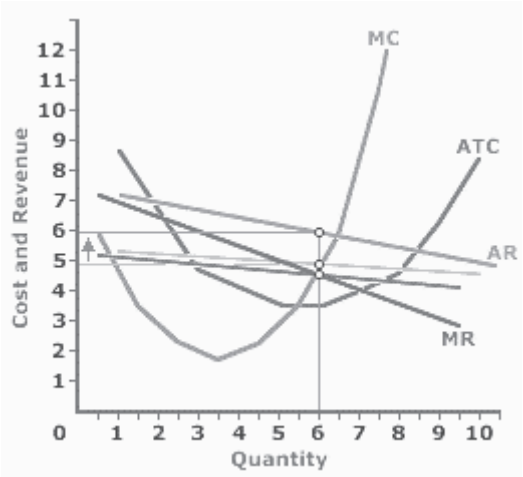

Figure 12.6 shows the effect of advertising on demand elasticity. The new demand curve facing Everest is a little steeper and less elastic. Less elastic demand means that buyers are less inclined to change their quantity demanded with a price change. Given this, Everest is able to charge a slightly higher price for the same quantity of packets sold. It can now charge a price of ₹ 5.95 for each of the 6 packets sold at the profit-maximising level of production.

There are, however, a couple of things that a monopolistically competitive firm should take care of. They are:

1. First, firms cannot maximise profit in the inelastic range of demand as in this range marginal revenue is negative. This would mean that the marginal cost would also have to be negative. This is not possible. In case the advertising is so successful that demand becomes inelastic, then the firm will have to raise the prices until it moves back into the elastic range. Quite sensibly so, when it is not possible to garner profits in the inelastic range, the firms move back to the elastic range to boost profit.

2. Second, advertising involves a lot of cost. The revenue generated by advertising must be compared against the cost of the advertising. In Everest's case, demand might increase and become less elastic, but average and marginal costs are also likely to increase.

Case Study

Maruti facing Tough Competition

The key issue for Maruti today is to sell at least the number of cars it sold last year (1998-99). Insiders in the company admit that it can't. The reason: Hyundai, Daewoo and Telco all plan to hawk 60,000 cars by end of next April. And all of them are targeting the Zen or the Maruti 800, the two monopolists, and not the crowded luxury segment. And with the market expected to stagnate, by simple logic the newcomers will be grabbing a share only from Maruti.

The threat from the new car makers is not an empty one. For instance, Hyundai plans to follow the policy of "enrichment" of the Zen. It intends to price its air conditioned model slightly lower than the Zen VX and top it by pricing the higher end model with power steering and windows just ₹ 10,000-15,000 more than the Zen VX.

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Similarly, Daewoo plans to woo buyers of the Maruti 800 air conditioned and the Zen by pricing its car under ₹ 3 lakhs. And Telco is all set to take on the 800 by offering a model at a slightly higher price.

The scenario might worsen in 1999-2000 when Maruti would have added to capacity. By next year the three other car rivals will have the capacity to put 3.6 lakh cars a year on the road. Of course, they might not reach full capacity but even at a conservative estimate they would be selling over 1 lakh cars in 1999-2000. Assuming the market grows by 10 per cent, as some optimists predict, there will be more capacity chasing the 40,000 extra car consumers.

Competition has already begun to put pressure on the company's financials. For example, when Maruti launched the upgraded version of the Zen recently, it decided not to increase the cost of the car even though it had been hit both by the customs and excise duty hikes and the extra cost of the upgradation. That is a sharp reversal of its earlier practice of increasing Maruti 800 prices after it launched an upgrade.

In fact, Maruti is not passing on the customs and excise increases for any model on to its customers. The cost increase on the Zen alone is ₹ 28,000 per car. As a result, Maruti has had to absorb ₹ 120 crores on this account plus ₹ 80 crores for upgradation.

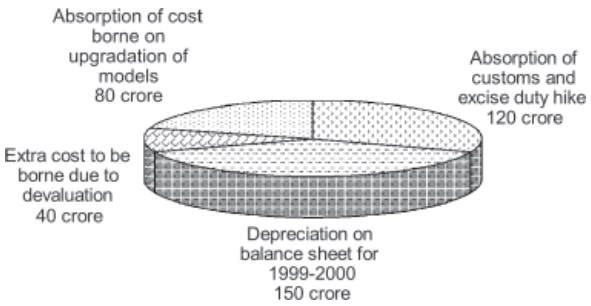
Worse, with the depreciation of the rupee, imported components will cost more leading to an extra outflow of over ₹ 40 crores. So the total extra tab that will immediately affect the bottomline will be ₹ 240 crores.

On the other hand, cost savings for 1998-99 will account for over ₹ 100 crores – which means that more than a fifth of Maruti's net profits last year will be wiped out.

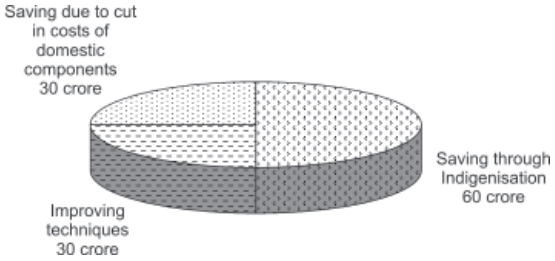
This year Maruti will save around ₹ 30 crores more – from ₹ 50 crores to ₹ 80 crores through improvements in techniques and another ₹ 50-60 crores through further indigenisation. And while negotiations are on with vendors to cut costs, insiders say this would probably be neutralised by Suzuki deciding to hike the price of components it supplies to its joint venture.

Why India's Largest Car Maker will be under threat from this fiscal.

Outgo



Savings



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Provisional Results for 1997-98 in ₹ Crores

	1997-98	1996-97	% Increase
Total income	8,454	7,956	8.3
PBT	976	808	20.8
PAT	651	510	27.6
(Sales in number)			
800cc	1,89,000	1,83,000	3.3
Omni	57,000	47,000	21.3
Gypsy	7,700	700	10.0
Esteem/1000cc	18,700	25,000	-25.2
Zen	79,500	42,000	89.3

But whatever the future market, it is clear that Maruti will have a large unutilised capacity. Even assuming that the company can grab as much as 30,000 more cars, its total sales in 1999-2000 will be below 4 lakh cars per year.

But while the company builds up idle capacity with no new models it has to consider the depreciation costs of the new plant. This will dent the bottomline even more. According to Maruti, depreciation cost will go up ₹ 150 crores in 1999-2000.

The options for Maruti are limited: it has to get its new cars on the roads as early as possible. One option that the board will consider is to import completely knocked down (CKD) kits of the new cars which will be available in Japan from October. But the cost of the CKDs will be prohibitive and Maruti will have to subsidise them, which would hit margins and profits. The alternative is for the Maruti board to convince the Japanese parent to subsidise the CKDs for a year before the model is indigenised. Either way, Maruti's future is troubled (Business Standard, August 98).

Question

Discuss Maruti's situation in the light of monopolistic competition.

12.4 Summary

- Monopolistic competition is a form of market structure in which a large number of independent firms are supplying products that are slightly differentiated.
- When firms are competing only through price changes, there are three cases of long run equilibrium of a typical firm under monopolistic competition.
- The long run equilibrium can be seen under three situations: when competition takes place only through the entry of new firms, when competition takes place only through price variations and when competition arises through price variation and new entry.
- Advertising is commonly used by firms operating under monopolistic competition as a way to create product differentiation and thus to acquire some degree of market control and thus charge a higher price.

12.5 Keywords

Actual demand: The actual changes in demand arising from simultaneous reduction in price.

Advertising: any paid form of non-personal presentation of a product, idea, or organization

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Equilibrium: Condition when the firm has no tendency either to increase or to contract its output.

Monopolistic competition: the form of imperfect competition that exists when there are many producers or sellers of similar but differentiated goods or services.

Product differentiation: Differences among competing products.

Profit: Difference between total revenue and total cost.

12.6 Self Assessment

State whether the following statements are true or false:

1. In a monopolistic market, the demand for the product of one producer depends upon the price and the nature of the products of his rivals.
2. A firm in the long-run under monopolistic competition earns high profits like that in perfect competition but only the price is higher and output lower.
3. A firm under monopolistic competition does not enjoy monopoly profits in the long run even though it charges monopoly price.
4. Selling costs cannot change, and create demand curves.
5. Monopolistic competition is identified by a few firms producing a slightly differentiated product.
6. Under monopolistic competition the firm has not the ability to collude with respect to price.
7. If a large number of firms are competing, the market could be monopolistic competition or monopoly.
8. Both monopolistic competition and perfect competition have firms that are price takers.
9. Because of the number of firms in monopolistic competition no one firm can dominate the market.
10. Identical product is a characteristic of monopolistic competition.
11. Product differentiation involves making a product that is completely different from the products of competing firms.

Fill in the blanks:

12. In monopolistic competition the relative market share of all sellers are .....
13. Under monopolistic competition, the demand or AR curve of an individual firm is a gradually ..... curve.
14. As the firm's AR curve is falling, the price is ..... than marginal revenue.
15. In the long run equilibrium output of the individual firm is ..... than optimum output.
16. The assumed demand curve is ..... than the actual demand curve.

Notes

12.7 Review Questions

1. Which of the following are examples of product differentiation in monopolistic competition and why?
   (a) new and improved packaging
   (b) lower price
   (c) acceptance of more credit cards than the competition
   (d) location of the retail store
2. What will happen as a result of the increase in the degree of product differentiation among the products sold in a monopolistically competitive industry?
3. What would happen as a result in a case where a monopolistically competitive seller can convince buyers that his/her product is of better quality and value than products sold by rival firms?
4. What single circumstance in monopolistic competition best explains the nature of the industry's relatively elastic demand curve in the market?
5. Think and answer – does the insurance industry have monopolistic competition – why/ why not?
6. If all firms in a monopolistic competitive industry were to merge would that firm produce as many different brands or just one brand?
7. "In the long run, there is no difference between monopolistic competition and perfect competition." – true, false, or ambiguous. Discuss this statement with respect to the following:
   (a) The price charged to consumers - true
   (b) The average total cost of production - false
   (c) The efficiency of the market outcome - ambiguous
   (d) The typical firm's profit in the long run hide problem- true
8. Do airlines fit into the concept of monopolistic competition? Why or why not?
9. Why or why should not be the monopolistic competition regulated?
10. If the market became competitive, what would happen to output and price?
11. Discuss the main features of monopolistic competition. Complement your answer with real world example.
12. Suppose a monopolistic firm has average revenue functions in three markets as follows:

    $P_1 = 63 - 4Q_1$ where Q_1, Q_2 and Q_3 are quantities sold

    $P_2 = 105 - 5Q_2$ in three markets.

    $P_3 = 75 - 6Q_3$

    The total cost function is $C = 20 + 5\,Q$, where $Q = Q_1 + Q_2 + Q_3$.

    Find out the profit maximising output and price in the three markets. Also estimate demand elasticities.
13. If all the brand names of essential drugs are abandoned, what will be the impact on the society?

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14. Discuss whether you find the monopolistic competition in the following industry:

    Hotels and restaurants, Health Spas, Hair dressing.

15. How is equilibrium of a firm under monopolistic competition affected, when firms are competing only through price changes? Discuss with example.

16. Explain the role of advertising in monopolistic competition.

Answers: Self Assessment

1.	True	2.	False
3.	True	4.	False
5.	False	6.	False
7.	False	8.	True
9.	True	10.	False
11.	False	12.	insignificant
13.	falling	14.	higher
15.	less	16.	More

12.8 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books.

Jeffrey M. Perloff, *Microeconomics,* Pearson Education.

Robert S. Pindyck, *Microeconomics,* Pearson Education.

Sampat Mukherjee, *Microeconomics,* Prentice Hall.

Online links

http://ingrimayne.com/econ/International/MonoComp.html

http://faculty.lebow.drexel.edu/mccainr/top/prin/txt/Imch/MC1.html

http://www.peoi.org/Courses/mic/mic6.html

http://www.amosweb.com/cgi-bin/awb_nav.pl?s=wpd&c=dsp&k=monopolistic+competition

Notes

Unit 13: Oligopoly

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Objectives

After studying this unit, you will be able to:

- State the features of oligopoly
- Discuss various types of oligopoly
- Explain the kinked demand curve
- Identify the barriers to entry in market

Introduction

Oligopoly is a situation in which only a few firms (sellers) are competing in the market for a particular commodity. On reading this unit you will see that the structure of oligopoly is different from that of the three market structures we have discussed till now. The distinguishing characteristics of oligopoly are such that neither the theory of monopolistic competition nor the theory of monopoly can explain the behaviour of an oligopolistic firm. But speaking generally, you will find that an oligopoly is much like a monopoly, in which only one company exerts control over most of a market. In an oligopoly, there are at least two firms controlling the market. The retail gas market is a good example of an oligopoly because a small number of firms control a large majority of the market.

Notes

13.1 Features of Oligopoly

The characteristics of oligopoly are briefly explained below:

1. Under oligopoly the number of competing firms being small, each firm controls an important proportion of the total (industry) supply. Consequently, the effect of a change in the price or output of one firm upon the sales of its rival firms is noticeable and not insignificant. When any firm takes an action its rivals will in all probability react to it (i.e. retaliate). The behaviour of oligopolistic firms is interdependent and not independent or atomistic as is the case under perfect or monopolistic competition.
2. The demand curve of an individual firm under oligopoly is not known and is indeterminate because it depends upon the reaction of its rivals which is uncertain. Each theory of oligopoly therefore makes a specific assumption about how rivals will (or will not) react to an individual firm's action.
3. In view of the uncertainty about the reaction of rivals and interdependence of behaviour, oligopolistic firms find it advantageous to coordinate their behaviour through explicit agreement (cartel) or implicit, hidden, understanding (collusion). Also because the number of firms is small, it is feasible for oligopolists to establish a cartel or collusive arrangement. However, it is difficult as well as expensive to monitor and enforce an agreement or understanding. Very few cartels last long, particularly when oligopolistic firms significantly differ in their cost conditions.
4. Under oligopoly, new entry is difficult. It is neither free nor barred. Hence the condition of entry becomes an important factor determining the price or output decisions of oligopolistic firms, and preventing or limiting entry an important objective.
5. Given the indeterminacy of the individual firm's demand and, therefore, the marginal revenue curve, oligopolistic firms may not aim at maximization of profits. Modern theories of oligopoly take into account the following alternative objectives of the firm:
   (a) Sales maximization with profit constraint.
   (b) Target or "fair" rate of profit and long-run stability.
   (c) Maximization of the managerial utility function.
   (d) Limiting (preventing) new entry.
   (e) Achieving "satisfactory" profits, sales, etc. That is, the firm is a "satisficer" and not "maximizer".
   (f) Maximization of joint (industry) profits rather than individual (firm) profits.

Example: Oligopolies may include the markets for petrol in the UK (BP, Shell and a few other firms) and soft drinks (such as Coke, Pepsi, and Cadbury-Schweppes).

The accountancy market is controlled by PricewaterhouseCoopers, KPMG, Deloitte, and Ernst & Young (commonly known as the Big Four).

Three leading food processing companies, Kraft Foods, PepsiCo and Nestle, together achieve a large proportion [indistinct] of global processed food sales. These three companies are often used as an example of "Rule of three", which states that markets often become an oligopoly of three large firms.

Notes

13.2 Types of Oligopoly

There are two major types of oligopoly:

1. Non-collusive- Cournot Model (Duopoly) and Kinked Demand Curve Models
2. Collusive- Joint Profit Maximisation and Price Leadership

We will discuss the models on one by one in the following subsections. However, we will discuss the Kinked Demand Curve Models separately in the next section.

13.2.1 Cournot Model (Duopoly)

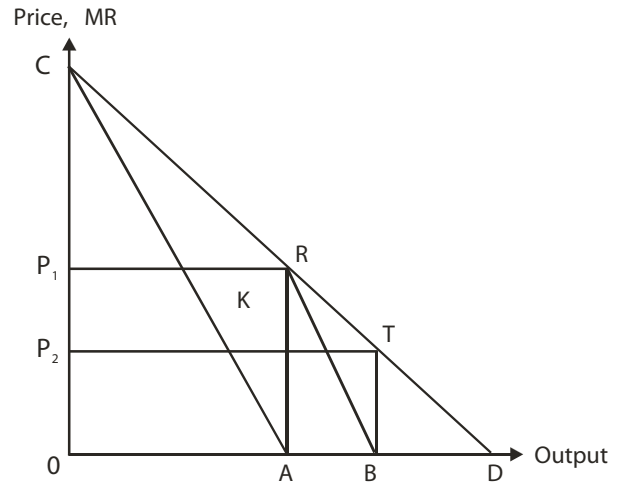
The Cournot model (by Antoine Cournot, 1838) is in terms of duopoly (two sellers) but it can be easily extended to an oligopolistic situation. This model analyses the process of equilibrium in a duopoly situation when each duopolist assumes that his rival will not react when he changes his output to maximise profits. The assumptions of this model are:

1. There are two sellers in the market.
2. The products sold by these two sellers are homogeneous.
3. The market, or total demand curve, is known and it is a straight line.
4. Each duopolist assumes that his rival's output will remain constant when he changes his output. Thus, each duopolist assumes his rival will not react to his action. This is, for each duopolist the conjectural variation or seller interdependence, as given by dQ_1/dQ_2 or dQ_2/dQ_1, is assumed to be zero. (Q_1 and Q_2 are the outputs of two sellers).
5. Each duopolist produces output of which the profits are at the maximum.
6. The cost of production is zero for both the sellers.

Example: Two natural springs of mineral water with healing qualities, are each owned by one seller. The average and marginal costs for each seller are zero and these curves coincide with the X-axis.

In Figure 13.1, CD is the known straight line total (market) demand curve. Note that under pure competition, Price = marginal cost which is zero by assumption.

Figure 13.1



Notes

Hence, demand or output at zero price shows the competitive output.

$\therefore$ OD is competitive output.

Let the two duopolists be denoted by X and Y. Let Q_x and Q_y be their respective outputs.

Suppose seller X enters the market first, followed by seller Y.

We analyse the behaviour of X and Y in stages.

In stage I, seller X acts as a monopolist. He faces demand curve CD so that CA is his marginal revenue curve which must be situated halfway between the Y-axis and demand curve. CA cuts OD at A, such that OA = AD = 1/2 OD. At output OA, marginal revenue = marginal cost = zero and profits are at their maximum. Seller X charges price P_1 and makes profit = $OARP_1$.

Thus at stage I, we find Q_x = 1/2 OD.

Now seller Y enters with the assumption that X will keep his output constant at 1/2 OD. In other words, Y considers his demand curve to be RD which shows the leftover demand after X has supplied OA output.

Hence at Stage I, seller Y finds his demand curve to be RD with RB as his marginal revenue curve. RB cuts the X-axis at B. For seller Y, marginal revenue = marginal cost = zero at output AB. Thus profit maximising output of Y at Stage I, is AB = 1/2 AD = 1/2 (1/2 OD) = 1/4 OD.

Thus in Stage I, Q_x = OA = 1/2 OD

and Q_y = AB = 1/2 AD = 1/2 (1/2 OD) = 1/4 OD

Seller Y charges price BT = OP_2 and makes a maximum profit = ABTK.

However, since X and Y are selling homogenous products, the price will decrease from OP to OP_2 for both of them. Profits of X will thus decline to $OAKP_2$.

Assuming seller Y will keep his output Q_y constant at 1/4 OD, seller X will have to reduce his output so as to raise the price and his profit.

In stage II, Seller X will produce profit maximising output on the basis of the demand leftover after assuming Q_y to be = 1/4 OD. Therefore, in Stage II, X will produce output Q_x = 1/2 (OD – AB) = (OD – BD) and BD is 1/2 AD = 1/4 OD.

At stage II, Y decides his profit maximising output assuming Q_x will remain constant at (1/2 – 1/8) OD. Hence, Q_y at Stage II will be = 1/2 [OD – (1/2 – 1/8) OD].

That is, Q_y = 1/2 (OD – 1/2 OD + 1/8 OD)

= (1/2 – 1/4 + 1/16) OD = (1/4 + 1/6) OD.

We can carry on this reasoning further, to Stage III, Stage IV, etc., to find Q_x and Q_y at each stage.

In short, we find that at each stage, seller X will decrease his output in such a way that it will be equal to one-half of OD minus the output of Y in the previous stage (which is initially zero). On the other hand, Y will increase his output Q_y at each stage so that it will be equal to one-half of the difference between OD and Q_x at the same stage.

The stagewise changes in Q_x and Q_y are summarised in Table 13.1.

We find that at each stage, Q_x declines by smaller and smaller quantities. In contrast, Q_y increases by smaller and smaller amounts at each stage. Both Q_x and Q_y will, therefore, arrive at some finite values which will give the equilibrium values of Q_x and Q_y.

Notes

Table 13.1

Stage	Values for Q_x	Values of Q_y
I	Q_x = 1/2OD	Q_y = 1/2(1–1/2)OD = 1/4OD
II	Q_x = 1/2(1 –1/4)OD = (1/2–1/8)OD = 3/8 OD	Q_y = 1/2[1–(1/2–1/8)]OD = (1/2–1/4+1/16)OD = (1/4+1/16)OD = (5/16)OD
III	Q_x =1/2[1–(1/4+1/16)]OD = (1/2–1/8–1/32)OD	Q_y =1/2[1–(1/2–1/8–1/32)]OD = (1/4[1–1/16+1/64)OD

The equilibrium values of Q_x and Q_y are found in the following way:

Q_x = [1/2–1/8–1/32 ...]OD

= [1/2–1/2 (1/4)–1/2(1/4)^2...]OD

= [1/2–1/2 [(1/4+(1/4)^2+(1/4)^3....]OD

= 1/2–1/2 [(1/4)/(1–1/4)]OD

= (1/2–1/6)OD

= (1/3)OD

∴ Equilibrium Q_x = (1/3) OD

Q_y = 1/4+1/16+1/64 ....)OD

= [(1/4+(1/4)^2+(1/4)^3 ....]OD

= [(1/4)/(1–1/4)]OD

= (1/3)OD

Equilibrium Q_y = (1/3)OD

Hence the total equilibrium output of the two duopolists X and Y is (Q_x + Q_y) = 1/3 OD + 1/3 OD = 2/3 OD.

Since OD = competitive output, the duopoly equilibrium output is 2/3 of competitive output, and the equilibrium output of each duopolist is = 1/3 of competitive output.

We can write 2/3 as = (2) / (2+1) and 1/3 as = 1/(2+1), where 2 is the number of sellers in duopoly.

Extending this duopoly case to oligopoly with the number of firms (sellers) to be N, we can say that according to the Curnot model, the equilibrium output of each of the N oligopolists is = 1/(N+1) X competitive output. And total equilibrium output of N oligopolistic firms is = N / (N+1) X competitive output

A Mathematical Version of Cournot's Model

Assume that the market demand facing the duopolists is:

$$X = a^*+b^*P$$

or

$$P = a+bX \quad b < 0$$

Notes

Given that $X = X_1 + X_2$

$$\frac{\partial X}{\partial X_1} = \frac{\partial X}{\partial X_2} = 1$$

and the MRs of the duopolists need not be the same. Actually if the duopolists are of unequal size the one with the larger output will have the smaller MR.

Proof:

$$R_i = pX_i$$

$$P = a+b(X_1+X_2) = f(X_1,X_2)$$

Thus

$$\frac{\partial R_i}{\partial X_i} = P + X_i \frac{\partial P}{\partial X_i}$$

But,

$$\frac{\partial P}{\partial X_1} = \frac{\partial P}{\partial X_2} = \frac{\partial P}{\partial X} = b$$

Therefore,

$$\frac{\partial R_i}{\partial X_i} = P + X_i \frac{\partial P}{\partial X} = P + (X_i)(b)$$

Given that $P > 0$ while $b < 0$, it is clear that the larger X_i is, the smaller the MR will be. The two duopolists have different costs

$$C_1 = f_1(X_1) \text{ and } C_2 = f_2(X_2)$$

The first duopolist maximises his profit by assuming X_2 constant, irrespective of his own decisions, while the second duopolist maximises his profit by assuming that X_1 will remain constant.

The first order condition for maximum profits of each duopolist is

$$\left.\begin{aligned} \frac{\partial R_1}{\partial X_1} - \frac{\partial C_1}{\partial X_1} = 0 \\ \frac{\partial R_2}{\partial X_2} - \frac{\partial C_2}{\partial X_2} = 0 \end{aligned}\right] \qquad \text{..... (1)}$$

Rearranging, we have

$$\left.\begin{aligned} \frac{\partial R_1}{\partial X_1} = \frac{\partial C_1}{\partial X_1} \\ \frac{\partial R_2}{\partial X_2} = \frac{\partial C_2}{\partial X_2} \end{aligned}\right] \qquad \text{..... (2)}$$

Solving the first equation of (2) for X_1 we obtain X_1 as a function of X_2, that is, we obtain the reaction curve of firm A. It expresses the output which A must produce in order to maximise his profit for any given amount X_2 of his rival.

Solving the second equation of (2) for X_2 we obtain X_2 as a function of X_1, that is, we obtain the reaction function of firm B.

If we solve the two equations simultaneously, we obtain the Cournot equilibrium, the values of X_1 and X_2 which satisfy both equations; this is the point of intersection of the two reaction curves.

The second order condition for equilibrium requires that

Notes

$$\frac{\partial^2 \Pi_i}{\partial X^2_i} = \frac{\partial^2 R_i}{\partial X^2_i} - \frac{\partial^2 C_i}{\partial X^2_i} < 0 \text{ (i=1,2)}$$

or

$$\frac{\partial^2 R_i}{\partial X^2_i} < \frac{\partial^2 C_i}{\partial X^2_i}$$

Each duopolist's MR must be increasing less rapidly than his MC, that is, the MC must cut the MR from below, for both duopolists.

Example: Assume that the market demand and the cost of the duopolists are

$$P = 100-0.5(X_1+X_2)$$

$$C_1 = 5X_1$$

$$C_2 = 0.5X^2_2$$

The profits of the duopolists are

1. $\pi_1 = PX_1-C_1 = [100-0.5(X_1+X_2)]X_1-5X_1$

   or

   $\pi_1 = 100X_1-0.5X^2_1-0.5X_1X_2-5X_1$

2. $\pi_2 = PX_2-C_2 = [100-0.5(X_1+X_2)]X^2-0.5X^2_2$

   or

   $\pi_2 = 100X_2-0.5X^2_2-0.5X_1X_2-0.5X^2_2$

   Collecting terms we have

   $\pi_1 = 95X_1-0.5X^2_1-0.5X_1X_2$

   and

   $\pi_2 = 100X_2-X^2_2-0.5X_1X_2$

For profit maximisation under the Cournot assumption we have

$$\left\{\begin{array}{l} \frac{\partial \Pi_1}{\partial X_2} = 0 = 95 - X_1 - 0.5X_2 \\ \frac{\partial \Pi_2}{\partial X_2} = 0 = 100 - 2X_2 - 0.5X_1 \end{array}\right\} \qquad \text{..... (3)}$$

The reaction functions are:

$$X_1 = 95-0.5X_2$$

$$X_2 = 50-0.25X_1$$

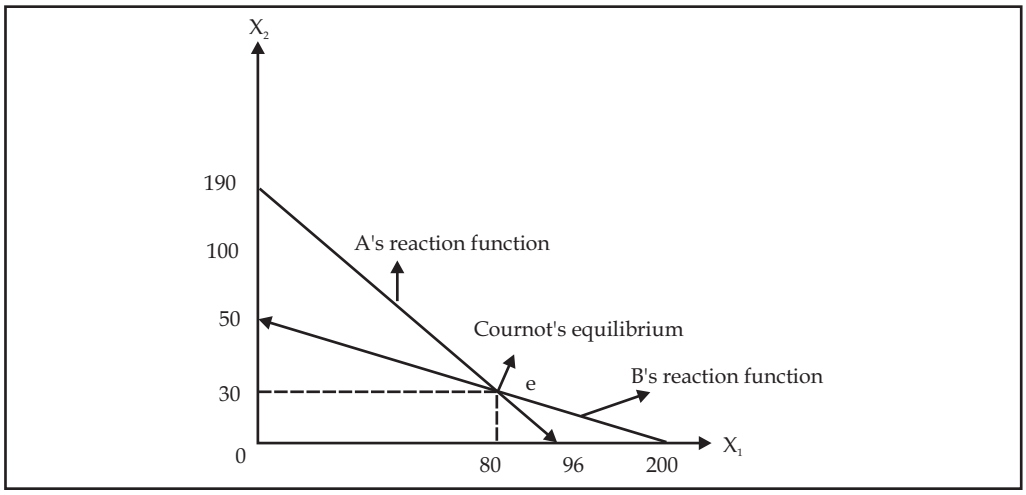
The graphical solution of Cournot's model is found by the intersection of the two reaction curves which are plotted in Figure.

Mathematically the solution of system (3) yields

$$\left.\begin{array}{l} X_1 = 95 - 0.5X_2 \\ X_2 = 50 - 0.25X_1 \end{array}\right]$$

$X_1 = 95-0.5(50-0.25X_1)$

Notes



or

$X_1 = 80$

and

$X_2 = 50–0.25X_1 = 50–(0.25)(80) = 30$

Thus total output in the market is

$$X = X_1+X_2 =110$$

and the market price

$$P = 100 – 0.5 (110)= 45$$

$$MR_1 = \frac{\partial R_1}{\partial X_1} = \frac{\partial (PX_1)}{\partial X_1} = P + X_1 \frac{\partial P}{\partial X}$$

$$MR_1 = 45+80(–0.5)$$

$$MR_1 = 5$$

$$\text{while } MR_2 = 45+30(–0.5)$$

$$MR_2 = 30$$

That is the firm with the larger output has the smaller marginal revenue. The profits of the duopolists are

$$\pi_1 = PX_1 – C_1$$

$$\pi_1 = (45)(80)–5(80) = 3200$$

and

$$\pi_2 = PX_2–C_2$$

$$\pi_2 = (45)(30) – 0.25 (30)^2 = 900$$

The second-order condition is satisfied for both duopolists

$$\left.\begin{array}{ll} \dfrac{\partial \Pi_1}{\partial X_1} = 95 - X_1 - 0.5X_2 & \dfrac{\partial \Pi_2}{\partial X_2} = 100 - 2X_2 - 0.5X_1 \\ \dfrac{\partial^2 \Pi_1}{\partial X_1^2} = -1 < 0 & \dfrac{\partial^2 \Pi_2}{\partial X_2^2} = -2 < 0 \end{array}\right\}$$

Notes

13.2.2 Other Duopoly Models

Bertrand's Duopoly Model

This model assumes that the rival firm will keep its price constant irrespective of his own decision about pricing. Thus each firm is faced by some market demand and aims at maximising its profit assuming that its competitor will not change its price.

The model uses the analytical tools of reaction functions of the duopolists derived on the basis of isoprofit curves. These curves are drawn on the basis of various combinations of prices charged by the rival firms for a given level of profit. The equilibrium point is reached where the curves of two firms intersect. The prices at which the two firms will sell their respective outputs is determined by the point of equilibrium. This is a stable equilibrium.

The assumption that firms never learn from past experience is naive. Each firm maximises its own profit but the joint profits are not maximised.

Edgeworth's Model of Duopoly

This model also assumes that each seller assumes his rival's price, instead of his output, to remain constant. It is assumed that the entire market is equally divided between the two sellers who face identical demand curves. A continuous price war goes on between the duopolists and the equilibrium price goes on fluctuating. The equilibrium is unstable and indeterminate since price and output are never determined. This model is also based on a naive assumption that each firm continues to assume that his rival will never change its price even if he may change its own.

Stackelberg's Duopoly Model

This is an extension of the duopolist model. It assumes that one of the duopolists is sufficiently sophisticated to recognise that his competitor acts on the Cournot assumption. This permits the sophisticated duopolist to determine the reaction curve of his rival and incorporate it in his own profit function. Consequently, he maximises his profit like a monopolist. He emerges as the leader and a stable equilibrium emerges as the naive firm will act as a follower. However, if both firms are sophisticated and act like leaders, disequilibrium results. There will either be a price war until one of the firms surrenders or a collusion will be reached between the two firms.

Task Analyse Coke-Pepsi non price competition and its effect on their market.

13.2.3 Collusive Oligopoly Models

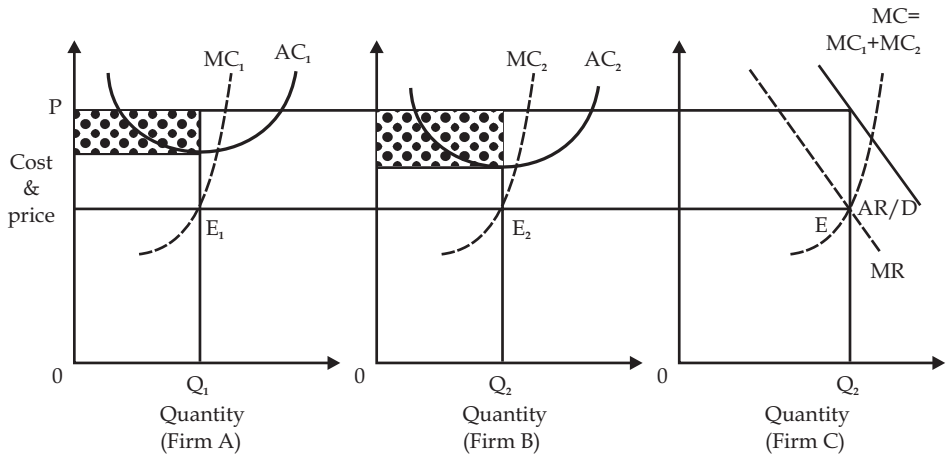
There can be two types of collusion (a) Cartels where firms jointly fix a price and output policy through agreement, and (b) Price Leadership where one firm sets the price and others follow it.

Cartel

A cartel is a formal collusive organisation of the oligopoly firms in an industry. There may either be an open or secret collusion. A perfect cartel is an extreme form of collusion in which member firms agree to abide by the instructions from a central agency in order to maximise joint profits. The profits are distributed among the member firms in a way jointly decided by the firms in advance and may not be in proportion to its share in total output or the costs it incurs.

Notes

Figure 13.2: Equilibrium under Oligopoly: Cartel



If A and B are two firms which join together to form a cartel, the cartel's marginal cost curve can be shown as a lateral summation of MC_1 (marginal cost of firm A) and MC_2 (marginal cost of firm B), as in Figure 13.2. The cartel is in equilibrium at point E when MC=MR. P is the cartel equilibrium price. Each firm will be in equilibrium when it produces output corresponding to the MC of the cartel equilibrium, i.e., at points E_1 and E_2 respectively. Each firm takes price as given i.e., P. The shaded areas represent the shares of profits contributed to the aggregate cartel profit. The division of this profit between the firms depends upon their relative bargaining strengths.

Caselet

Cartel on the Wings

While the Competition Commission of India is yet to progress on one alleged case of airline cartelisation — code sharing deal — by Kingfisher and Jet Airlines, our national carrier, Air India, barely escaped being prosecuted by the Korean Fair Trade Commission in a recent case of cartelisation in cargo freight. In May, 2010 the KFTC levied a record fine of more than $98 millions on 19 airlines in the biggest cartel case that it has handled.

Fuel Surcharge Rates

It was found that the airlines had conspired to raise fuel surcharge rates for air cargo to-and-from Korea between 1999 and 2007 in a concerted manner. The case included summoning 54 airline executives from all over the world for investigation and conducting a joint investigation with foreign competition authorities for the first time. The regulator found that the conspiracies took place on outbound shipments from Korea and inbound shipments to Korea from Hong Kong, Europe and Japan.

The case showed that the airlines overcharged by $5.71 billions in the local market by imposing or increasing fuel surcharges during the eight-year period.

The uncovering of airline cartels on fuel surcharge actually began in 2006, when European and US authorities investigated few airlines including British Airways. The investigation came at a time when the airlines were facing high fuel costs and competition from low-cost carriers.

Contd...

Notes

The situation deteriorated further in 2007, as more airlines were inspected and charged for various anti-competitive practices. European Commission charged several airlines for fixing freight service prices. British Airways had to pay billions of dollars in fines as the UK and the US competition authorities denounced it for price fixing during the period 2006-07.

Difficult to Detect

Cartelisation is very difficult to detect and investigate for its inherently secretive nature. The task is more difficult in aviation industry because it operates across borders. As a consequence of liberalisation, many large airlines such as British Airways and Lufthansa are now privately owned. These are being increasingly scrutinised as they engage themselves in collusive agreements.

In all the reported cartel cases, there was always one partner who spilled the beans with the hope of getting away with lesser penalty or what is called as leniency. In the case of British Airways, which was prosecuted in 2007, it was Virgin Airlines which cooperated with the authorities.

Even in the Korean case, it was the Korean Airlines which applied for leniency by becoming the prosecuting agency's 'friend'. Such a provision for leniency now exists in all competition laws, including the one in India. In fact, leniency can be sought by more than one perpetrator as the enquiry moves on thus buttressing the prosecution's case.

The Australian Competition & Consumer Commission has to date named 15 airlines in its investigation and has already collected $38 million as fines while some of the cases are yet to be decided.

The damage that airline cargo cartels cause by raising the surcharge rates is huge as evident from the figures published by competition agencies. Consequently, the prices of goods transported also get overburdened from artificial hikes thus affecting consumer welfare adversely.

Source: www.thehindubusinessline.com

Price Leadership

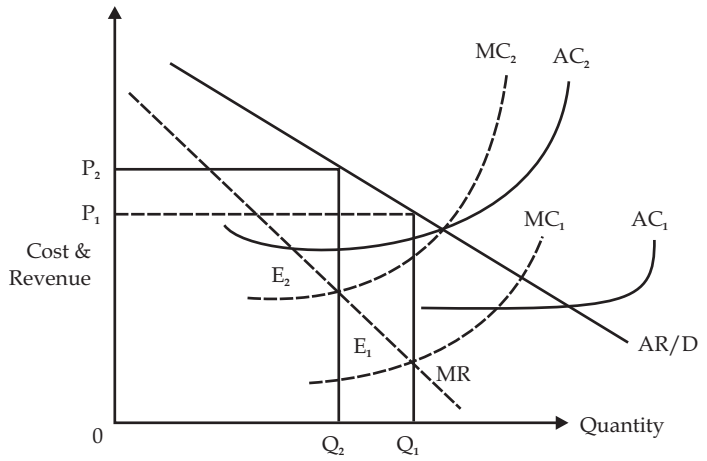
This is an example of imperfect collusion among duopoly firms. It may result through tacit or formal agreement as one firm sets the price and others follow it. Price leadership has two forms.

Price Leadership by a Low Cost Firm

Say, two firms A and B face identical demand curves (i.e., AR) and MR. If firm A has lower MC and AC curves then $MC_1 < MC_2$ and $AC_1 < AC_2$, as shown in Figure 13.3, firm A will maximise its profit by equating MR to MC_1 at point E_1 and selling Q_1 units at price P_1. Firm B will maximise its profits by equating MR to MC_2 at point E_2 and selling Q_2 units at price P_2. But firm B will not be able to charge P_2 price as firm A is charging P_1 which is lower than P_2. The high cost firm will then accept the leadership of the low cost firm and sell Q_2 units at price P_1. The high cost firm shall earn less profit than low cost firm.

Notes

Figure 13.3: Price Leadership by a Low Cost Firm under Oligopoly



Example: Assume that the market demand is

$P = 105–2.5X = 105–2.5(X_1+X_2)$

The cost functions of the two firms are

$C_1 = 5X_1$

$C_2 = 15X_2$

The leader will be the low cost firm A: he will set a price which will maximise his own profit on the assumption that the rival firm will adopt the same price and will produce an equal amount of output. Thus the demand function relevant to the leader's decision is

$\pi_1 = 105–2.5(2X_1) = 105–5X_1$

and his profit function is

$\pi_1 = R_1–C_1 = PX_1 = (105–5X_1)X_1–5X_1$

or

$\pi_1 = 100X_1–5X^1_2$

from the first order condition we have

$$\frac{\partial \Pi_1}{\partial X_1} = 100 - 10\,X_1 = 0$$

which yields

$X_1 = 10$

Substituting in the price equation, we find

$P = 105–5X_1 = 55$

The follower will adopt the same price (55) and will produce an equal level of output ($X_2 = 10$). Note that the profit maximising output of firm B would be $X^*_2 = 9$ units, and he would sell it at $P^* = 60$. This solution is found by maximising from B's profit function

$\Pi_2 = R_2–C_2 = (105–5X_2)X_2–15X_2$

Notes

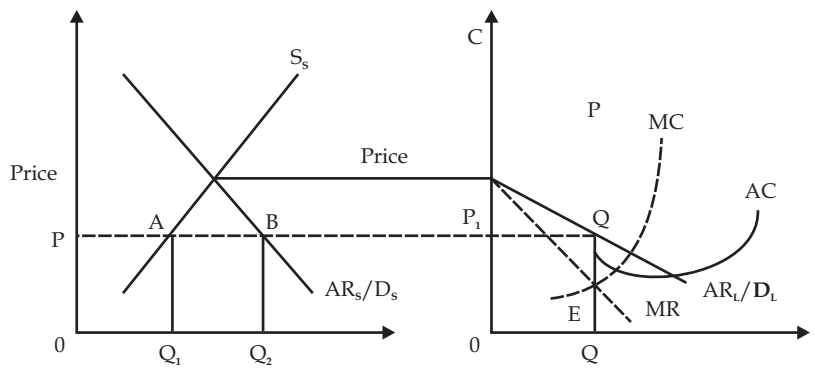
Price Leadership by Dominant Firm

This is more common and happens when a dominant firm shares a larger part of the market along with few small firms. It may become monopolist but compromises with the small rival firms which in turn accept the dominant firm as the price setter and behave as if they are firms under perfect competition i.e., price takers.

It is assumed that the dominant firm knows the aggregate market demand. It finds its own demand curve by setting a price and deducts from the market demand the quantity supplied jointly by the small firms. It also knows the supply curve of the small firms through a knowledge of their individual MC curves. The part of the market demand not supplied by the small firms will be its own share. Given a price, the market share of the dominant firm equals the market demand less the share of small firms. Figure 13.4 shows the aggregate market demand curve (AR) and the supply curve of the *small firm* (a) and *dominant firm* (b).

The gap between D and S_S of small firm determines the AR curve (D_L) of the dominant firm. The dominant firm maximises its profit when MR=MC at point E. It sells Q units at price P. The demand curve for small firm becomes the horizontal line PB which is AR as well as MR curve for them. S_S is their MC or supply curve. They supply Q_1 units at price P.

Figure 13.4: Price Leadership by a Dominant Firm under Oligopoly



Case Study

Rumblings in the New York Skies

The combination of United and Continental Airlines would upend the balance of power at New York's airports.

Continental was already the dominant player at Newark Liberty International Airport. But in merging with United, it gains a much bigger network of domestic routes and connections to the rest of the world that would leave its rivals in New York — Delta Air Lines and American Airlines — struggling to catch up.

While the city would be just one of the 10 hubs of the new airline, the battle for control in New York offers a window into why United and Continental found a merger so attractive.

All the major airlines have been looking for ways to regain the upper hand as air travel begins to rebound. And New York City was already a major focus of their attention.

Its airports — Kennedy International, La Guardia and Newark — play a critical role in both domestic and international travel. Combined, they account for four of the top five domestic routes and constitute the biggest hub in the country for international flights.

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"It's the most contested market there is," said Gail Grimmett, the senior vice president at Delta Air Lines in charge of New York. "That's because it's the largest revenue pool."

A big piece of the battle is for business travelers, who account for the bulk of the industry's profits. To woo them, airlines are introducing sommelier-chosen wines and fancy lie-flat beds to their business cabins on international flights from New York. They are sprucing up shabby terminals and expanding their domestic networks from all three of the area's airports.

If the United-Continental merger succeeds, the new airline will have about a 55 percent share of domestic travelers and a 65 percent share of international travelers at Newark, where Continental has been building its lead for 10 years.

Delta, meanwhile, which bought Northwest Airlines two years ago to become the nation's top airline, has used its new muscle to expand its presence in both La Guardia and Kennedy. American, once the biggest airline in New York, has been losing ground. Until now, United has not been one of the city's big players.

All the competition for the New York market has kept air fares relatively low so far. But analysts cautioned that if an airline becomes too dominant at any one airport, there would be less pressure to keep the lid on prices. Such concerns could raise antitrust issues for United and Continental's planned merger.

The one major airline left out of all the jockeying in New York has been Southwest, which has struggled to establish a presence at La Guardia. The airline's executives have expressed frustration at their inability to expand in New York. "If you want to capture the business travelers you need to be in New York City," said Whitney Eichinger, a spokeswoman for Southwest.

The New York airports are the largest American gateway to Europe, accounting for a third of all passengers flying across the Atlantic. Those routes, in turn, capture 26 percent of all spending on business and first-class tickets, according to the International Air Transport Association.

As part of the struggle for a piece of the trans-Atlantic market, the biggest American airlines have been lining up European partners through three major alliances — Sky Team, Star, and Oneworld. The alliances allow the airlines to coordinate prices, jointly schedule international flights and, sometimes, share revenue. They also help the airlines on both sides of the Atlantic attract more passengers to their own domestic networks.

One of the most visible parts of the battle for New York is taking place in the front of the airplane. Delta, for example, is planning to spend $1.2 billion on improving its business- and first-class cabins in the next three years and has started by introducing flat-bed seats on flights from New York to London.

Then there's the battle for market share, particularly at La Guardia, the 70-year-old airport that last year ranked last in on-time arrivals but is favored by business travelers because it is the closest to Midtown Manhattan.

Delta said last summer that it planned to trade 42 daily takeoff and landing rights, called slots, at Reagan National Airport in Washington for US Airways' 125 pairs of slots at La Guardia.

But the Transportation Department requested that the airlines divest 34 pairs to preserve competition. In response, Delta and US Airways offered to give up 20 pairs, which would still double Delta's market share to about 40 percent at La Guardia.

The department said that counter offer was still "insufficient," but repeated it would approve the deal if the companies abided by its original ruling. The airlines said on May 4 2010 they would appeal the decision.

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American, which has been operating in New York for 80 years, is clearly threatened by its loss of market share. It responded to Delta's move by saying it would collaborate with JetBlue on some routes and also add 31 new flights from Kennedy and La Guardia, including new routes to Minneapolis-St. Paul, Atlanta and Charlotte, N.C., on regional jets outfitted with new first-class seats.

In a letter to employees after these announcements, Gerard J. Arpey, the chairman and chief executive of AMR, American's parent company, said, "We are in a tough, important fight in New York — a fight we intend to win."

But while Delta has big plans to grow in New York, one sore point is its drab and cramped Terminal 3 at Kennedy, built in 1965 for Pan Am. It is now straining to accommodate Delta's five million international passengers a year.

The executive director of the Port Authority of New York and New Jersey, the agency that runs the city's airport, has been critical of the terminal, describing it as unfit as a point of entry for overseas arrivals.

JetBlue, by contrast, opened a sleek, airy $743 million terminal at Kennedy last fall. And American has a new and modern terminal at Kennedy, too. Completed in 2007, it cost $1.3 billion.

Delta executives concede they have a problem at Kennedy, and said they are working on a solution. "If you ask me what keeps me awake at night, this is it," Ms. Grimmett said. "It's an unpleasant experience, sometimes."

The third front in the battle for New York's travelers is invisible to most passengers but potentially the most critical for airlines.

In October, 2009, Continental defected from the Sky Team alliance, dominated by Delta and Air France, to join Star, the alliance established by United and Lufthansa.

The switch provided Star with a badly needed New York hub. American, which is part of Oneworld with British Airways, is expecting to gain antitrust immunity for its Atlantic routes later this year and hopes to be in a better position to compete with the other two rivals.

William S. Swelbar, a research engineer at the International Center for Air Transportation at the Massachusetts Institute of Technology, said New York was a major laboratory for the alliances.

"New York is vital for each of the three alliances," he said. "It's a global game, and it is playing right in front of us."

Question

Explain the oligopolistic market situation in the US aviation industry? How does the merger help in our better understanding of the market conditions?

Source: www.nytimes.com

Task Two duopolist manufacture identical radio sets. The total cost of an output x sets per month in ₹ $\left[\frac{1}{25}x^2 + 3x + 100\right]$ for each duopolist. When the price is ₹ p per set, the market demand is x = 75 – 3p per month. What is the total equilibrium output per month.

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13.3 Kinked Demand Curve Models

There are two versions of the kinked demand curve model. One is called the Sweezy version and the other is called the Hall and Hitch version. Both models were conceived independently in 1939. The essential difference between these two versions is that Sweezy's model is based on the marginalist approach, with the hypothesis that even an oligopolistic firm aims at profit maximisation. In contrast, the Hall and Hitch version rejects the marginalist approach of profit maximisation. It argues that, under oligopoly, firms aim at 'fair' profit and follow the full cost principle in determining the price.

13.3.1 Sweezy's Model of Kinked Demand Curve

According to Sweezy, the most distinguishing feature of oligopoly is that an individual firm does not know (and cannot determine) the exact nature (functional form) of its actual demand curve because of the uncertainty and indeterminacy of rivals' reactions to its own actions. An oligopolistic firm is therefore guided in its decisions by the 'imagined' demand curve which is based on what it expects to be the most likely (probable) reaction of its rivals.

Under oligopoly, a firm expects that when it raises its price, it is most likely that rival firms will not follow suit by raising their prices. Instead, the rivals will keep their prices constant in order to increase their sales at the expense of the firm that raises the price. Hence, when a firm increases its price, its demand is expected to fall much more than it would if its rivals were not to keep their prices constant. That is, for upward changes in price, a firm's demand is expected to be highly elastic.

In contrast, when the firm lowers its product price, it is most likely that its rivals will follow suit because if they did not do so they would lose sales to the firm that lowered the price. Hence, when a firm reduces its price, its demand is expected to increase much less than would otherwise have been the case (because its rivals will also reduce their prices). That is, for downward changes in the price, a firm's demand curve is expected to be less elastic than it would have been had the firm's rivals not followed suit by reducing their prices.

Consequently, for an oligopolistic firm, the demand curve is highly elastic and gradually falling for prices above the current or existing price, and for prices below the current price the demand curve is less elastic and steeply falling.

Caution Because of the differences in elasticity (and slope) at prices above and below the current price, the demand curve of the firm has a corner or a kink at the current or existing price.

In Figure 13.5 the firm's demand curve is APB, which has a kink or corner at current price P and output ON. The upward segment AP is relatively more elastic than the downward segment PB. That is, if e_1 shows the elasticity of AP and e_2 shows the elasticity of PB_1 then e_1 is > e_2. The 3 dotted line PB_1 shows the decrease in the firm's demand that would have occurred if the rivals were not expected to keep their prices constant when the firm raised price above P. Dotted line PA_1 shows the rise in demand if rivals were expected not to follow any fall in price below P.

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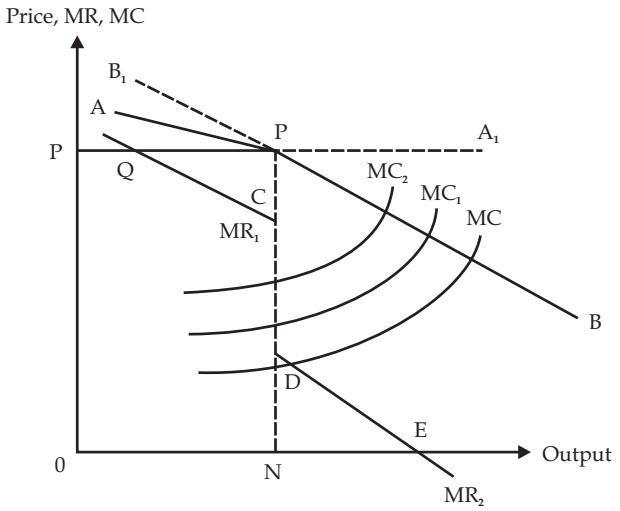
Figure 13.5



Since the elasticity for a change in price above P is more than, and different from, elasticity for a change in price below P, there are two values of marginal revenue for current price, P. Thus the marginal revenue curve has a discontinuity or gap at price P. For the upper AP portion of the demand curve the marginal revenue (MR_1) curve is QC and for the lower portion PB, the marginal revenue (MR_2) curve is DE.

The marginal revenue curve corresponding to APB is shown by QCDE with discontinuity or gap CD. Note that both e_1 and e_2 have to be greater than 0 for MR_1 and MR_2 to be positive at P.

The magnitude (or length) of this gap is given by $P(1/e_2 - 1/e_1)$. This follows from the fact that $MR = P(1-1/e)$. We find the $MR_1 = P(e_1-_1)/e_2$ and $MR_2 = P(e_2-1)/e_2$.

Hence, $MR_1-MR_2 = P(e_1e_2-e_2-e_1e_2+e_1)/e_1e_2 = P(e_1-e_2)/e_1e_2 = P(1/ e_2-1/e_1)$. Since e_1 is > e_2, the gap MR_1-MR_2 is positive.

The marginal cost curve, MC, of the firm passes through the discontinuous gap CD in the marginal revenue curve QCDE. Though the current existing price, P, is not precisely equal to the profit maximising equilibrium price (as there is no unique MR at price P), this price P is consistent with profit maximising, marginalist equilibrium. For output less than ON we find MC is below marginal revenue and for output more than ON we find MC is above marginal revenue. That is, MC cuts the discontinuous MR curve from below.

Since, under oligopoly, demand curve is kinked at the existing price (P) and marginal revenue curve has discontinuity CD at the existing price, any upward or downward shift in the MC curve will not bring about any change in the current or existing price so long as the new MC curve passes through the gap (CD) in the marginal revenue curve (QCDE).

In Figure 13.5 the new higher marginal cost curves MC_1 and MC_2 are passing through the gap CD with the result that the current price P continues to be consistent with profit maximisation even while remaining constant at the existing level.

Thus the most important conclusion of Sweezy's kinked demand curve model of oligopoly is that price remains unchanged and rigid or 'sticky' at the existing level P when, in the short run, the marginal cost increases due to a rise in raw material prices or hike in wages through trade union pressure.

Thus Sweezy's Kinked demand curve model explains the rigidity or stickness of oligopolistic prices in the face of short-term increases or decreases in variable input costs. When costs of raw

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materials or labour rise, profits will get squeezed and when these costs fall, the benefit of lower input costs will not be passed on to the consumers.

Thus the Sweezy model of Kinked demand curve under oligopoly explains why prices of oligopolistic firms are inflexible and fail to reflect short run changes in variable costs of raw materials and wages.

The principal shortcoming of the Sweezy model is that it does not explain how the existing or current price is determined, and this is a criticism that Sweezy accepts.

13.3.2 Hall and Hitch Version of Kinked Demand Curve

The Hall and Hitch model of the Kinked demand curve is based on an empirical survey of a sample of 38 well managed firms in England. The survey was conducted by these two Oxford economists to find out how firms in the real world determine price and output.

The principal findings of the study were as follows:

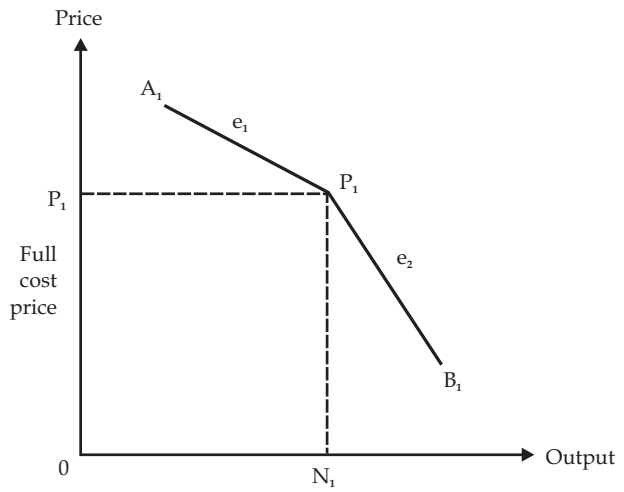
1. In the real world, most manufacturing firms operate in oligopolistic markets.
2. Contrary to what is assumed by economic theory, in reality oligopolistic firms do not know their demand curve because of uncertainty regarding their rivals' reaction. They do not therefore know their marginal revenue curve. Since most large firms tend to be multi-product firms, they also do not know the marginal cost curve. Thus in the real world, firms cannot determine equilibrium price and output by marginalist calculations, i.e., by equating marginal revenue and marginal costs.
3. Oligopolistic firms in reality determine their price on the basis of the full cost principle. They charge that price which not only covers variable and fixed costs but also yields a fair profit margin. The full cost is the sum of average variable cost (AVC) and average fixed cost (AFC) at normal output level and a predetermined percentage of this sum added for 'fair' (reasonable) profit. In short, according to this principle Price = Full cost = (AVC + AFC) at Normal Output + 'Fair' profits as a percentage of (AFC + AVC).

   Example: If normal output is 1000 units, total fixed and total variable costs at this output are ₹ 8000 and 2000, respectively, and fair profit is considered to be 10 per cent, then full cost price = 8 + 2 + 1 = 11 ₹/Unit.
4. The demand curve has a kink at the price which is equal to full cost price. If a firm charges a price higher than full cost, its rivals will not follow suit but will keep their prices constant. Hence, for prices higher than the full cost price, the demand curve of an oligopolist has high elasticity. If the firm charges a price lower than full cost price, its rivals will follow suit by lowering their prices. Hence, for prices less than the full cost price, the oligopolist's demand curve has relatively low elasticity.
5. Oligopolistic firms adopt full cost pricing rule because it not only covers AFC at normal output but also earns a reasonable rate of profit. The objective of oligopolistic firms is to have long run stable profits and a 'quiet life', free from uncertainities. If profits exceed what is regarded as a 'reasonable' or 'fair' rate, it may attract new entrants and accusation of 'excessive' profits from customers as well as distributors. Both these consequences will cause instability of long run profits and make life difficult (unquiet) for firm's decision makers. Similarly, charging a price below full cost will be considered 'unethical' by competitors and create a threat of price war. Also, it is difficult to raise price later to the full cost level. Thus, for oligopolistic firms, price tends to remain rigid or sticky at the full cost level, and short run changes in costs and demand will not cause changes in the oligopolistic price.

Notes

The full cost version of the kinked demand curve is shown by Figure 13.6 where ON_1 is Normal output, P_1 is full cost price and $A_1P_1B_1$ is the kinked demand curve. Elasticity e_1 for AP_1 is greater than elasticity e_1 for P_1B_1. The kink occurs at the full cost price. Thus unlike the Sweezy version, this version explains how the existing price is determined.

Figure 13.6: Hall and Hitch Version of Kinked Demand Curve



Notes: OP_1 Full cost price at normal output

ON_1 = Normal output, $e_1 > e_2$

Example: Suppose that the demand functions for price increases and for price facing an oligopolist are, respectively,

$Q_1 = 280–40\ P_1$ or $P_1 = 7 – 0.025\ Q_1$

$Q_2 = 100–10\ P_2$ or $P_2 = 10–0.1\ Q_2$

where,

Q is output and

P is price in Rupees.

Suppose that the firm's total cost function is

$$TC = 2Q+0.025Q^2$$

We can calculate MR_1, MR_2, and MC as follows

$$TR_1 = P_1Q_1 = (7–0.025Q_1)\ Q_1 = 7Q_1–0.025Q^2_1$$

$$MR_1=\frac{d(TR_1)}{dQ_1}=7-0.05Q_1$$

$$TR_2 = P_2Q_2 = (10 – 0.1Q_2)Q_2 = 10Q_2–0.1Q^2_2$$

$$MR_2=\frac{d(TR_2)}{dQ_2}=10-0.2Q_2$$

$$MC=\frac{d(TC)}{d(Q)}=2+0.05Q$$

Notes

To find the kink, or point of intersection of demand curves D_1 and D_2, we set $Q_1 = Q_2 = Q$ and get

$$7 - 0.025Q = 10 - 0.1Q$$

$$0.075Q = 3$$

$$Q = 40$$

and

$$P = 7 - 0.025(40) = ₹\ 6$$

The upper and lower limits of the MR gap are

$$MR_1 = 7 - 0.5(40) = 7 - 2 = 5$$

$$MR_2 = 10 - 0.2(40) = 10 - 8 = 2$$

Since

$$MC = 2 + 0.05(40) = 4$$

The MC curve intersects the vertical portion of the MR curve. The total profits (π) of the firm are

$$\pi = TR - TC = PQ - 2Q - 0.025Q^2$$

$$= 6(40) - 2(40) - 0.025(40)^2 = ₹.\ 120$$

The level of π could also have been found from

$$\pi = (P - ATC)Q$$

$$ATC = \frac{TC}{Q} = \frac{2Q + 0.025Q^2}{Q} = 2 + 0.025Q = 0 + 0.025(40) = 3$$

so that

$$\pi = (6 - 3)\ (40) = ₹\ 120$$

Did u know? **Is there any non-price competition among oligopolists?**

Oligopolists are, in general, reluctant to lower prices for fear of starting a price war and prefer instead to compete on the basis of quality, advertising, service and other forms of non-price competition. To be sure, oligopolists are also likely to react to increased expenditures on product differentiation, advertising and service by competitors. But the response time is much longer than for price changes because it takes time to plan and introduce a variant of the product, a major advertising campaign, or a new service programme. This allows the oligopolist to reap the benefits (profits) from the changes introduced, at least in the short run, and at the same time avoid the possibility of triggering off a ruinous price war with price competition. Non-price competition in oligopolistic markets can be examined with game theory. With this approach, an oligopolist assumes that its competitors choose the optimal strategy and then develops its own best counter strategy.

13.4 Market Structure and Barriers to Entry

Many factors can contribute to the existence of a particular market structure. However, in the long run, conditions of entry may be the most important determinant. Difficulties encountered in entering an industry are often referred to as barriers to entry. It has been defined in two alternate way.

Notes

1. JS Bain (1956) argues that entry barriers should be defined in terms of any advantage that existing firms hold over potential competitors.
2. GJ Stigler (1968) contends that for any given rate of output, only those costs that must be borne by new entrants but that are not borne by firms already in the industry should be considered in assessing entry barriers.

If a firm has control over all iron ore deposits in a country, new entrants in the steel industry could get ore only by transporting it from another foreign supplier. This will increase cost of producing steel as compared to those of the existing firm and prevent the new firm from successful entry. Both Bain and Stigler criteria for a barrier to entry are satisfied in this example. But if iron ore deposits are equally available to the established firm and new entrants and the existing firm is large enough to take advantage of highly efficient production technologies, then the new entrants require to build large plants which are able to take advantage of economies of scale. Small plants of new entrants will increase costs such that they cannot sell steel at a price competitive with the established firm. Bain would consider this as a barrier to entry because of difficulty in coordinating and raising capital for large scale entry. However, Stigler's definition would not recognise scale economies as an entry barrier because the old and new firms both face same cost conditions. That is, for any given rate of output produced, the cost per unit would be same for the new and existing firm. Stigler's position has appeal but Bain's definition is more useful as it includes all factors that impede entry and provides a better framework for understanding the determination of market structure.

Four important sources of barriers to entry are:

1. ***Product differentiation:*** A firm may have convinced consumers that its product is significantly better than the product of new entrants. The new firm may be forced to sell at lower price and reduce profit though the existing product may not essentially be superior. (e.g., Bayer's Aspirin despite presence of chemically identical brands).
2. ***Control of inputs by existing suppliers:*** Examples are scarcity of natural resources, locational advantages and managerial talent.
3. ***Legal restrictions:*** Examples are patents, licenses, exclusive franchises granted by government.
4. ***Scale economies:*** A new firm entering the industry on a small scale will have higher average cost of production. On the other hand, large scale entry may require gouge, capital organisation, etc. Thus the ability of existing firms to expand gradually as compared to the need for new entrants to start out with considerable production capacity can be a substantial advantage for existing firms (automobile industry).

Case Study

Paint Industry — From Pure Competition to Oligopoly

Even as the paints industry is poised for further large-scale consolidation, the last three years have already resulted in some reshuffling of companies. In the struggle for the survival of the fittest, while some of the weaklings have faded away, the stronger ones have gained more strength. The curious result — which, incidentally, is taking place in other industries too — is that from the days when the industry operated under pure competition, competition is slowly turning mesoeconomic (oligopolistic). In other words, it is just a handful of companies which literally control the entire paints industry now.

As these companies extend their mesoeconomic power, they may impose unequal conditions of competition in the market. In contrast with the traditional view of a firm, big

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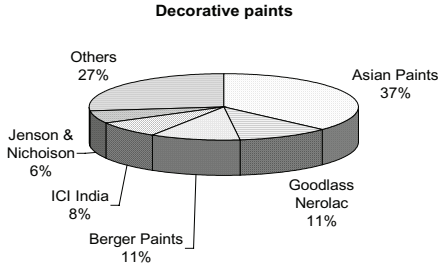
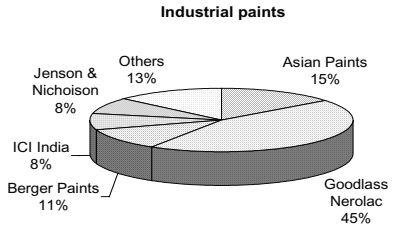
companies would be multiproduct, multisectoral, multiregional and multinational. What implications can this change in the market structure have on the functioning of companies? What will be the impact on profitability?





The emerging mesoeconomic industry structures, apart from indicating the relatively small number of players, may cover even the differentiated product manufacturers such as the paints. The existence of mesoeconomic structures could be seen from the concentration ratios (market shares) of the dominant companies.

The top five companies — Asian Paints, Goodlass Nerolac, Berger Paints, ICI India and Jenson and Nicholson — together control around 73 per cent of the total market for decoratives.

The industry is even more concentrated in industrial paints, where the same top five companies control around 87 per cent of the total market. These five would form the mesoeconomic barrier which would be tough even for any new strong entrant to penetrate.

But how did the paints industry acquire such a mesoeconomic structure? The existence of economies of scale usually leads to its establishment. Where economies of scale exist, profitable expansion to larger plant sizes will necessarily come at the expense of rival companies. Realisation of economies of scale by some companies means the number of rival firms are simultaneously reduced through failure or merger. However, no such economies of scale exist in the paints industry. Paint manufacture essentially being a batch process, economies of scale do not automatically flow from larger plant sizes. On the other hand, there are other factors which contributed to the emergence of the industry structure. The basic infrastructure in terms of distribution network, the consumer hold through strong brand awareness, power of innovation and the introduction of a large variety of products are some of the aspects responsible for the creation of strong entry barriers and, consequently, dominant firms.

Regardless of how such structures have started emerging, one important phenomenon which may develop in the future is the mutual interdependence of companies. What it means in reality is that no company in the mesoeconomic industry may dare to alter its price policies without attempting to calculate the most likely reaction of its rivals. It is like playing a chess or a poker game. There is no way to know beforehand the best way to play your cards in a poker or a chess game because it depends on the way the other players play theirs. Players should pattern their actions according to the expected reactions of their rivals.

What emerges out of the difficulty in assessing rival reaction is the rigidity in prices. Prices are expected to change less frequently in mesoeconomic structures than under pure or monopolistic competition. On the other extreme, a price change by one producer may spark off a price war as other producers come out with more drastic price changes. As an intermediate position, producers may collide with each other to bring about organised price changes. However, non-collusive mesoeconomies may seek to lead a quiet life and may adopt a live-and-let live policy.

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At the same time, collusive behaviour, though difficult, cannot be ruled out. To reduce the uncertainties of price wars, producers may collide with each other and charge the maximum profit making price. For society, it would be more like a monopolist kind of market under the garb of competition. Yet another way to deal with uncertainties with respect to rival reactions would be collusion. Adopting a "follow the leader" policy may result in tacit collusion. This has often been witnessed in the paints industry — when one company comes out with a price change, it is followed by the other players. What all this indicates is that mesoeconomic companies shun price competition.

But often such collusive behaviour is accompanied by non-price competition. This phenomenon has also been witnessed in the paints industry. The emphasis on non-price competition has its roots in two facts. One, price cuts can be quickly and easily met by a firm's rivals who may promptly react to cancel out any potential gains in sales through matching price cuts. There is also the risk of price war. On the other hand, non-price competition is harmless and can be safely carried out without any side effects through product innovation, improvement in productive techniques and advertising gimmicks which may be difficult to replicate.

This is exactly what the paints industry has been following for the last three years with the introduction of consumer-interactive marketing methods for advertising paints – 'Insta Colour' by Jenson & Nicholson, "Colour Solutions" by ICI India, "Colour Bank' by Berger Paints and "Colour World' by Asian Paints. ICI India's generous offer to paint the Ananthpur Sahib could also be fitted into the category of non-price competition. And, second, mesoeconomic firms generally have the financial strength to support such advertising.

But are such mesoeconomic structures economically efficient? Traditional view holds that being characterised by barriers to entry, mesoeconomic entitles can be expected to result in a restriction of output short of the point of lowest unit costs and a corresponding market price which yields substantial, if not maximum, economic profits. But Kenneth Galbraith, in his book American *Capitalism*, challenged this view by arguing that mesoeconomic firms, because of their inherent strengths, are necessary to ensure rapid technological growth. They have the necessary financial muscle to undertake innovations and research.

Empirical research on this aspect has been ambiguous. Though consensus opinion has it that big mesoeconomic industries are not big contributors to technological progress, there are quite a few exceptions. The paints industry has been one.

The industry, recognising the need to differentiate itself from others, has been frequently introducing technologically innovative products. The introduction of interactive paints solutions, anti-bacterial exterior paints and washable plastic emulsion paints are just some of the innovations. It is of interest that some leading researchers in this field have tentatively concluded that technological progress in an industry may be determined more by the industry's scientific character and "technological opportunities" rather than by its market structures.

Question

Identifying the factors contributing to the paint industry for becoming oligopoly.

13.5 Summary

- Oligopoly is a situation in which only a few firms (sellers) are competing in the market for a particular commodity.
- Under oligopoly, each firm controls an important proportion of the total supply. The demand curve of an individual firm under oligopoly is not known and is indeterminate.

Notes

- Oligopolistic firm may form cartel or enter into collusion. There may be barrier to new entrants.
- Theories of oligopoly are divided into three broad groups, namely, models of non-collusive oligopoly, models of collusive oligopoly, and managerial theories.
- The models of non-collusive oligopoly include cournot model, kinked demand curve model, and other duopoly models.
- The collusive oligopoly models have cartel, and price leadership.
- There are four important sources of barriers to entry, such as product differentiation, control of inputs by existing suppliers, legal restrictions and scale economies.

13.6 Keywords

Cartel: A formal collusive organisation of the oligopoly firms in an industry.

Collusive oligopoly: industry containing few producers (oligopoly), in which producers agree among one

Duopoly: A market situation with two sellers selling homogenous products.

Kinked demand curve: A bend in a standard demand curve that is a result of competitors decreasing their prices to match each others, but not raising them to achieve the same effect.

Monopoly: A market situation with a single supplier of a particular good or service.

Oligopoly: A situation in which few firms are competing in the market for a particular commodity.

13.7 Self Assessment

Fill in the blanks:

1. Sweezy's model is based on the ..... list approach,
2. An oligopolistic firm is guided in its decisions by the ..... demand curve.
3. Under oligopoly, a firm expects that when it raises its price, it is most likely that rival firms will also ..... the price.
4. For an oligopolistic firm, the demand curve is highly ..... and gradually falling for prices above the current or existing price,
5. Sweezy's kinked demand curve model explains the rigidity or stickiness in oligopolistic prices in the face of short-term increases or decreases in ..... input costs.
6. The Hall and Hitch model of the Kinked demand curve is based on an empirical survey of a sample of 38 well managed firms in ..... .
7. ..... duopoly model model assumes that his rival firm will keep its price constant irrespective of his own decision about pricing.

State whether the following statements are true or false:

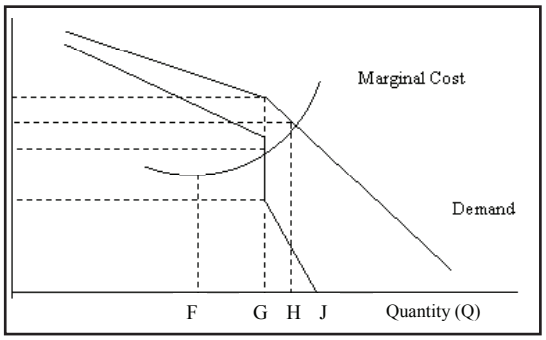
8. Locational advantages and managerial talents have nothing to do with entry barriers.
9. Price leadership can be seen as collusive oligopoly.
10. Under oligopoly, new entry is easy.

Notes

11. The demand curve of an oligopolist is indeterminate.
12. Under Hall and Hitch version the demand curve has a kink at the price which is above full cost price.
13. Oligopoly firm may form cartel.
14. Price leadership is, where firms jointly fix a price and output through agreement.
15. Bertrand's duopoly model assumes that each seller assumes his rival's price, instead of his output, to remain constant.

13.8 Review Questions

1. In what form does rivalry occur in an oligopoly? Why does competition among rivals occur most often in oliogopolies?
2. Go through the figure below and answer the questions that follow:



   (a) Which point determines the equilibrium output in the figure above?

   (b) Which point determines the equilibrium price in the figure above?

3. Why is there so much advertising in oligopoly? How does such advertising help consumers and promote efficiency? Why might it be expensive at times?
4. There is an oligopoly consisting of 4 firms. Assume that the marginal cost of production is ₹ 10 per unit of the good. Demand at price X is given as:

P	Q
60	0
50	100
40	200
30	300
20	400
10	500
0	600

   What are the price and output levels in an oligopoly Nash Equilibrium?

5. Two firms compete in the market for a homogeneous good. Total demand equals D(p) = 37 – p. They produce the good at a constant marginal cost of 5 (that is, the cost functions are $C_1(q) = C_2(q) = 5q$). The state obliges firms to set price equal to p = 17. (So total demand will be 20 units.) The firms compete in advertising in order to attract costumers.

Notes

In particular, if the firms 1 and 2 choose levels of advertising $n_1 \geq 0$ and $n_2 \leq 0$, respectively, firm *i* attracts fraction

$$\frac{n_i + 1/2}{n_1 + n_2 + 1}$$

of total demand. For example, if no firm does advertising, ($n_1 = n_2 = 0$) each firm attracts half of total demand. The cost of advertising at level *ni* is equal to $(½)_{ni}$.

(a) Describe the profit function of each firm as a function of levels of advertising.

(b) Calculate the first order condition for a firm that has to be satisfied when it maximizes its profits.

(c) What is the optimal level of advertising for firm 1 when firms 2 sets $n_2 = 7$?

6. 'Oligopoly is the most prevalent form of market structure in the manufacturing sector'. Describe this statement with the help of an example.

7. Assume that firms in the short-run are earning above normal profits. Explain what will happen to these profits in the long-run for the following markets:

(a) Pure Monopoly

(b) Oligopoly

(c) Monopolistic Competition

(d) Perfect Competition

8. The following list is a number of well-known companies and their products. Which of the four types of markets (perfect competition, monopoly, monopolistic competition and oligopoly) best characterize the markets in which they compete? Explain why.

(a) Mcdonald's-hamburgers.

(b) exxon-gasoline.

(c) IBB-personal computers

(d) Heinz

9. Comment on the following statements with logical reasoning and appropriate diagrams.

(a) In oligopoly, there is no one single determinate solution, but a number of determinate solutions depending upon different assumptions.

(b) The success of price leadership of a firm depends upon the correctness of his estimates about the reactions of his followers.

(c) The kinked demand curve theory explains why a price once determined would remain sticky but does not determine that price level.

(d) The Curnot model assumes a duopoly but is not extendable to multiform oligopoly.

10. Discuss with the help of diagram the non-collusive models of oligopoly.

11. Why might oligopolists be more likely to match a price cut than a price increase by a competitor?

12. What is price leadership? Explain price leadership with the help of real world examples.

13. As a manager, what might be the different types of barriers to entry an oligopoly? How will you react and what will be your different ways of strategic behaviour for entry?

14. 'Globalisation and high level of competition have resulted in oligopolies emerging in many market sectors'. Discuss with examples.

Notes

Answers: Self Assessment

1.	Marginal	2.	Imagined
3.	raise	4.	elastic
5.	Variable	6.	England
7.	Bertrand's	8.	False
9.	True	10.	False
11.	True	12.	False
13.	True	14.	False
15.	False		

13.9 Further Readings

Books

Dr. Atmanand, *Managerial Economics,* Excel Books

G.S. Maddala, *Microeconomics: Theory and Application,* Tata McGraw-Hill

N. Gregory Mankiw, *Principles of Microeconomics,* Harcourt College Publications

Samuel Bowles, *Microeconomics: Behavior, Institutions and Evolution,* Oxford

Online links

http://tutor2u.net/economics/content/topics/monopoly/oligopoly_notes.htm

http://www.referenceforbusiness.com/encyclopedia/Oli-Per/Oligopoly.html

http://www.amosweb.com/cgi-bin/awb_nav.pl?s=wpd&c=dsp&k=oligopoly

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Unit 14: Pricing Decisions

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Objectives

After studying this unit, you will be able to:

- Realise cost-based pricing
- Discuss the pricing-based on firm's objectives
- Explain the competition-based pricing
- Compare different types of pricings strategies

Introduction

You have learnt so far that the microeconomic principle of profit maximisation suggests pricing by the marginal analysis that is by equating MR to MC. However, in the pricing methods followed in practice, firms rarely follow this process. Uncertainty with regard to demand and cost functions and the deviation from the objective of short run profit maximisation are the two main reasons for this.

Determination of profit maximisation requires an accurate knowledge of the demand and cost conditions facing the firm. It is not easy to get a good estimate of the true demand function, for; one faces difficulties with regard to the specification of the function, data availability and

limitations of the estimation method. Besides, there is a problem of product interdependence among rival firms, which is rather significant in an oligopolistic market. Similar problems are witnessed with regard to the cost function.

There is no unique theory of firm behaviour. Profit is certainly an important variable for which every firm cares, but maximisation of short run profit is not a popular objective of the firm today. Firms seek maximum profit in the long run. The problem is dynamic and its solution requires accurate knowledge of demand and cost conditions over time, which may be impossible.

In view of these problems, economic prices are a rare phenomenon. Instead, firms set prices for their products through several alternative means which we are going to discuss in this unit.

14.1 Cost-based Pricing

Cost-based pricing methods have three types – Full cost pricing, target return pricing and the marginal cost pricing.

14.1.1 Cost-plus or Full-cost Pricing

This is the most common method used for pricing. Under this method, the price is set to cover costs (materials, labor and overhead) and pre-determined percentage or profit. The percentage differs strikingly among industries, among member firms and even among products of the same firm. This may reflect differences in competitive intensity, differences in cost base and differences in the rate of turnover and risk. In fact, it denotes some vague notion of a just profit.

Let us discuss the factors determining the normal profit. Ordinarily margins charged are highly sensitive to the market situation. They, may, however, tend to be inflexible in the following cases:

1. They may become merely a matter of common practice.
2. Mark-ups may be determined by trade associations either by means of advisory price lists or by actual lists of mark-ups distributed to members.
3. Profits sanctioned under price control as the maximum profit margins remain the same even after the price control is discontinued. These margins are considered ethical as well as reasonable. Usually profit margins under price controls are set so as to make it possible for even the least efficient firms to survive. Thus, the margin of profits tends to be higher than what would be possible under competitive conditions.

Advantages of Cost-plus Pricing Method

A clear explanation cannot be given for the advantage and widespread use of full cost pricing, as firms vary greatly in size, product characteristics and product range. They also face varying degrees of competition in markets for their products. However, the following points may explain its advantages:

1. Full-cost pricing offers a means by which fair and plausible prices can be found with ease and speed, no matter how many products the firm handles.
2. Prices based on full cost look factual and precise and may be more defensible on moral grounds than prices established by other means.
3. Firms preferring stability use full cost as a guide to pricing in an uncertain market where knowledge is incomplete. In cases where costs of getting information are high and the process of trial and error is costly, they use it to reduce the cost of decision making.

Notes

4. In practice, firms are uncertain about the shape of their demand curve and about the probable response to any price change. This makes it too risky to move away from full-cost pricing.
5. It is difficult, except ex-post, to identify and compute direct costs.
6. Fixed cost must be covered in the long run and firms feel that if they are not covered in the short run, they will not be covered in the long run either.
7. A major uncertainty in setting a price is the unknown reaction of rivals to that price. When products and production processes are similar, cost-plus pricing may offer a source of competitive stability by setting a price that is more likely to yield acceptable profit to most other members of the industry also.
8. Management tends to know more about product costs than other factors, which are relevant to pricing.

Disadvantages of Cost-plus Pricing Method

Following are the commonly observed disadvantages of cost plus or full cost pricing method. A firm should be sensitive to these issues before deciding in favor of such a method.

1. It ignores demand - there is no necessary relationship between cost and what people will pay for a product.
2. It falls to reflect the forces of competition adequately. Regardless of the margin of profit added, no profit is made unless what is produced is actually sold.
3. Any method of allocating overheads is arbitrary and may be unrealistic given the nature of the product and the market in which it is being sold. Insofar as different prices would give rise to different sales volumes, units costs are a function of price, and, therefore, cannot provide a suitable basis for fixing prices. The situation becomes more difficult in multi-product firms.
4. It may be based on a concept of cost, which may not be relevant for the pricing decision. Full cost pricing ignores marginal or incremental costs and uses average costs instead.

Cost-plus pricing is especially useful while deciding prices for public utility and for tailored or customized products. Situations in which cost plus pricing is useful:

1. Product tailoring involves determining the product design after the selling price is determined. By working back from this price, the product design and the permissible cost is decided upon.
2. This approach takes into account the market realities, by looking from the viewpoint of the buyer in terms of what he wants and what he will pay.
3. Cost plus pricing is also helpful for pricing products that are designed to the specification of a single buyer. The basis of pricing is the estimated cost plus gross margin that the firm could have got by using facilities otherwise.
4. It is also possible for monopoly buying, where the buyers know a great deal about suppliers' costs. They may make the products themselves if they do not like the price. The more relevant cost is the cost that the buying company would incur if it made the product by itself.

These reasons provide some explanation but do not justify it as the logical approach to pricing.

Notes

Notes Cost-plus pricing method is widely used in India due to two special reasons.

1. The prevalence of sellers' market in India till recently made it possible for the manufacturers to pass on the increases in costs to the consumers.
2. Costs plus a reasonable margin of profit are taken into consideration for the purposes of price fixation in the price-controlled business in India.

14.1.2 Target Return Pricing

An important problem that a firm might have to face is adjusting prices to changes in costs. The popular policies that are often followed for deciding prices include revising prices to maintain a constant percentage mark-up over costs; revising prices to maintain profits as a constant percentage of total sales and revising prices to maintain a constant return on invested capital. The use of the above policies is illustrated below.

Example: A firm sells 1,00,000 units per year at a factory price of ₹ 12 per unit. The various costs are given below:

Variable Costs	Materials	₹ 3,60,000
	Labor	₹ 4,20,000
Fixed Costs	Overhead	₹ 1,20,000
	Selling and Administrative	₹ 1,80,000
Total investment cash, inventory and equipment		₹ 8,00,000

Suppose, the labor and materials cost increases by 10 per cent. So let us look at how we should revise price according to the above-mentioned three policies.

The above data reveal that costs are ₹ 10,80,000, the sales are ₹ 12,00,000 and the profit is ₹ 1,20,000. The profit percentages according to the three policies are:

1. Percentage over costs 1,20,000/10,80,000 × 100 = 11.1
2. Percentage on sales 1,20,000/12,00,000 × 100 = 10
3. Percentage on capital employed 1,20,000/8,00,000 × 100 = 15

The revised costs are ₹ 11,58,000 (₹ 10,80,000 + 36,000 + 42,000).

According to the first formula, we have to earn a profit of 11.1 per cent on costs. Our revised profits should be ₹ 1,28,667 and sales volume on this basis would be ₹ 12,86,67. The selling price would, therefore, be ₹ 12.87 per unit.

Under the second formula, the profit should be 10 per cent on sales. If sales are S, the profit would S/10 and the cost would be 9S/10. We know the cost and we have to find out the sales.

If 9S/10 = ₹ 11,58,000, S = ₹ 12,86,667

Therefore, the price per unit is ₹ 12.87

Under the third formula, we assume that the capital investment is the same. Therefore, the required profit is ₹ 1,20,000 (15 per cent on ₹ 8,00,000). The sales value would then be ₹ 12,78,000 and the selling price per unit would be ₹ 12.78.

Notes

Most of the American firms start with a rate of return they consider satisfactory, and then set a price that will allow them to earn that return when their plant utilization is at some 'standard rate' - say, 80 per cent. In other words, they determine standard costs at standard volume and add the margin necessary to return a target of profit over the long run.

Rate of return pricing is a refined variant of full-cost pricing. Naturally, it has the same inadequacies, viz. it tends to ignore demand and fails to reflect competition adequately. It is based upon a concept of cost, which may not be relevant to the pricing decision at hand and overplays the precision of allocated fixed costs and capital employed.

14.1.3 Marginal Cost Pricing

Both under full-cost pricing and the rate-of-return pricing, prices are based on total costs comprising fixed and variable costs. Under marginal cost pricing, fixed costs are ignored and prices are determined on the basis of marginal cost. The firm uses only those costs that are directly attributable to the output of a specific product. A pricing decision involves planning into the future, and as such it should deal solely with the anticipated and, therefore, estimated revenues, expenses, and capital outlays. All past outlays which give rise to fixed costs are historical and shrunk cost.

With marginal cost pricing, the firm seeks to fix its prices so as to maximize its total contribution to fixed costs and profit. Unless the manufacturer's products are in direct competition with each other, this objective is achieved by considering each product in isolation and fixing its price at a level which is calculated to maximize its total contribution.

Caution There are two assumptions behind use of such a method:

1. The firm is able to segregate its markets so that it is able to charge higher price in some market
2. Lower price in others, and there are no legal restrictions.

Advantages of Marginal Cost Pricing

1. With marginal cost pricing, prices are never rendered uncompetitive merely because of a higher fixed overhead structure, or because hypothetical unit fixed costs are higher than those of the competitors. The firm's prices will only be rendered uncompetitive by higher variable costs, and these are controllable in the short run while certain fixed cots are not.
2. Marginal costs more accurately reflect future as distinct from present cost levels and cost relationship. When making a pricing decision one is more interested in changes in cost that will result from that decision. Marginal cost represents these changes, while total costs include fixed costs, which are not incurred as a result of the pricing decision.
3. Marginal cost pricing permits a manufacturer to develop a far more aggressive pricing policy than does full-cost pricing. An aggressive pricing policy should lead to higher sales and possibly reduced marginal costs through increased marginal physical productivity and lower input factor prices. However, before entering into a more differentiated and a more flexible pricing policy, it would be necessary to consider the impact of unstable prices on consumer goodwill.
4. Marginal cost pricing is more useful for pricing over the life cycle of a product, which requires short-run marginal cost and separable fixed cost data relevant to each particular stage of the cycle, not long-run full-cost data. Marginal cost pricing is more effective than full-cost pricing because of two characteristics of modern business:

Notes

5. The prevalence of multi-product, multi-process and multi-market concerns makes the absorption of fixed costs into product costs absurd.

6. In many businesses, the dominant force is innovation combined with constant scientific and technological development and the long-run situation is often highly unpredictable.

Disadvantages of Marginal Cost Pricing

1. Some accountants are not fully conversant with the marginal cost techniques themselves, and are not, therefore, capable of explaining their use to management.

2. In a period of business recession, firms using marginal cost pricing may lower prices in order to maintain business and this may lead other firms to reduce their prices leading to cut-throat competition.

3. With the existence of idle capacity and the pressure of fixed costs, firms may successively cut down prices to a point at which no one is earning sufficient total contribution to cover its fixed costs and earn a fair return on capital employed.

4. In spite of its advantages, due to its inherent weakness of not ensuring the coverage of fixed costs, marginal cost pricing has usually been confined to pricing decisions relating to special orders.

Business situations requiring the use of marginal costing include situations where price is the primary determinant of an offer; where initial product acceptance is being sought to facilitate entry into a new market; where the product is being targeted to a low quality market segment; where price competition is intense, and when the price responsiveness of demand is high i.e. a little reduction in price may lead to a substantial increase in volume.

Case Study

Real World: Changes Required in the Simple Cost-plus Pricing Method

Many manufacturers base their prices on direct costs, adding an arbitrary percentage to cover overheads. In theory, such an approach will produce profits, but it can also price a product out of the market or lead to an overproduction of less profitable items at the expense of more profitable ones.

The reason for this apparent contradiction is that traditional pricing methods often fail to consider the following essential factors:

1. The price of competing products;

2. The need for the maximum loading of production facilities throughout the year or an optimum utilisation of the plant and equipment at any given point of time;

3. The "restraining factors".

The shortcomings of the traditional pricing system can be illustrated best by an actual example. Let us assume that a manufacturer has, in his collection, two fabric designs made from the same yarn and that supplies of this raw material during a particular season are limited.

Now, the customers show keen interest in both fabrics, and the marketer knows that he will not have enough yarn to meet all the orders. He will need to decide the product mix

Contd...

Notes

that will allow maximum profit from a limited supply of yarn. If he uses traditional pricing systems, his decision will be based on the following (hypothetical) calculations:

Cost per metre	Design A	Design B
Yarn cost	R 36	R 18.00
Other materials	R 27	R 24.00
Labour and other variable costs	R 15	R 12.00
Total variable costs	R 78	R 54.00
Total fixed costs	R 12	R 10.50
Total costs	R 90	R 64.50
Selling price per metre	R108	R 77.40
Profit per metre	R 18	R 12.90

Obviously, it appears that Design A is more profitable than Design B. However, a costing that is based on variable costs and contributions produces a different result.

Per metre	Design A	Design B
Selling price	R108	R77.40
Total variable costs	R78	R54.00
Contribution per mtr.	R30	R23.40

Of course, we have not yet taken into account the "restraining factor" – in this case, the yarn supply and the fact that Design B uses half the raw material needed to make Design A. To get a more accurate picture, we make a calculation based on the fact that, with the yarn available, Design B allows twice as much fabric to be manufactured.

	Design A	Design B
Product in metres (say)	5,000	10,000
Contribution per metre	R30	R23.40
Total contribution	R 1.5 lakh	R 2.34 lakh

The emphasis should, therefore, be on marketing Design B.

Indeed, a more important advantage of this route is that it allows the marketer to make any price adjustment dictated by the market whilst knowing precisely what effect it will have on his profits!

Let us assume a competitor offers a product similar to the fabric B used in the example, at a price of R 75. According to the traditional costing method, design A apparently becomes even more profitable to produce.

But, again, the "restraining factor" – let us say, limited yarn supply in this case – combined with the contribution approach, reveals a different situation although the price of Design B is reduced by, say, R 2.40 per metre.

	Design A	Design B
Metre Produced (say)	5,000	10,000
Contribution per metre	R 30	R 21
Total contribution	R 1.5 lakh	R 2.1 lakh

Product B can still produce extra profits over Product A, even at the lower price made necessary to match the price of competition.

Contd...

Notes

Profit Planning

To effectively apply the method of contribution, it is necessary to first determine which costs are variable and which costs are fixed. A further example illustrates how a garment marketer can make use of this technique (widely adopted in the far-East) to change the complexion of his bottom line.

Style X produces an additional profit of R 24 per garment. But the capacity of the factory is limited by the number of workers and the number of workstations installed. On that basis, and because the labour content of style X is twice that of style Y, the relative revenue of the two styles is:

Cost per garment	Style X	Style Y
Fabric cost		
Trimmings/material, etc	R 180	R 120
Direct labour cost	R 120	R 60
Total direct cost	R 360	R 270
Fixed costs	R 120	R 90
Total cost	R 480	R 360
Selling price	R 576	R 432
Profit per garment	R 96	R 72

The obvious application of this new knowledge would be for the marketer to promote the sales of product Y in order to achieve greater volume and maximum utilisation of his capacity. He could well afford, for example, to reduce the sale price of product Y, should market forces so dictate, and still enjoy an extra contribution.

Main Applications

Although the examples provided here apply to the textile sector, they could just as easily be applied to any other industry. Only the "restraining factors" change according to the company's activity and circumstances. In a machine shop, for example, the "restraining factors" could be the limitation of a category of CNC units; in a garment factory, the number of special machines needed for a given style, the area of cutting tables available, or just the amount the direct labour, i.e., man-hours needed to make one garment or another.

	Style X	Style Y
Total direct cost	R 360	R 270
Selling price	R 576	R 432
Contribution per garment	R 216	R 162
Output (Nos)	5,000	10,000
Total contribution	R 10.80 lakh	R 21.60 lakh

In each case, the concept of contribution, allied to that of the "restraining factor", produces a costing analysis that reflects profit opportunities far more accurately than the traditional "cost plus" methods of pricing, enabling a marketer to polish his business plan.

This flexibility can be extremely valuable when market conditions are difficult and a constant pressure on prices is being experienced. It is better to cut prices and maintain one's market share than to cut output. A problem of receivables is better than a stockpile.

Question

Evaluate the effectiveness of cost based pricing methods.

Source: Indian Management

Notes

14.2 Pricing-based on Firm's Objectives

There are many different strategies companies adopt for accomplishing pricing objectives. Some of the important ones and often used are discussed here.

14.2.1 New Product Pricing

The base price of a new product is easily adjusted in the absence of price control by government. A pioneer can set the base price high to recover product development costs quickly. While setting the base price, the company also considers how quick will be the entry of competition in the market, what would be the strength of entry campaign, and what impact this will have on primary demand. If the company concludes that competitors will enter with heavy campaign, with limited effect on primary demand, then the company may opt for penetration pricing policy and set a low base price to discourage competitors' entry.

Price skimming refers to charging the highest possible price that a sufficient number of most desirous customers for the product will pay. This approach offers the most flexibility to a pioneer in the product's introduction stage because the demand tends to be inelastic during most of this period due to the absence of competitors. Skimming approach generates much needed cash flows to offset high cost of product development. Most companies, who introduce successful pioneering products, usually adopt price-skimming approach.

Price skimming can generate quick returns to cover up the product's research and development costs. This strategy restricts product's market penetration because only the most desirous customers buy the product. Possibility of earning large margins encourages competitors to enter the market.

Penetration pricing approach requires the price to be set less than the competing brands and aims at market penetration to capture large market share quickly. Companies adopt this strategy when the demand tends to be elastic. Sometimes companies use penetration pricing to rapidly capture a large market share. Increased demand makes it necessary to produce more and this decreases per unit production costs. Low unit production cost puts the marketer in a position of advantage to further decrease the price, and thereby make it difficult for aspiring new competitors to enter the market. Besides, a low unit price is likely to be less attractive to competitors because the lower per unit price results in lower per unit profits. With this approach it becomes difficult to raise price subsequently. Some firms initially skim the market and later set a penetration price. A lower price makes the market less attractive to potential new entrants.

14.2.2 Psychological Pricing

Psychological pricing approach is suitable when consumer purchases are based more on feelings or emotional factors rather than rational, such as love, affection, prestige, and self-image etc. Price sometimes serves as a surrogate indicator of quality. Technological advancements are making product differentiation difficult and many companies attempt to differentiate their offers based on non-functional product attributes, such as image and lifestyle etc. Psychological pricing is not appropriate for industrial products.

Firms set artificially high prices to communicate a status or high quality image. This pricing method is appropriate for perfumes, jewelry, autos, liquor, and ready-to-wear garments etc. John C. Groth and Stephen W, McDaniel found that firms use prestige pricing and consumers associate a higher price with higher quality.

Example: Acer and Sony have adopted this type of pricing for their range of Ferrari and Vaio Lifestyle notebook PCs. Apple adopts this method of pricing for its high-end PowerBook

laptop computers. This pricing method requires creation of strong brand image through promotion programmes that reinforce the brand's quality and image of total exclusiveness.

Price perceptions are significantly influenced by the brand's perceived quality and extent of advertising. Paul W. Farris and David J. Reibstein studied 227 consumer businesses to examine the relationships among relative price, relative quality, and relative advertising and found that:

1. Brands with high relative advertising but with average product quality were able to charge premium prices successfully than brands that were relatively unknown.
2. Brands with both high relative advertising and high relative product quality could charge the highest prices. Brands with low ad budgets and low quality realised the lowest prices.
3. The positive relationship between high relative advertising and high relative product quality was very strong during later life cycle stages for market leaders.

Odd-even Pricing: Firms sometimes set their product prices that end with certain numbers. The assumption is that this type of pricing helps sell more of a product. It is supposed that if the price is ₹ 99.95, consumers view it not as ₹ 100 and certain types of consumers are attracted more by odd prices rather than even. This assumption is not supported by substantial research findings, but still odd prices seem to be far more common than even prices. Also, supposedly even prices favour exclusive or upscale product image and consumers view the product as a premium quality brand.

Task Find some examples of firms (products and services) that use psychological pricing.

14.2.3 Promotional Pricing

Companies can choose a variety of pricing techniques to motivate consumers to buy early. As the name suggests, these techniques are considered as an important part of sales promotions. Some of these techniques include loss leader pricing, special event pricing, low-interest financing, longer payment period, cash rebates, free auto insurance, warranties, increased number of free services, etc. Generally, these techniques do not lead to significant gains because most competitors can copy them in a hurry: To illustrate, just three techniques are briefly discussed.

Loss Leader Pricing: Sometimes large retail outlets use loss leader pricing on well-known brands to increase store traffic. By attracting increased number of consumers to store the retailers hope that sales of routinely purchased products will rise and increase sales volume and profits. This compensates for the lower margins on loss leader brands. Firms whose brands are chosen as loss leader oppose this approach as the image of their brands, gets diluted and consumers resist paying list price to retailers selling the same brands.

Superficial Discounting: It is superficial comparative pricing. It involves setting an artificially high price and offering the product at a highly reduced price.

Example: The communication might say, "Regular price was ₹ 495, now reduced to ₹ 299." This is a deceptive practice and often used by retailers. Occasionally we come across advertisements that show ₹ 495 crossed (X) and a fresh price written as ₹ 250.

Special Event Pricing: This involves coordinating price cuts with advertising for seasonal or special situations to attract consumers by offering special reduced prices. For example, before the beginning of a new session for young children at school, we see ads of shoes generally viewed as part of uniform.

Notes

14.3 Competition-based Pricing

There are two types of competition-based pricing strategies, as discussed in following subsections.

14.3.1 Going-rate Pricing

Instead of the cost, the emphasis here is on the market and market situation. The firm adjusts its own pricing policy to the general pricing structure in the industry. Where costs are particularly difficult to measure, this may seem to be the logical first step in a rational pricing policy. It may also reflect the collective wisdom of the industry.

This type of situation leads to price leadership. Where price leadership is well established, charging according to what competitors are charging may be the only safe policy. It may simply be a way in which firms try to escape the hazards of price in an oligopolistic market. It may be less costly and troublesome to the business than the exact calculation of costs and demand and has a practical advantage over a highly individualistic pricing policy.

Many big Indian companies have adopted a policy of following competitors, which implies that they follow a price set either by the market or by a price leader. It must be noted that 'going-rate pricing' is not quite the same as accepting a price impersonally set by a near perfect market. Rather, it would seem that the firm has some power to set its own price and could be a price maker if it chooses to face all the consequences. It prefers, however, to take the safe course and conform to the policy of others.

14.3.2 Customary Prices

Prices of certain goods become more or less fixed, not by deliberate action on the sellers' part but as a result of their having prevailed for a considerable period of time. For such goods, changes in costs are usually reflected in changes in quality or quantity. Only when the costs change significantly, are the customary prices of these goods changed. Customary prices may be maintained even when products are changed.

Example: The new model of an electric fan may be priced at the same level as the discontinued model. This is usually so even in the face of lower costs. A lower price may cause an adverse reaction on the competitors, leading them to a price war, as also on the consumers who may think that the quality of the new model is inferior. Going along with the old price is the easiest thing to do. Whatever be the reason, the maintenance of existing price as long as possible is a factor in the pricing of many products.

If a change in customary prices is intended, the firm must study the pricing policies and practices of competing firms; behavior and emotional make-up of the people of similar designations as him in those firms. Another possible way out, especially when an upward move is sought, is to test the new price in a limited market to determine the consumer reactions.

Task Analyse the pricing strategy used by any two Indian firms and any two inter national firms.

Notes

Case Study

Value Based Pricing: "We are not the cheapest but…."

In this highly competitive online marketplace, it can be difficult to persuade customers to buy from you when you offer a similar product to your opposition but with a higher price tag. And trying to beat competitors on price alone is a cut-throat business, very risky and not recommended. It attracts bargain hunters ready to defect to competitors for a better deal.

Using a value-pricing strategy is a better proposition because it attracts loyal customers. Why do customers buy designer-labeled clothes and luxury cars? Why are those items more expensive when they don't cost so much more to make? The answer lies in the perceived value. Value is not an inherent attribute of the product but it commands a higher price.

Customers do not buy features and benefits, they buy VALUE.

Value is subjective. Value is a benefit but a benefit is not necessarily of value to all customers.

For example, a vendor offers free installation and free updates for his software. Customer-A considers 'free installation' as 'value' because he has no technical knowledge and this will save him time and effort. Customer-B rates the free installation as 'nice to have' but the drawcard or 'value' is the free updates that will save him money in the long run. Customers do not assign value to the same benefits.

Source: www.content4reprint.com

14.4 Summary

- Price is referred to as the market value, or agreed exchange value, that will purchase a definite quantity, weight, or other measure of a good or service. Price plays a crucial role in both commodity as well as branded product market.
- Pricing decisions are usually considered a part of the general strategy for achieving a broadly defined goal.
- Cost based pricing is the most common method used for pricing. Under this method, the price is set to cover costs (materials, labor and overhead) and pre-determined percentage or profit. Target based pricing is to maintain a constant percentage mark-up over costs.
- Under marginal cost pricing, fixed costs are ignored and prices are determined on the basis of marginal cost. Under going rate pricing, the firm adjusts its own pricing policy to the general pricing structure in the industry.
- However the second category of methods is competition based or market based methods, in which the prices are decided on the prevailing market condition and customary pricing methods.
- There are specific pricing methods like value pricing, sealed bid pricing, price-quality based pricing and psychological pricing.

Notes

14.5 Keywords

Cost-plus Method: Under this method, the price is set to cover costs (materials, labor and overhead) and pre-determined percentage or profit.

Customary Prices: Prices of certain goods become more or less fixed, not by deliberate action on the sellers' part but as a result of their having prevailed for a considerable period of time

Going Rate Pricing: In this method, the firm adjusts its own pricing policy to the general pricing structure in the industry.

Marginal Cost Pricing: Under marginal cost pricing, fixed costs are ignored and prices are determined on the basis of marginal cost.

Price: Price is the exchange value of goods and services in terms of money.

Psychological Pricing: In this method, the marketer bases prices on the psychology of consumers. Many consumers perceive price as an indicator of quality. While evaluating products, buyers carry a reference price in their mind and evaluate the alternatives on the basis of this reference price. Sellers often manipulate these reference points and decide their pricing strategy.

Target Return Pricing: In this method, the firm decides the target return that it expects out of business and then decides prices.

14.6 Self Assessment

Fill in the blanks:

1. In …… strategy, prices are high in early stages to recover costs as soon as possible.
2. Under …….. method, price is set up to cover manufacturing costs plus a pre-decided amount of profits.
3. In telecom sector, the companies often follow the …… pricing.
4. Some products are abruptly priced at 9.99 or 99.99. It is known as …….. pricing.
5. A consumer purchases more of a good if the price goes down and vice versa. This is known as……..

State whether the following statements are true or false:

6. Most of the firms are uncertain about their demand curve.
7. Target return pricing is a variant of full cost pricing.
8. Marginal cost pricing permits a manufacturer to develop a far more aggressive pricing policy than does full-cost pricing.
9. Companies adopt penetration pricing strategy when the demand tends to be inelastic.
10. Customary prices may be maintained even when products are changed.

14.7 Review Questions

1. "Pricing in real world is different from the economic prices that we study". Justify
2. Compare and contrast the full cost pricing method and target return pricing method.
3. Analyse the relevance of marginal cost pricing method.

Notes

4. Examine the benefits of using full cost pricing methods vis-à-vis its shortcomings.
5. Discuss the two main competition based pricing methods.
6. Suppose you are a businessman whose objective is to capture larger market share as soon as possible. Which type of pricing method will you use and why?
7. Bring out the difference between price skimming and penetration pricing. Use suitable examples.
8. Analyse the rationale for using psychological pricing method.
9. Identify and discuss the techniques to be used if you want to induce your customers to buy early.
10. Differentiate between going rate pricing and customary pricing.
11. Which pricing method do you think is most suitable under conditions of high competition and insignificant individual market shares?
12. You are a businessman producing shirts. You enjoy a fair amount of market share and huge profits. But in recent years, another manufacturer has come up in the market and is threatening to eat up your market share. What type of pricing strategy would you use under such a situation?

Answers: Self Assessment

1.	Market Skimming	2.	Full cost pricing
3.	Going rate	4.	Psychological
5.	Law of Demand	6.	True
7.	True	8.	True
9.	False	10.	True

14.8 Further Readings

Books

Dr. Atmanand, *Managerial Economics*, Excel Books

G.S. Maddala, *Microeconomics: Theory and Application*, Tata McGraw-Hill

Jeffrey M. Perloff, *Microeconomics,* Pearson Education

Sampat Mukherjee, *Microeconomics*, Prentice Hall

Samuel Bowles, *Microeconomics: Behavior, Institutions, and Evolution*, Oxford

Online links

http://entrepreneurs.about.com/od/salesmarketing/a/pricingstrategy_2.htm

http://marketingteacher.com/lesson-store/lesson-pricing.html

http://www.articlesbase.com/answers/what-are-the-various-pricing-methods-46421

http://www.pricingstrategy.net/