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**SELF-LEARNING
MATERIAL**



MASTER OF BUSINESS ADMINISTRATION (HRM)

MBAH 204 : BUSINESS ENVIRONMENT AND MANAGERIAL ECONOMICS

w.e.f Academic Session: 2024-25



**CENTRE FOR DISTANCE AND ONLINE EDUCATION
UNIVERSITY OF SCIENCE & TECHNOLOGY MEGHALAYA**

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Techno City, 9th Mile, Baridua, Ri-Bhoi, Meghalaya, 793101

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Centre for Distance and Online Education
UNIVERSITY OF SCIENCE AND TECHNOLOGY MEGHALAYA

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COURSE INTRODUCTION

This paper on Business Environment and Managerial Economics provides students with a comprehensive understanding of the factors influencing business operations and decision-making processes. It covers the dynamics of the business environment, including both micro and macro elements, and explores the impact of historical and contemporary industrial policies on economic planning and development in India. Students will delve into managerial economics, learning how to apply economic theories and principles to real-world business challenges. By examining topics such as market demand, elasticity, production functions, and cost concepts, this course equips learners with the tools to analyze and optimize business strategies in a complex economic landscape.

Unit 1 shall introduce the learners to the business environment, encompassing both internal and external factors that influence a company's performance and strategic decisions. It will explore the nature and scope of the business environment, highlighting its dynamic and broad nature. This unit will cover economic, political, legal, technological, social, and cultural factors, emphasizing the importance of understanding these elements to grasp their impact on business operations and strategy. Additionally, it will examine the components of the business environment, distinguishing between micro and macro factors. Micro factors include consumers, competitors, the organization itself, the market, suppliers, and intermediaries. Macro factors involve broader influences such as economic conditions, legal frameworks, demographic changes, political and legal environments, socio-cultural dynamics, technological advancements, and global factors.

Unit 2 shall discuss industrial policy and economic planning in India. It will cover the historical policies of 1956, which focused on public sector growth and included regulations such as IDRA, MRTP, and FERA that governed industrial and foreign activities. The unit will then shift to the 1991 policy, which marked a significant

shift towards liberalization, privatization, and globalization, moving away from previous restrictive practices. It will also address the evolution of planning in India through Five-Year Plans, transitioning from central to market-oriented strategies. The issue of industrial sickness, driven by poor management and outdated technology, will be examined along with remedies involving restructuring and financial support.

Unit 3 shall introduce the concept of managerial economics. This unit will apply economic theories to business decisions and strategy, integrating both theoretical and practical approaches to address business problems. It will emphasize the importance of understanding resource allocation and market dynamics. The scope of managerial economics will be outlined, including demand analysis, production and cost evaluation, pricing, and capital budgeting. Key economic principles such as marginal analysis, opportunity cost, and the law of diminishing returns will be covered, with a focus on addressing the central problems of what, how, and for whom to produce.

Unit 4 shall cover market demand and elasticity. This unit will explain market demand as the total quantity consumers are willing to buy at various prices and elasticity as a measure of responsiveness in demand or supply to price changes. It will explore price elasticity, which examines how demand responds to price fluctuations, income elasticity, which assesses changes in demand with variations in income, and cross elasticity, which evaluates the impact of one good's price change on the demand for another. The unit will also cover market supply, which refers to the total quantity producers are willing to sell at different prices, and market equilibrium, the point where the quantity demanded equals the quantity supplied.

Unit 5 shall focus on production and costs. It will cover the transformation of inputs into outputs, considering scenarios with one and two variable inputs. The concept of producer's equilibrium will be discussed, where marginal cost equals marginal revenue for profit maximization. The unit will also explore the expansion path, which identifies optimal input combinations for varying output levels, and revenue concepts, including total, marginal, and average revenue. It will address the law of diminishing returns, which describes how additional output decreases with increasing variable inputs, and returns to scale, which analyze changes in output with proportional changes in all inputs. Cost concepts will be examined, including fixed, variable, short-run, and long-run costs, as well as total, average, and marginal costs. Economies of scale and scope will be discussed, focusing on cost advantages from increased production scale and the production of multiple products. The unit will conclude with an analysis of revenue curves, including total, marginal, and average revenue, to aid in pricing and production decisions.

UNIT-I

MEANING AND SIGNIFICANCE OF BUSINESS ENVIRONMENT

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Unit Objectives

Introduction

Learning Outcomes

1.1 Concept of business environment, Nature and Scope of Business Environment

1.2 Components of business environment-Micro and Macro Environment.

1.3 Elements of Micro Environment – Consumers/Customers, Competitors, Organization, Market, suppliers, Intermediaries.

1.4 Elements of Macro Environment- external, internal, micro, macro, economic, legal, demographic Political-legal, Socio-cultural, Technological, Global Environment.

1.5 Let us sum up

1.6 Answers to Check Your Progress

1.7 Model Questions

1.8 Suggested Books

UNIT OBJECTIVES

After studying this unit, you will be able to:

- Gain a deep understanding of fundamental concepts in business environment and managerial economics.
- Analyze and evaluate various business environments and industrial policies.
- Apply economic principles to optimize business decisions and processes.
- Develop critical thinking skills to navigate complex business scenarios.

Introduction

Business environment refers to all the factors and conditions which impact a business operation. The sum total of all the factors which bear a direct and indirect impact on business functioning is known as business environment. A firm in operation may be influenced by internal and external factors, which compel them to change their strategy, marketing efforts, distribution, human

resource, structure, product line or advertising, all because of the prevailing business environment. Therefore, business environment may be defined as the sum total of external and internal factors, both at micro and macro level, which bear a significant influence on its operation.

Learning Outcomes

- Gain a deep understanding of fundamental concepts in business environment and managerial economics.
- Analyze and evaluate various business environments and industrial policies.
- Apply economic principles to optimize business decisions and processes.
- Develop critical thinking skills to navigate complex business scenarios.

1.1 Nature of Business Environment

The nature of business environment is as follows:

1. Complex:

Business environment is full of complexity. Complexity in business environment can occur due to number of factors, sources, events and changes taking place across different times. Business environment is complex as it is difficult for firms to predict which underlying factors will hinder its operation.

2. Interdependence:

Interdependence in business environment signifies that each factor in business environment is dependent on many other factors. The sources and events in business rely on each other to impact the business environment. For instance, political environment can have direct or indirect impact on legal factors. The government philosophy and ideology can impact rules and

regulations of business operation. The economic conditions in one hand can impact the regulatory mechanism within a country.

3. Dynamic:

Business environment is constantly changing process. Business environment is dynamic as it keeps on changing in terms of technological improvement, shifts in consumer preferences or entry of new competition in the market. The various forces in the environment keep on changing from time to time thus making business dynamic and not static.

4. Inter-relatedness:

The different factors of business environment are co-related. For example, let us suppose that there is a change in the import-export policy with the coming of a new government. In this case, the coming of new government to power and change in the import/export policy are political and economic changes respectively. Thus, a change in one factor affects the other factor.

5. Impact:

Business environment has both long term and short term impact. Environment therefore has different effects on different firms in the same industry, for example, drugs.

6. Uncertainty:

Business environment is largely uncertain as it is very difficult to predict future happenings, especially when environment changes are taking place too frequently as in the case of information technology or fashion industries.

7. Relativity:

It is a relative concept since it differs from country to country and region to region. Political conditions in the USA, for example differ from those in China or Pakistan. Similarly, demand for sarees may be fairly high in India whereas it may be almost non-existent in France.

Significance of Business Environment

Some of the direct benefits of understanding the business environment are given below:

1. Customer Focus:

Environmental understanding makes the management sensitive to the changing needs and expectations of consumers. For example: Hindustan Lever and several other FMCG companies launched small sachets of shampoo and other products realizing the wishes of customers. This move helped the firms to increase sales.

2. Strategy Formulation:

Environmental monitoring provides relevant information about the business environment. Such information serves as the basis for strategy making. For example: ITC realized that there is a vast scope for growth in the travel and tourism industry in India and the government is keen to promote this industry because of its employment potential. With the help of this knowledge ITC planned new hotels both in India and abroad.

3. Public Image:

A business firm can improve its image by showing that it is sensitive to its environment and responsive to the aspirations of public. Leading firms like Reliance Industries, ICICI Bank and others have built good image by being sensitive and responsive to environmental forces. Environmental understanding enables business to be responsive to their environment.

4. Continuous learning:

Environmental analysis serves as broad based and ongoing education for business executives. It keeps them in touch with the changing scenario so that they are never caught unaware. With the help of environmental learning managers can react in an appropriate manner and thereby increase the success of their organizations.

5. Giving Direction for Growth:

The interaction with the environment leads opening up new frontiers of growth for the business firms. It enables the business to identify the areas for growth and expansion of their activities.

6. Change Agent:

Business leaders act as agents of change. They create a drive for change at the grass root level. In order to decide the direction and nature of change, the leaders needs to understand the aspirations of people and other environmental forces through environmental scanning. For example: contemporary environment requires prompt decision-making and power to people. Therefore, business leaders are increasingly delegating authority to empower their staff and to eliminate procedural delays.

CHECK YOUR PROGRESS

- a) What does the business environment include?

1.2 Micro and Macro level Environment

Every business is affected by a myriad of factors. In other words, an organization as such can never exist and operate “in a vacuum”. It is a part of a larger entity known as the business environment. In broad terms, this environment can be divided into two categories. The first one is the micro-environment. This category influences the functionality of a particular business itself. The latter one is the macro-environment which affects the operation of all existing

business entities out there. The two categories may be different, but both are essential to understand in order to truly see your business in its full context. You have to be knowledgeable about the business environment in order to be able to track and comprehend how various factors affect your company.

What is the micro-environment?

The micro-environment is basically the environment that has a direct impact on your business. It is related to the particular area where your company operates and can directly affect all of your business processes. In other words, it consists of all the factors that affect particularly your business. They have the ability to influence your daily proceedings and general performance of the company. Still, the effect that they have is not a long-lasting one. The micro-environment includes customers, suppliers, resellers, competitors, and the general public.

What is the macro-environment?

The macro-environment is more general - it is the environment in the economy itself. It has an effect on how all business groups operate, perform, make decisions, and form strategies simultaneously. It is quite dynamic, which means that a business has to constantly track its changes. It consists of external factors that the company itself doesn't control but is certainly affected by. The factors that make up the macro-environment are economic factors, demographic forces, technological factors, natural and physical forces, political and legal forces, and social and cultural forces.

CHECK YOUR PROGRESS

- b) What are micro-environment factors?
- c) What are macro-environment factors?
- d) Why is the business environment considered complex?
- e) How does interdependence affect the business environment?

1.3 Micro-environment factors:**Customers**

The kind of customer base that your company attracts, as well as the reasoning behind purchasing your product, are going to highly affect the way you create marketing campaigns. Your customers can be B2C, B2B, international, local, and so on.

Important factors related to customers are:

- Stability of demand
- Prospects of sale growth
- Relative profitability
- Intensity of competition

Suppliers

If a supplier of a particular product is the largest, or even the only one, they are certainly going to have a big influence on how successful your business is.

The suppliers are extremely important factors as:

- Key link in the value delivery process

- Insurance that your business has the necessary resources
- Essential determinants in terms of price increase or decrease

Resellers

If you decide to sell your product via a third party reseller, or middlemen such as wholesalers and retailers, then the success of your marketing is going to be highly dependent on them. If let's say, a certain retail seller has a strong reputation, it will pass on to your product.

As a link between you and the customer, they are important in terms of these factors:

- Promotion
- Sale
- Distribution
- Marketing
- Financial mediation

Competitors

Logically, every business that sells the same or a similar kind of product as you do is your competition on the market. So, their sale and marketing tactics matter to you a lot. You need to answer various questions, such as how their product and its price affects yours and how you can make use of that in order to gain an edge over them.

The three factors that matter in this case are:

- Desire competition
- Product form competition
- Brand competition

The general public

Of course, every business organization has in its best interest to appease to the general public. Every step that you take needs to be viewed from their perspective as well. It is extremely important how your actions affect others because their opinion can be the one thing that either pushes you towards success or pulls you down from the pedestal.

So, the general public is very important in terms of:

- Public opinion
- Media
- Environmental pollution

1.4 Macro-environment factors

Economic factors

Basically, the very environment of the economy can have an effect on two essential aspects – your company’s levels of production and the decision-making process of your customers. Some examples of economic factors affecting business:

- Interest rates
- Exchange rates
- Recession
- Inflation
- Taxes
- Demand / Supply

Demographic forces

Each and every chunk of the market is affected by universal demographic forces. These are age, education level, cultural characteristics, country and region, lifestyle, and so on. The crucial variables include:

- How income variables influence business
- Age variables that affect business
- Geographic Region Variables
- Education Level as a Variable

Technological factors

These factors are related to skills and ability that are implemented into production, as well as all the materials and technology that a particular product requires to be made. They are essential and can have a big impact on how well your business is running. It boils down to even the most basic factors, such as what kind of maintenance trolleys you use in order to preserve your tools and equipment for as long as you possibly can. Some of the most common technological factors are:

- Automation ▪ Internet connectivity
- 3D technology
- Speed/power of computer calculation
- Engine performance and efficiency
- Security in terms of cryptography
- Wireless charging

Natural and physical forces

Every business must also take into account the very planet and its resources. There are those that can be renewed, such as forests and agricultural products, and those that cannot, such as coal, minerals, oil, and the like. Both are strongly related to production. So, natural and physical forces can be:

- Climate change
- Pollution
- Weather
- Availability of both non-renewable and renewable resources
- Laws that regulate the environment
- Survival of particular biological species

Political and legal forces

The market develops according to the political and legal environment in various areas. This means that every business needs to be up to date with such forces worldwide in order to be able to make the right decisions. This generally includes legal factors such as:

- Copyright law
- Employment law
- Fraud law
- Discrimination law
- Health and Safety law
- Import/Export law

Social and cultural forces

Finally, it is crucial to understand that the product that you bring to the market can have a strong impact on society. For example, your production needs to eliminate every practice that is hazardous to society, and show that it is socially responsible. There is a wide variety of social and cultural factors, some of them being:

- Purchasing habits
- Level of education
- Religion and beliefs
- Consciousness about health issues
- Social classes
- Structure and size of a family
- Growth rate of the population
- Emigration and immigration rates
- Life expectancy rates and age distribution
- Different lifestyles

Both micro and macro factors have a strong influence on how successful your business is. Every decision that you make needs to take these two environments into consideration. Your marketing strategies have to be based on them as well, if you truly want them to be lucrative, and retain a reputable position on the market.

CHECK YOUR PROGRES

- f) What does it mean that the business environment is dynamic?
- g) What is the significance of understanding the business environment?
- h) How do economic factors influence business operations?
- i) What role do social and cultural forces play in the business environment?
- j) Why must businesses continually adapt their strategies?

1.5 Let us sum up

After reading this unit, you have gained insights into how the business environment consists of both internal and external factors that influence a company's operations, including micro factors (such as customers and suppliers) and macro factors (like economic and political conditions). This environment is marked by its complexity, dynamism, interdependence, and uncertainty, requiring businesses to adapt their strategies continually. Mastering these elements allows firms to effectively formulate strategies, improve customer relations, and enhance their public image while navigating the ever-evolving business landscape.

1.6 ANSWERS TO CHECK YOUR PROGRESS

- a) It includes all internal and external factors affecting a company's operations.
- b) Factors directly affecting a company, like customers and suppliers.
- c) Broad, general factors such as economic conditions and political stability.
- d) Due to the numerous, unpredictable factors and changes affecting it.
- e) Factors are interconnected, with changes in one area impacting others.
- f) It is constantly changing due to technological advancements and shifting consumer preferences.
- g) It helps firms create effective strategies, improve customer focus, and enhance public image.
- h) They affect production levels, customer decisions, and financial conditions.
- i) They impact purchasing habits, education levels, and societal norms.
- j) To remain competitive and responsive in the face of ongoing changes and uncertainties.

1.7 Model Questions

1. Discuss the nature of the business environment and explain how its complexity impacts a firm's strategic planning.
2. Analyze the interdependence of micro and macro-environmental factors in a business setting. Provide examples to illustrate how changes in one factor can influence others.
3. Evaluate the role of technological factors in shaping the business environment. How do technological advancements influence business operations and strategies?
4. Examine the significance of demographic forces in the business environment. How do factors such as age, education, and income levels impact business decisions and market strategies?
5. Assess the impact of political and legal forces on business operations. How do changes in laws and regulations affect business practices and strategic decisions?
6. Explain the importance of understanding both micro and macro-environmental factors for business success. How can firms use this understanding to navigate challenges and seize opportunities?

1.8 Suggested Books

- Morrison J, *The International Business Environment*, Palgrave
- Francis Cherunilam, *Business Environment*-Himalaya Publishing House, New Delhi
- Aswathappa, *Essentials of Business Environment*, Himalaya Publishing House, New Delhi

UNIT-II

INTRODUCTION TO INDUSTRIAL POLICY

TABLE OF CONTENT

Unit Objectives

Introduction

Learning Outcomes

2.1 Historical development of Industrial Policy, with emphasis on 1956 policy, IDRA, MRTP Act, FERA

2.2 Industrial Policy 1991

2.3 Planning in India

2.4 Industrial sickness- causes and remedies

2.5 Let us sum up

2.6 Answers to Check Your Progress

2.7 Model Question

2.8 Suggested Books

UNIT OBJECTIVES

After studying this unit, you will be able to:

- **Understanding Industrial Policy Evolution:** Gain insight into the trajectory of industrial policies since independence, discerning key shifts and their impact on economic development.
- **Emphasizing Planning and Management:** Recognize the pivotal role of effective planning and management in fostering the growth of diverse industries, contributing to overall economic advancement.
- **Economic Development Focus:** Appreciate the significance of industry-specific strategies in driving economic growth, fostering a nuanced understanding of their implications for national development.

INTRODUCTION

"Exploring the Evolution of Industrial Policy: Unraveling the journey of industrial policies since independence, highlighting pivotal shifts and their economic ramifications.

Highlighting the Importance of Planning and Management: Acknowledging the critical role of strategic planning and efficient management in nurturing diverse industries and propelling overall economic progress.

Focusing on Economic Development: Understanding the importance of industry-specific strategies in stimulating economic growth, fostering a nuanced perspective on their implications for national development."

LEARNING OUTCOMES

- Understanding Industrial Policy Evolution: Gain insight into the trajectory of industrial policies since independence, discerning key shifts and their impact on economic development.
- Emphasizing Planning and Management: Recognize the pivotal role of effective planning and management in fostering the growth of diverse industries, contributing to overall economic advancement.
- Economic Development Focus: Appreciate the significance of industry-specific strategies in driving economic growth, fostering a nuanced understanding of their implications for national development.

2.1 Industrial Policy of India

Meaning

- Government action to influence the ownership & structure of the industry and its performance. It takes the form of paying subsidies or providing finance in other ways, or of regulation.

- It includes procedures, principles (i.e., the philosophy of a given economy), policies, rules and regulations, incentives and punishments, the tariff policy, the labour policy, government's attitude towards foreign capital, etc.

The quest for industrial development started soon after independence in 1947. The Industrial Policy Resolution of 1948 defined the broad contours of the policy delineating the role of the State in industrial development both as an entrepreneur and authority. This was followed by comprehensive enactment of Industries (Development & Regulation) Act, 1951 (referred as IDR Act) that provides for the necessary framework for implementing the Industrial Policy and enables the Union Government to direct investment into desired channels of industrial activity inter alia through the mechanism of licensing keeping with national development objectives and goals.

The main objectives of the Industrial Policy of the Government are (i) to maintain a sustained growth in productivity;(ii) to enhance gainful employment;(iii) to achieve optimal utilisation of human resources; (iv) to attain international competitiveness; and (v) to transform India into a major partner and player in the global arena. To achieve these objectives, the Policy focus is on deregulating Indian industry; allowing freedom and flexibility to the industry in responding to market forces; and providing a policy regime that facilitates and fosters growth. Economic reforms initiated since 1991 envisages a significantly bigger role for private initiatives. The policy has been progressively liberalized over years to at present, as would be evident in subsequent paragraphs

Industrial Policy Reform

1. Industrial Policy 1948

This was the first Policy that was implemented after gaining independence. It ushered in a mixed economic model in the country. Existing industries in India were categorized into the following sectors –

- Strategic industries such as rail transport, atomic energy along with arms and ammunition

- Basic industries such as iron and steel, mineral oil, coal, etc.
- Controlled private sectors such as cement, paper, textile, etc.
- The private and cooperative sector

For the implementation of Policy resolutions, the Industries (Development and Regulation) Act, 1951 was passed.

2. Industrial Policy 1956

The Policy of 1956 led to an enormous expansion of the public sector to restrict private monopolies. Three schedules were laid out for the classification of industries –

- Schedule A – Included 17 industries that were entirely under the control of the State.
- Schedule B – Included 12 industries that had both public and private ownership.
- Schedule C – Included all other industries which did not fall within the ambit of the previous two categories.

3. Industrial Policy 1977

The Policy statement of 1977 had been highly criticized for having undertaken no clear measures for socio-economic development. The Policy's main emphasis had been, however, the propagation of cottage and small industries.

4. Industrial Policy 1980

This Policy focused on the promotion of economic federation and restoration of the Monopolies and Restrictive Trade Practices (MRTP) Act.

2.2 Industrial Policy 1991

The Industrial Policy of 1991 opened up India's economy to the world, in the backdrop of a severe economic crisis. It was this policy that led to an acceleration of economic growth in our country -

- The public sector, with the exceptions of railways and atomic energy, was opened up for the private sector.
- Industrial licensing was abolished barring hazardous chemicals industries, defense, aerospace, industrial explosives, cigarettes, and tobacco.
- Substantial government stakes were sold off from public sector enterprises.
- Foreign Direct investment as allowed.
- Amendment of the Monopolies and Restrictive Trade Practices (MRTP) Act.

There have been certain drawbacks in the Industrial Policies as well. Some of such criticisms include – stagnation of the manufacturing sector, labor displacement, selective investment flow, and general lack of incentives for enhancing efficiency, among others. As the economy of India stands today, there is a greater need for initiatives like Startup India and Make in India.

Industries (Development and Regulation) Act, 1951 (IDRA)

Purpose:

- To regulate the development and production of certain key industries in India.
- To ensure that these industries operate in a manner that is consistent with the overall economic development of the country.
- To prevent the concentration of economic power in the hands of a few.

Key Provisions:

- The government can declare any industry as a "scheduled industry" under the act. This gives the government the power to control the production, licensing, and expansion of such industries.
- The government can appoint a Development Council for each scheduled industry. The council's role is to advise the government on the development of the industry.
- The government can also control the prices of certain industrial products.

Current Status:

While IDRA remains in force, many of its provisions have been diluted over time due to economic reforms. Many industries have been delicensed, and the government's role in regulating them has been reduced.

CHECK YOUR PROGRESS

- a) What were the main objectives of the Industrial Policy of India since independence?
- b) Describe the key shift in industrial policy introduced by the 1991 Industrial Policy.

Monopolies and Restrictive Trade Practices Act, 1969 (MRTP Act)

Purpose:

- To prevent the concentration of economic power to the common detriment.
- To control monopolies and unfair trade practices.
- To promote competition and protect the interests of consumers.

Key Provisions:

The act defines a "dominant undertaking" as one that controls 25% or more of the market share in a particular industry.

Such undertakings are subject to certain restrictions, such as prior approval for mergers and acquisitions.

The act also prohibits certain restrictive trade practices, such as price fixing, market allocation, and resale price maintenance.

Current Status:

The MRTP Act has been repealed and replaced by the Competition Act, 2002. However, some of its provisions are still in force, such as those relating to monopolies.

Foreign Exchange Regulation Act, 1973 (FERA)

Purpose:

- To regulate the flow of foreign exchange in India.
- To prevent the misuse of foreign exchange.
- To conserve foreign exchange reserves.

Key Provisions:

The act required all foreign exchange transactions to be approved by the government.

It also restricted foreign investment in India.

Current Status:

FERA has been repealed and replaced by the Foreign Exchange Management Act, 1999 (FEMA). FEMA is a more liberal regime that allows for greater freedom in foreign exchange transactions and investment.

Planning in India

Planning has played a significant role in India's economic development since independence. It has helped the country achieve rapid economic growth, reduce poverty, and improve living standards. India adopted a centralized planning model with Five-Year Plans, outlining economic and social goals. The first plan focused on agriculture and rural development. Subsequent plans emphasized industrial development, infrastructure, and social welfare. 14 Five-Year Plans were implemented, each with different priorities and achievements. The Planning Commission oversaw the planning process and coordinated between different ministries.

CHECK YOUR PROGRESS

c) How did the Industrial Policy of 1956 impact the public sector in India?

Year	Plan	Key Focus	Achievements	Challenges
				Limited industrial growth, high dependence on foreign aid
1951-56	First Five Year Plan	Agriculture and rural development	Increased food production, improved irrigation	
	Second Five Year Plan		Establishment of steel plants, expansion of power generation	
1956-61	Five Year Plan	Heavy industries and infrastructure		Inflation, foreign exchange crisis
		Balanced development with focus on agriculture and industry	Increased food production, development of basic industries	
1961-66	Third Five Year Plan			Indo-China war, droughts
		Economic slowdown due to wars and droughts	Focus on agriculture and family planning	
1966-69	Plan Holidays			Stagnant economic growth
			Increased agricultural productivity, import substitution	
1969-74	Fourth Five Year Plan	Green Revolution and self-reliance		Oil crisis, inflation
			Minimum Needs Programme launched	
1974-78	Fifth Five Year Plan	Poverty alleviation and social welfare		Slow economic growth, political instability
1978-80	Rolling Plan	Short-term plan due to political instability	Continued focus on poverty alleviation	Inflation, lack of direction
1980-85	Sixth Five Year Plan	Emphasis on technology and modernization	Growth in electronics, telecommunications	Fiscal deficit, resource constraints
		Human resource development and environmental protection		
1985-90	Seventh Five Year Plan		Focus on education, healthcare, environment	High inflation, trade deficit
1990-92	Annual Plans	Economic liberalization and structural reforms	Balance of payments crisis, recession	

Market-oriented reforms				
1992-97	Eighth Five Year Plan	and economic liberalization	Continued reforms, growth in IT and services	Inflation, social unrest
1997-2002	Ninth Five Year Plan	Social development and inclusive growth	Poverty reduction, employment generation	Slowdown in agriculture, fiscal deficit
2002-07	Tenth Five Year Plan	Faster and inclusive growth	High economic growth, increased FDI	Rising inflation, regional imbalances
Eleventh				
2007-12	Five Year Plan	Inclusive growth and social justice	Focus on education, health, rural development	Global financial crisis, inflation
Twelfth				
2012-17	Five Year Plan	Rapid and inclusive growth	Sustainable development, environmental protection	Economic slowdown, political instability

Objectives of Planning in India:

Rapid Economic Growth: Achieve sustained economic growth to increase national income and per capita income.

Social Justice: Reduce poverty and inequality, promote social welfare, and provide basic necessities for all citizens.

Self-reliance: Reduce dependence on foreign aid and develop domestic capabilities in key sectors.

Balanced Regional Development: Ensure equitable development across different regions of the country.

Modernization: Modernize the economy through technological advancements and industrial development.

Achievements of Planning:

India achieved impressive economic growth averaging around 5.7% per year since independence.

Poverty has been significantly reduced, with the poverty rate declining from 55% in 1973 to 22% in 2011.

Life expectancy has increased from 42 years in 1951 to 69 years in 2021.

Literacy rates have improved from 18.3% in 1951 to 74.04% in 2011.

India has become a major global player in various industries, including IT, pharmaceuticals, and automobiles.

Challenges and Criticisms:

Planning has been criticized for being overly centralized and inflexible.

Bureaucratic hurdles and corruption have hampered effective implementation.

Lack of focus on environmental sustainability has led to environmental degradation.

Regional disparities and social inequalities persist.

Small Scale Industrial Policy 1991

Prior to 1991, the Indian economy was characterized by extensive government regulation and control, including a complex licensing system for industrial activity. This system hampered the growth of the small-scale industries (SSIs) sector, which was often seen as inefficient and lacking in technological sophistication.

Objectives of the SSIP 1991:

Deregulation: Abolish industrial licensing requirements for most SSI units, except for a few specified industries related to safety, security, and the environment.

Promotion of investment: Increase investment in the SSI sector by providing financial incentives, such as tax concessions and easier access to credit.

Technological upgradation: Encourage the adoption of modern technology by SSIs through various assistance programs.

Enhancement of competitiveness: Improve the competitiveness of SSIs by facilitating access to raw materials, marketing support, and infrastructure facilities.

Employment generation: Promote employment generation by encouraging the growth of the SSI sector, which is more labor-intensive than large-scale industries.

Key Features of the SSIP 1991:

Investment ceiling: The investment ceiling for SSIs was raised from Rs. 25 lakhs to Rs. 50 lakhs (later revised to Rs. 1 crore) for plant and machinery.

Automatic approval: Most SSI units could be set up without prior government approval, except for those in reserved industries.

Reservation of products: A number of products were reserved for exclusive production by SSIs, providing them with a protected market.

Financial incentives: Various financial incentives were introduced, such as tax concessions, concessional interest rates on loans, and easier access to working capital.

Technological upgradation: The government established several programs to provide technological assistance to SSIs, such as technology development centers and industrial estates.

Marketing support: The government set up various marketing support programs to help SSIs reach out to a wider market.

Impact of the SSIP 1991:

The SSIP 1991 is widely credited with playing a significant role in the growth of the Indian SSI sector. The policy led to a surge in investment, employment, and output in the sector. The number of SSI units increased from around 350,000 in 1991 to over 8 million in 2015. The sector's contribution to GDP also increased significantly, from around 5% in 1991 to over 25% in 2015.

However, the SSIP 1991 has also been criticized for some shortcomings, such as:

Benefits being concentrated in certain regions and industries: The benefits of the policy may not have been evenly distributed across all regions and industries.

Lack of access to finance: Many SSIs still face difficulties in accessing finance, despite the various government initiatives.

Competition from large industries: SSIs may face increasing competition from large industries, particularly with the liberalization of the Indian economy.

Overall, the SSIP 1991 is considered a landmark policy that has had a significant positive impact on the growth of the Indian SSI sector. However, there are still some challenges that need to be addressed to ensure that the sector continues to thrive.

2.3 Future of Planning: NITI Aayog (2015-present)

In 2015, NITI Aayog (National Institution for Transforming India) replaced the Planning Commission. NITI Aayog is a think tank that provides strategic advice to the government. It focuses on fostering cooperative federalism and promoting bottom-up planning. NITI Aayog has launched several initiatives, such as Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Digital India, to address various development challenges. NITI Aayog's focus on cooperative federalism and bottom-up planning is expected to improve planning effectiveness. Digital technologies are being used to improve data collection, monitoring, and implementation. Increasing focus on environmental sustainability is crucial for long-term development. Addressing regional disparities and social inequalities remains a major challenge. Overall, planning has played a crucial role in India's development journey. While there are challenges to overcome, continuing to adapt and improve the planning process will be essential for achieving inclusive and sustainable development in the future.

2.4 Industrial sickness

Industrial sickness is a term used to describe a situation where an industrial unit is unable to generate enough revenue to cover its costs and meet its financial obligations. There are a number of factors that can contribute to industrial sickness, which can be broadly categorized into internal and external factors.

Internal factors

Financial mismanagement: This can include poor budgeting, over-leveraging, and inadequate inventory control.

Operational inefficiencies: These can include outdated technology, poor production processes, and a lack of skilled labor.

Marketing problems: This can include a weak brand, poor product quality, and ineffective sales strategies.

Management problems: This can include poor decision-making, a lack of communication, and conflict between management and employees.

External factors

Economic recession: This can lead to a decline in demand for the company's products or services.

Government policies: Changes in government policies, such as tax increases or changes in regulations can have a negative impact on businesses.

Competition: Increased competition from domestic or foreign rivals can make it difficult for businesses to maintain their market share.

Natural disasters: Events such as earthquakes, floods, or fires can damage property and disrupt production.

Remedies for industrial sickness

There are a number of steps that can be taken to address industrial sickness, depending on the specific causes of the problem. Some common remedies include:

Financial restructuring: This may involve renegotiating debt with creditors, selling assets, or raising new capital.

Operational improvements: This may involve investing in new technology, improving production processes, and training employees.

Marketing initiatives: This may involve developing new products or services, improving branding, and launching new marketing campaigns.

Management changes: This may involve bringing in new managers, improving communication, and resolving conflict.

In some cases, it may be necessary to close down a sick unit if it is not possible to turn it around. However, there are a number of government and private sector initiatives that can help businesses to avoid or overcome industrial sickness. It is important to note that the causes and remedies of industrial sickness can vary depending on the specific industry, country, and company. The information provided here is a general overview and should not be taken as a substitute for professional advice.

CHECK YOUR PROGRESS

- d) What role did the Planning Commission play in India's economic planning?
- e) What was the primary focus of the Small Scale Industrial Policy (SSIP) of 1991?
- f) What were the main criticisms of the Industrial Policy of 1977?
- g) What is the purpose of the Industries (Development and Regulation) Act, 1951 (IDRA)?
- h) What are some of the challenges faced in India's planning process?

2.5 Let us sum up

The evolution of industrial policy in India since independence reflects significant shifts in economic strategy, driven by changing national goals and global dynamics. Early policies focused on state-led industrialization and regulation, such as the 1948 and 1956 policies that emphasized public sector expansion and control. By 1991, in response to an economic crisis, reforms introduced deregulation, privatization, and global integration, which accelerated growth and modernized the economy. Effective planning and management have been crucial in this evolution, with successive Five-Year Plans guiding economic development through varied objectives like poverty alleviation, technological advancement, and regional balance. Industry-specific strategies, like those for small-scale industries introduced in 1991, highlight the importance of targeted approaches in stimulating growth and addressing challenges. Understanding these policies and their impacts is essential for appreciating their role in shaping India's economic landscape.

2.6 ANSWERS TO CHECK YOUR PROGRESS

- a) The main objectives include maintaining sustained productivity growth, enhancing gainful employment, optimizing human resource utilization, achieving international competitiveness, and transforming India into a significant global player.

- b) The 1991 Industrial Policy marked a major shift towards liberalization by opening up the public sector to private investment, abolishing most industrial licensing, allowing Foreign Direct Investment (FDI), and privatizing many public sector enterprises.
- c) The Industrial Policy of 1956 led to a substantial expansion of the public sector by classifying industries into three schedules, with Schedule A including industries under full state control, Schedule B with both public and private ownership, and Schedule C including all other industries.
- d) The Planning Commission was responsible for formulating and overseeing Five-Year Plans that outlined economic and social goals, coordinated between different ministries, and aimed to achieve rapid economic growth, social justice, and balanced regional development.
- e) The SSIP of 1991 focused on deregulation by removing licensing requirements for most SSI units, promoting investment through financial incentives, encouraging technological upgradation, and improving competitiveness and employment generation within the SSI sector.
- f) The Industrial Policy of 1977 was criticized for lacking clear measures for socio-economic development and having an overemphasis on the propagation of cottage and small industries without addressing broader industrial issues.
- g) The IDRA aims to regulate the development and production of certain key industries, prevent concentration of economic power, and ensure industries operate in alignment with national economic development goals.
- h) Challenges include being overly centralized and inflexible, dealing with bureaucratic hurdles and corruption, lack of focus on environmental sustainability, and persistent regional disparities and social inequalities.

2.7 Model Question

1. Exploring the Evolution of Industrial Policy in India:

Analyze the trajectory of industrial policies in India from independence to the present day. Discuss how pivotal shifts in these policies, particularly those introduced in 1948, 1956, 1977, 1980, and 1991, have influenced India's economic development. What have been the key economic ramifications of these shifts, and how have they shaped India's industrial landscape?

2. The Role of Strategic Planning and Management in Economic Development:

Examine the significance of strategic planning and efficient management in fostering industrial growth and advancing economic progress. How have planning models, including the Five-Year Plans and the initiatives by NITI Aayog, contributed to the development of various industries in India? Discuss the impact of planning and management on both the growth of small-scale industries and the overall economic trajectory of the country.

3. Evaluating the Impact of Industrial Policy Reforms on Economic Growth:

Critically assess the impact of industrial policy reforms introduced in 1991 on India's economic growth. How did the changes in policy, such as deregulation, privatization, and foreign investment facilitation, influence the industrial sector and broader economic development? Consider both the positive outcomes and the challenges that have emerged from these reforms.

4. The Interplay Between Planning and Industrial Policy in India:

Discuss the interaction between planning and industrial policy in India. How have the objectives and achievements of various Five-Year Plans aligned with or influenced the goals of industrial policies over the years? Evaluate how planning has shaped industrial policy and vice versa, and how this interplay has affected the overall economic development of the country.

5. Assessing the Impact of the Small Scale Industrial Policy (SSIP) of 1991:

Analyze the objectives, features, and impact of the Small Scale Industrial Policy (SSIP) of 1991. How did the policy aim to support small-scale industries, and what were its key features? Discuss the successes and limitations of the policy in terms of growth, competitiveness, and regional development of small-scale industries in India.

6.Industrial Sickness: Causes, Remedies, and Policy Implications:

Investigate the phenomenon of industrial sickness in India. What are the primary internal and external factors contributing to industrial sickness? Evaluate the remedies and policy measures that have been proposed or implemented to address industrial sickness. Discuss the effectiveness of these measures and their implications for industrial policy and economic development in India.

2.8 Suggested Books

- MISHRA AND PURI, Indian Economy, Himalaya Publishing House, New Delhi
- Business Environment Raj Aggarwal Excel Books, Delhi

UNIT III

INTRODUCTION TO MANAGERIAL ECONOMICS

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Unit Objectives

After studying this unit, you will be able to:

- Explain the nature and scope of managerial economics
- Identify the role of economics in decision making
- Discuss the concepts of economic analysis

Learning Outcome:

The unit will facilitate the students to:

- Comprehend the role and scope of managerial economics in business.
- Understand the basic economic problems and how different economies address them.
- understand Economic Principles Relevant to Managerial Decisions.

Introduction

Countless firms have used the well-established principles of managerial economics to improve their profitability. Managerial economics draws on economic analysis for such concepts as cost, demand, profit and competition. It attempts to bridge the gap between the purely analytical problems that intrigue many economic theorists and the day-to-day decisions that managers must face. It now offers powerful tools and approaches for managerial policy-making. It will be relevant to present here several examples illustrating the problems that managerial economics can help to solve. These also explain how managerial economics is an integral part of business. Demand, supply, cost, production, market, competition, price, etc. are important concepts in real business decisions.

3.1 Meaning and Definition of Managerial Economics

Managerial Economics is a discipline that combines economic theory with managerial practice. It tries to bridge the gap between the problems of logic that intrigue economic theorists and the problems of policy that plague practical managers. The subject offers powerful tools and techniques for managerial policy-making. An integration of economic theory and tools of decision sciences works successfully in optimal decision-making in face

of constraints. A study of managerial economics enriches the analytical skills, helps in the logical structuring of problems, and provides adequate solution to the economic problems.

To quote Mansfield, "Managerial Economics is concerned with the application of economic concepts and economic analysis to the problems of formulating rational managerial decisions."

According to McNair and Meriam, "Managerial economics is the use of economic modes of thought to analyse business situations."

"Managerial Economics is concerned with the application of economic principles and methodologies to the decision-making process within the firm or organisation under the conditions of uncertainty," says Prof. Evan J Douglas.

Spencer and Siegelman define it as "The integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management."

According to Hailstones and Rothwel, "Managerial economics is the application of economic theory and analysis to practice of business firms and other institutions."

3.2 Nature of Managerial Economics

A close interrelationship between management and economics has led to the development of managerial economics. Management is the guidance, leadership and control of the efforts of a group of people towards some common objective. It does tell us about the purpose or function of management but it tells us precious little about the nature of the management process.

Koontz and O'Donnell define management as the creation and maintenance of an internal environment in an enterprise where individuals, working together in groups, can perform efficiently and effectively towards the attainment of group goals. Thus, management is:

1. Coordination
2. An activity or an ongoing process
3. A purposive process
4. An art of getting things done by other people.

On the other hand, economics, in its broadest sense, is what economists do. Economists are primarily engaged in analysing and providing answers to manifestations of the most fundamental problem, scarcity. Scarcity of resources results from two fundamental facts of life:

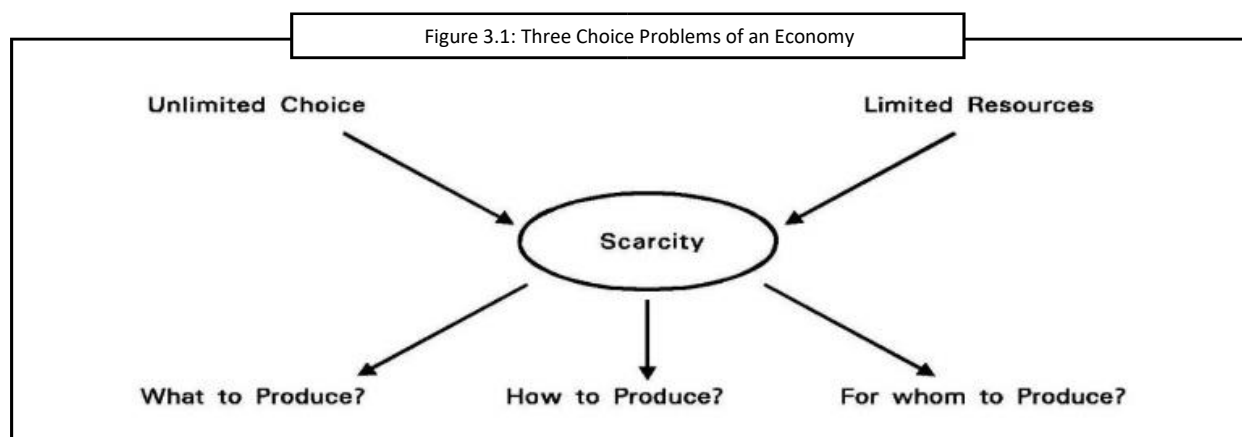
1. Human wants are virtually unlimited and insatiable, and

2. Economic resources to satisfy these human demands are limited.

Thus, we cannot have everything we want; we must make choices broadly between three areas:

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

These three choice problems have become the three central problems of an economy as shown in Figure 1.1 Science of economics has developed several concepts and analytical tools to deal with the problem of allocation of scarce resources among competing ends.



Managerial economics, when viewed in this way, may be taken as economics applied to "problems of choice" or alternatives and allocation of scarce resources by the firms. Thus managerial economics is the study of allocation of resources available to a firm or a unit of management among the activities of that unit.

Did u know? What is positive and normative analysis in economics?

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.

Caselet Importance of Economics in our Life

Economics is the study of how finite resources are consumed by demand, according to the costs imposed by their supply in relation to that demand. In other words, economics tells us that a freeze in Florida that damages the orange crop will cause the price of orange juice to change and how the price will modify demand over time.

History

Modern economic theory is said to have originated in "The Wealth of Nations," a book written by Scottish scholar Adam Smith in 1776. The theory holds that rational self interest pursued by individuals and businesses in a free market society leads to optimal economic conditions. Significance

The study of economics helps formulate an understanding of the effects of financial actions and reactions by individuals and institutions. This understanding allows the projection of future economic conditions based on current indications.

Misconceptions

An understanding of economics assists governments in managing macroeconomic conditions such as limiting a recession by inducing recovery. However, economic theory is not foolproof because it is a social science based on the interplay between culture and money. Economic effects change as cultural customs change.

Source: www.ehow.com/facts_5899581_importance-economics-life.html

3.3 Scope of Managerial Economics

Managerial economics is concerned with the application of economic concepts and analysis to the problem of formulating rational managerial 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 programming, 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.
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 managerial 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.

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?

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 guide 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

CHECK YOUR PROGRESS

A. Fill-in-the-Blank Questions

1. Managerial Economics is the integration of economic theory with _____ practice.
2. Scarcity of resources results from two fundamental facts of life: Human wants are virtually unlimited and insatiable, and economic resources to satisfy these human demands are _____.
3. The decision to automate clerical activities using PC network results in a more _____-intensive mode of production.
4. An analysis of _____ explains how price and output decisions are taken under different market forms.

B. State whether the given statements are True/False.

1. Managerial Economics attempts to bridge the gap between the analytical problems that intrigue economic theorists and the day-to-day decisions that managers must face.
2. According to McNair and Meriam, Managerial Economics is the use of economic principles and methodologies to the decision-making process within the firm or organization under conditions of uncertainty.
3. Inventory problems involve decisions about holding optimal levels of stocks of raw materials and finished goods over a period.
4. Positive economic analysis is based on value judgment.

making prudent decisions.

3.4 Economic Principles Relevant to Managerial Decisions

Key economic principles that are relevant to managerial decisions are discussed in the following sub-sections.

3.4.1 Division of Labour

I put the division of labor first mainly because Adam Smith did argue that division of labor is the key cause of improving standards of living. Modern economics doesn't do much with the concept of division of labor, but two closely related concepts are important:

1. Returns to Scale: Returns to scale may be increasing, constant or decreasing. Increasing returns to scale is the case that leads to special results, and division of labor is one cause (arguably the main cause) of increasing returns to scale.
2. Virtuous Circles in Economic Growth: For Smith, a major consequence of division of labor and resulting increasing productivity was a "virtuous circle" of continuing growth. Modern "virtuous circle" theories have more dimensions, but division of labor and increasing returns to scale are among them.

3.4.2 Opportunity Cost

The idea is that anything you must give up in order to carry out a particular decision is a cost of that decision. This concept is applied again and again throughout modern economics.

1. Scarcity: According to modern economics, scarcity exists whenever there is an opportunity cost, that is, where-ever a meaningful choice has to be made.
2. Production Possibility Frontier: The production possibility frontier is the diagrammatic representation of scarcity in production.
3. Comparative Advantage: A very important principle in itself and a key to understanding of international trade the principle of comparative advantage is at the same time an application of the opportunity cost principle to trade.
4. Discounting of Investment Returns: Another application of the opportunity cost principle that is very important in itself, this one tells us how to handle opportunities that come at different times.

3.4.3 Equimarginal Principle

This is the diagnostic principle for economic efficiency. It has wide applications in modern economics. Two of the most important are key principles of economics in themselves:

1. The Fundamental Principle of Microeconomics: This principle describes the circumstances under which market outcomes are efficient.
2. The Externality Principle: It describes some important circumstances in which the markets are not efficient.
3. Marginal Analysis: It is also an important principle in itself and very widely applied in modern economics. There is no major topic in microeconomics that does not apply marginal analysis and opportunity cost.

3.4.4 Market Equilibrium

The market equilibrium model could be broken down into several principles — the definitions of supply, demand, quantity supplied and demanded and equilibrium, at least — but these all complement one another so strongly that there is not much profit in taking them separately. However, there are many applications and at least four important subsidiary principles:

1. Elasticity and Revenue: These ideas are a key to understanding how market changes transform society.
2. The Entry Principle: This tells us that, when entry into a field of activity is free, profits (beyond opportunity costs) will be eliminated by increasing competition. This has a somewhat different significance depending on whether competition is “perfect” or monopolistic.
3. Cobweb Adjustment: This might give the explanations when the market does not move smoothly to equilibrium, but overshoots.
4. Competition vs. Monopoly: Why economists tend to think highly of competition, and lowly of monopoly.

3.4.5 Diminishing Returns

Perhaps the best-known of major economic principles, the Principle of Diminishing Returns is much more reliable in short-run than in long-run applications, so the Long Run/Short Run dichotomy is an important subsidiary principle. Modern economists think of diminishing returns mainly in marginal terms, so marginal analysis and the equimarginal principle are closely associated.

3.4.6 Game Equilibrium

Game theory allows strategy to be part of the story. One result is that we have to allow for several kinds of equilibriums.

1. Non-cooperative equilibrium
 - (a) Prisoners’ Dilemma (dominant strategy) equilibrium
 - (b) Nash (best response) equilibrium, (but not all Nash equilibrium are dominant strategy equilibrium),
2. Cooperative equilibrium
3. Oligopoly

3.4.7 Measurement Principles

Economics is multidimensional, and that creates some difficulties in measuring things like production, incomes, and price levels. Some of the problems can be solved more or less fully.

1. Value Added and Double Counting: One for which we have a pretty complete solution is the problem of double counting: the solution is, use value added.
2. “Real” Values and Index Numbers: Since we measure production and related quantities in dollar terms, we have to correct for inflation. Index numbers are a pretty good workable solution, but there are some problems and criticisms.
3. Measurement of Inequality: Another issue is that the “average income” may not mean very much, because nobody is average and income is unequally distributed. Even if we cannot correct for that we can get a rough measure of the relative inequality and see where it is going.

3.4.8 Medium of Exchange

Money is whatever is generally acceptable as a medium of exchange. That means a bank, or similar institution, can literally create money, so long as people trust the bank enough to accept its paper as a medium of exchange. We might call this magical fact the Fiduciary Principle.

3.4.9 Income-Expenditure Equilibrium

Like the market equilibrium principle, but even more so, this model pulls together a number of subsidiary principles that complement one another and together constitute the “Keynesian” theory of aggregate demand. The implications of this theory are less controversial than the word “Keynesian” is — controversy has to do more with the details than the applications. Among the subsidiary principles are

1. Coordination Failure
2. The income-consumption relationship
3. The Multiplier
4. Unplanned inventory investment
5. Fiscal Policy
6. The Marginal Efficiency of Investment
7. The influence of money on interest
8. Real Money Balances
9. Monetary Policy

3.4.10 Surprise Principle

People respond differently to the same stimuli if the stimuli come as a surprise than they would if the stimuli do not come as a surprise. This new economic principle plays the key role with respect to aggregate supply that “Income-Expenditure Equilibrium” plays with respect to aggregate demand.

Rational Expectations: People don't want too many unpleasant surprises. If they use the information available to them efficiently, then they won't be surprised in the same way very often. This can lead to: (a) Policy ineffectiveness

(b) Permanence

(c) Path Dependence

3.5 Relationship of Managerial Economics with Decision Sciences

Managerial eco helps the managers in taking various strategic decision. 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.

Scope of economics expands to the frontiers of big companies, both- Indian and International. Some of the real-world examples are discussed below:

Example: 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.

ICI Paints and Market Leadership: ICI paints, which contributes 43 per cent to ICI Limited’s 850 crores turnover, has decided to gun for number one position in the Indian paints industry. Ranking third currently, after Asian Paints and GoodlassNerolac, it has launched a spate of activities that emanate from a new, three-pronged strategy spearheaded by its new chief executive, D Bhatnagar (May 98).

The three-pronged strategy encompasses expanding reach by revamping strategy network, making marketing strategy more consumer friendly and taking initiatives in the supply chain to ensure reach and efficiency.

The decision of the strategy, however, clearly shows how the knowledge of micro economics and its concepts like supply, competition, etc., have been used.

Siemens and “MOST”: The storm clouds of the industrial slowdown have hit Siemens so hard that for the first time in its history, the company went deep into the red. Stunned by this, the German parent has chalked out a four-point rectification programme code named MOST (Maynards Operation Sequence Technique). The most important cause of the flight of Siemens has been a weak domestic demand and a severe cost-push effect on the internal front as a result of fast growth. The most important component of the rectification programme is cost reduction and improving cost structure, productivity and quality. Needless to say that cost is an important concept dealt with in detail in micro economics.

Telco and Competition: The gloomier picture of Telco can be explained in terms of concepts of micro economics integrated with other disciplines – high costs, piling inventories, a market slowdown, low demand and competition. The move of Telco to go in for automobiles has come as a result of slowdown in performance. The management admits that it is time to

cut down costs severely. Similarly, Telco is gearing itself for the imminent threat of competition in the truck segment (10-tonne). The company has made this segment virtually its own with a cost advantage and introducing measures for cost control.

Performance of Multinationals: The scope of micro economics is wide. Detailed studies and evaluation can be made using it. For example, a study conducted by The Economic Times Research Bureau of 29 MNCs for the year ended June 97 says, “Increasing costs and growing competition have squeezed margins of multinational firms in India, despite an overall increase in sales volumes”. Interestingly, last year’s (1997) first half saw bottom lines of most Indian corporates reeling under increasing costs, higher interest rates and declining demand.

Check your process

What is the division of labor and why is it important in economics?

How does the concept of opportunity cost affect decision-making in economics?

3.6 Central Problems of an Economy

Every economy faces some problems. These problems are associated with growth, business cycles, unemployment and inflation. The macroeconomic theory is designed to explain how supply and demand in the aggregate interact to concern with these four problems. Economists these very important national problems as macroeconomic problems — that is, as problems that could not be understood or solved without an understanding of the workings of the economic system as a whole. The four distinctively macroeconomic problems are:

1. Recession
2. Unemployment
3. Inflation
4. Economic Growth or Stagnation

3.6.1 Recessions, Depressions and Economic Fluctuations

The event that created modern macroeconomics was called "the Great Depression," but the general term for decreasing national production, in modern economics, is a recession.

CautionA recession is defined as a period of two or more successive quarters of decreasing production. Production is measured by a number of variables. Real Gross Domestic Product is one important measure. We will focus mainly on it.

But why do economists regard a recession as a problem?

It is not self-evident that a drop in production is a bad thing. For example, it might be that people want to enjoy more leisure, and spend less time producing goods and services. If production dropped for that reason, we would have no reason to think of it as an economic problem.

But, in some periods of recession, we have evidence that this was not what happened. In many recession periods, businesses that announced they were hiring had long lines of people who wanted to apply, with many more people than they could hire. This suggests that the people standing in line for a job had more leisure than they wanted, and would have preferred jobs and income to buy more goods and services. In the 1930's, some people sold apples or pencils in the street to get a little income, typically much less than they would have had in their old jobs. Again, this suggests that people had too much leisure and would have preferred more work and income. If this is so, then it seems that something was going wrong. In different terms, it seemed that the recession had caused unemployment.

Another possibility is that production might drop because a war or disaster had destroyed factories and other capital goods. But, in 1933, it seems very unlikely that the productive capacity of the economy could have dropped by 30%. There had been no war. And in fact, factories had been closed that could have been reopened and put to work, at the same time as many people were looking for work. Perhaps these circumstances show why the recession is regarded as a major economic problem.

Did u know? In which year "The Great Depression" occurred? It was in 1930.

3.6.2 Unemployment

Our second macroeconomic problem is unemployment. This problem is highly correlated with recession, but is distinct, and we need to look at it in its own terms. Unemployment occurs when a person is available to work and currently seeking work, but the person is without work. The prevalence of unemployment is usually measured using the unemployment rate, which is defined as the percentage of those in the labor force who are unemployed.

Economists distinguish between various types of unemployment. For example, cyclical, frictional, structural and classical, seasonal, hardcore and hidden. Real-world unemployment may combine different types. The magnitude of each of these is difficult to measure, partly because they overlap.

Unemployment is a status in which individuals are without job and are seeking a job. It is one of the most pressing problems of any economy especially the underdeveloped ones. This has macroeconomic implications too some of which are discussed below:

1. **Reduction in the Output:** The unemployed workforce could be utilized for the production of goods and services. Since they are not doing so, the economy is losing out on its output.

2. **Reduction in Tax Revenue:** Since income tax is an important part of the revenue for the government. The unemployed are unable to earn, the government loses out on the income tax revenue.
3. **Rise in the Government Expenditure:** The government has to give unemployment insurance benefits to the claimants. Hence the government will lose from both sides in terms of unemployment benefits and loss of tax revenue.

3.6.3 Inflation

In economics, inflation is a rise in the general level of prices of goods and services in an economy over a period of time.

A rising price level — inflation — has the following disadvantages:

1. It creates uncertainty, in that people do not know what the money they earn today will buy tomorrow.
2. Uncertainty, in turn, discourages productive activity, saving and investing.
3. Inflation reduces the competitiveness of the country in international trade. If this is not offset by a devaluation of the national currency against other currencies, it makes the country's exports less attractive, and makes imports into the country more attractive, which in turn tends to create unbalance in trade.
4. Inflation is a hidden tax on "nominal balances." That is, people who hold bonds and bank accounts in dollars lose the value of those accounts when the price level rises, just as if their money had been taxed away.
5. The inflation tax is capricious — some lose by it and some do not without any good economic reason.
6. As the purchasing power of the monetary unit becomes less predictable, people resort to other means to carry out their business, means which use up resources and are inefficient.

3.7 Summary

- Managerial Economics combines economic theory with managerial practice.
-
- The subject offers powerful tools and techniques for managerial policy-making.
- A close interrelationship between management and economics has led to the development of managerial economics.
- Managerial economics, may be taken as economics applied to "problems of choice" or alternatives and allocation of scarce resources by the firms.

Managerial economics covers the four groups of problem essential in both decision making and forward planning: Resource allocation, Inventory and queuing problem, Pricing problems and Investment problems.

- A firm applies principles of economics to answer these questions: What to produce and how much to produce? How to produce? For whom to produce?
-
- Every economy faces some problems. These problems are associated with growth, business cycles, unemployment and inflation.
- A recession is defined as a period of two or more successive quarters of decreasing production.
-
- Unemployment occurs when a person is available to work and currently seeking work, but the person is without work.

A rising price level means inflation. It has many disadvantages: uncertainty, discourage productive activity, inefficient use of resources etc.

Stagnation is a serious problem and a cause of other problems in an economy.

3.8 Keywords

Inflation: It is a rise in the general level of prices of goods and services in an economy over a period of time.

Macroeconomics: It is study to economy as whole.

Microeconomics: It is concerned with the study of individuals firm or unit.

Recession: It is defined as a period of two or more successive quarters of decreasing production.

Stagnation: It is a period of many years of slow growth of gross domestic product, in which the growth is, on the average, slower than the potential growth in the economy.

3.9 LETS SUM UP

this unit has provided a comprehensive overview of managerial economics, highlighting its nature, scope, and importance. You have gained insights into both micro and macro-level analyses, understanding how they impact economic decision-making. The concepts of static and dynamic analysis have been explored, revealing how they influence economic models and predictions. Additionally, you have learned about demand and supply analysis, including the methods used for forecasting. Finally, the unit has covered the determinants of demand elasticity, explaining how various factors affect consumer responsiveness to price changes.

CHECK YOUR PROGRESS

1. What is managerial economics?
2. What are the main objectives of managerial economics?
3. What is the difference between micro and macro-level analysis in managerial economics?
4. What is static analysis in managerial economics?
5. How does dynamic analysis differ from static analysis?
6. What is demand and supply analysis?
7. What methods are used for forecasting in managerial economics?
8. What are the determinants of demand elasticity?
9. Why is understanding demand elasticity important for businesses?
10. How does managerial economics contribute to resource allocation?

3.10 Modal Question For Practice :

(I) choose the correct option.

1. What does managerial economics primarily focus on?

- A) Historical economic trends
- B) The allocation of resources and decision-making
- C) Government policies
- D) Global economic theories

2. Which level of analysis in managerial economics focuses on individual units, such as firms and consumers?

- A) Macro-level
- B) Micro-level
- C) Global-level
- D) Sectoral-level

3. What does static analysis examine?

- A) Long-term changes
- B) Short-term equilibrium
- C) Historical data
- D) Future predictions

4. What is dynamic analysis concerned with?

- A) Market equilibrium
- B) Long-term changes over time
- C) Historical performance
- D) Short-term data

5. Which method is commonly used for forecasting in managerial economics?

- A) Regression analysis
- B) Historical data analysis

- C) Comparative analysis

- D) Descriptive statistics

6. What is demand elasticity?

- A) The measure of how supply changes with price

- B) The responsiveness of demand to price changes

- C) The measure of how supply responds to income changes

- D) The sensitivity of supply to technology changes

7. Which of the following is a determinant of demand elasticity?

- A) Income levels

- B) Prices of related goods

- C) Consumer preferences

- D) All of the above

8. How does managerial economics aid in resource allocation?

- A) By predicting future trends

- B) By analyzing market structures

- C) By making optimal decisions based on economic analysis

- D) By setting government policies

9. What is the main focus of demand and supply analysis?

- A) Understanding consumer behavior

- B) Determining market equilibrium prices and quantities

- C) Analyzing historical market data

- D) Forecasting future market trends

10. What role does managerial economics play in decision-making?

- A) It provides a historical perspective
- B) It assists in optimizing resource use and decision-making
- C) It sets government regulations
- D) It focuses on global economic theories

(II) . State whether true or false

1. Managerial economics exclusively deals with macroeconomic factors.
2. Micro-level analysis in managerial economics focuses on individual economic units.
3. Static analysis examines long-term changes in the economy.
4. Dynamic analysis looks at short-term equilibrium.
5. Regression analysis is not a method used for forecasting in managerial economics.
6. Demand elasticity measures the responsiveness of demand to price changes.
7. Income levels are not a determinant of demand elasticity.
8. Managerial economics helps in making optimal decisions based on economic analysis.
9. The primary focus of demand and supply analysis is to determine market equilibrium.
10. Managerial economics focuses on setting government policies.

(III) Descriptive Questions and Answers.

1. Explain the concept of managerial economics.
2. Describe the differences between micro and macro-level analysis in managerial economics.
3. What is the significance of static analysis in managerial economics?
4. How does dynamic analysis contribute to understanding economic changes?
5. Discuss the importance of demand and supply analysis in managerial economics.
6. What methods are used for forecasting in managerial economics, and why are they important?

7. Identify and explain the main determinants of demand elasticity.
8. How does understanding demand elasticity benefit businesses?
9. In what ways does managerial economics support effective resource allocation?
10. Analyze the role of managerial economics in decision-making processes within firms.

Answers to check your progress

(I)

1. B) The allocation of resources and decision-making
2. B) Micro-level
3. B) Short-term equilibrium
4. B) Long-term changes over time
5. A) Regression analysis
6. B) The responsiveness of demand to price changes
7. D) All of the above
8. C) By making optimal decisions based on economic analysis
9. B) Determining market equilibrium prices and quantities
10. B) It assists in optimizing resource use and decision-making

(II)

1. False
2. True
3. False
4. False
5. False
6. True

7. False

8. True

9. True

10. False

3.11 Suggested Readings

BooksDr. Atmanand, Managerial Economics, Excel Books, Delhi.

Haynes, Mote and Paul, Managerial Economics — Analysis and Cases, Vakils.
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UNIT IV

THEORY OF DEMAND AND SUPPLY

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Unit Objectives

After studying this unit, you will be able to:

- Identify the determinants of demand
- Know the basis of demand State the law of demand
- Calculate price elasticity of demand
- Explain the income elasticity of demand concept
- State how cross elasticities of demand are calculated
- State the law of supply
- Explain how market equilibrium is reached.

Learning outcome:

The unit would help students to :

- Comprehend the meaning of demand and supply and their determinants.
- Explain the law of demand and the different types of demand elasticity.
- Understand the law of supply and the elasticity of supply.
- Apply these concepts to real-world market scenarios.

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.

4.1 Market Demand

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.

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.

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

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:

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

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.

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.

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:

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

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

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.

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

4.1.2 Basis of Demand

The basic source of demand is the need of individuals. Individual need products and services and they are also willing to pay a price to acquire those products and services. The firms analyse the needs and create products and services for them. The market for a firm's product cannot be analysed without reference to the demand conditions. For a firm or an industry consisting of several firms, the extent of demand determines the size of market. Successful business firms, therefore, spend considerable time, energy and effort in analysing the demand for their products. Without a clear understanding of consumers' behaviour and a clear knowledge of the market demand conditions, the firm is handicapped in its attempt towards profit planning or any other business strategy planning.

Example: Estimating present demand and forecasting future demand constitutes the first step towards measuring and determining the flow of sales revenue and profits which generate internal resources to finance business. The stability and growth of business is linked to size and structure of demand.

Check your progress

- a. Define demand in economic terms.
- b. Explain the importance of market demand for a business enterprise.
- c. What are the three key components required for demand?
- d. What is the difference between desire and demand in economics?
- e. List the determinants of demand.

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 little 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.

- f. How does the price effect influence demand?

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 provided 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. Its 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 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 successfully 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. Contd...

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 Tanishqjewellery. This is a major demand inducer as the traditional jewelers are increasingly fudging on such things.

4.1.3 Direct 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 a direct 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 direct and derived demand varies in degree more than in kind.

Notes 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 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>

4.1.4 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.

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.

An Individual's Demand Schedule for Commodity X

Price x (per Unit) P_x	Quantity of x demanded (in Units) D_x
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).

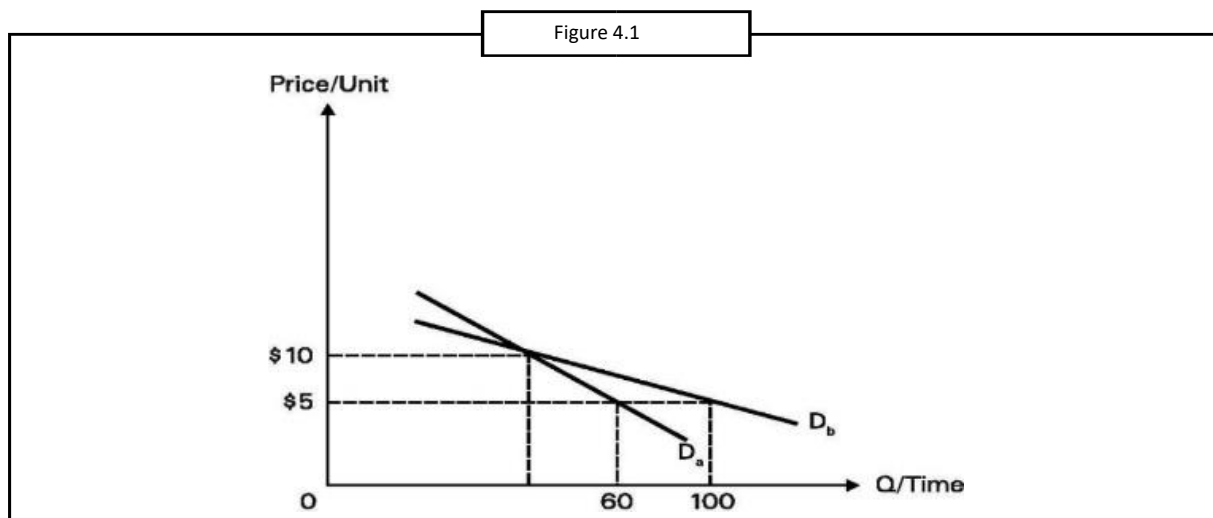
The inverse relationship between the price of the commodity and the quantity demanded per time period is referred to as the Law of Demand.

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

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.

4.2 Concept of Elasticity

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. The contribution of the concept of elasticity lies in the fact that it not only tells us that consumer's demand responds to price changes but also the degree of responsiveness of consumers to a price change. Figure 5.1 shows two demand curves. Let D_a be the demand for cheese in Switzerland and D_b be the demand for cheese in England.



At a price of \$10, the quantity demanded in both countries is 60. When the price falls from \$10 to \$5, the quantity of cheese demanded increases in both. However, for the same change in price, from \$10 to \$5, the change in quantity demanded increases more in England compared to Switzerland. In other words, for the same decrease in price in the two countries, the quantity demanded responds more in England than in Switzerland.

We would describe the above situation by saying that the demand for cheese is more elastic in England than in Switzerland. Elasticity, then, is first another word for "responsiveness".

Elasticity of demand is important primarily as an indicator of how total revenue changes when a change in price induces changes in quantity along the demand curve. The total revenues of the firm will equal the price changed times the quantity sold ($TR = P \times Q$). Naturally, total revenues received by firms are equal to total spending by consumers. If consumers buy 50 units at \$10 each, then the total revenue will be \$500. By simple multiplication, total revenue can always be calculated for each point in a demand schedule or diagram.

4.2.1 Classification of Demand Curves according to their Elasticities

Depending on how the total revenue changes, when price changes we can classify all demand curves in the following five categories:

1. Perfectly inelastic demand curve
2. Inelastic demand curve
3. Unitary elastic demand curve
4. Elastic demand curve
5. Perfectly elastic demand curve

Figure 4.2 helps us to explain what these five categories imply about the relationship between changes in total revenue and changes in price. It shows three different types of demand curves each having a different implication for total revenue when price is reduced from \$10 to \$5.

1. In the case of demand curve D_a in Figure 4.2, when the price is \$10, total revenue is \$500 (10×50). When the price changes to \$5, the quantity demanded does not respond at all and remains at 50. The total revenue when the price is \$5 is \$250. In other words, when price decreases, total revenue decreases as well.

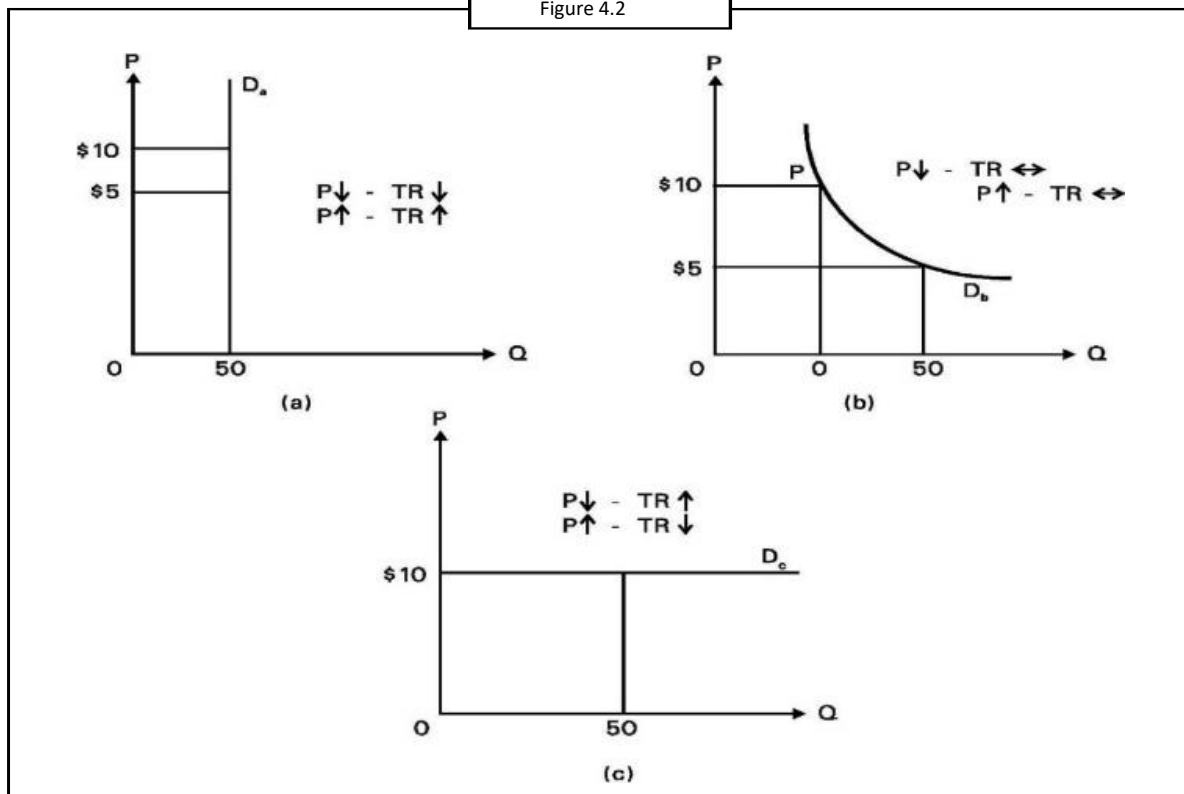
All such demand curves where quantity demanded is totally unresponsive to changes in price are called perfectly inelastic demand curves.

Further, such demand curves imply that when price decreases, the total revenue decreases and vice-versa.

Finally, all such demand curves are supposed to have an elasticity coefficient, E_d , equal to 0. Elasticity coefficient is a number describing the elasticity of the demand curve.

Lifesaving drugs are most likely to have demand curves which resemble perfectly inelastic demand curves. For example, a diabetic would be willing to pay almost any price to get the required amount of insulin.

Figure 4.2



2. Demand curve D_c in Figure 5.2(c) above represents another extreme case – a perfectly horizontal demand curve. When the price is \$10, 50 units are being sold and the total revenue is \$500. When the price falls to \$5, the quantity demanded increases infinitely and so does the total revenue. On the other hand, when price rises above \$10 the quantity demanded falls to Zero and total revenue also falls to zero.

Such horizontal demand curves, where quantity demanded is infinitely responsive to price changes, are called perfectly elastic demand curves.

These perfectly elastic demand curves have a property that when price decreases total revenue increases, and vice-versa.

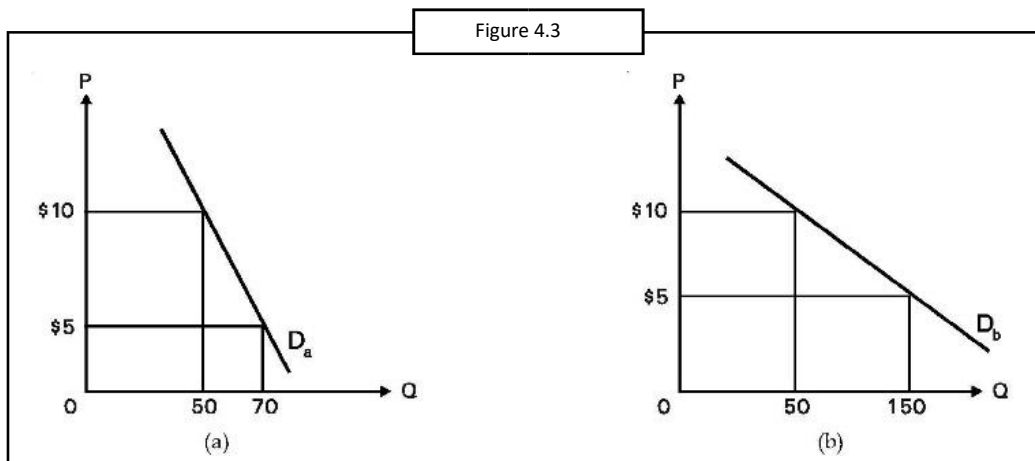
The elasticity coefficient, E_d , is equal to infinity ($E_d = \infty$).

3. The demand curve D_b in Figure 5.2(b) above represents the midpoint of a spectrum where extremes are represented by the demand curves D_a and D_c .

In the case of D_b when price decreases from \$10 to \$5, the total revenue remains unaffected at \$500, such a demand curve is said to be unitary elastic and has the property that when price increases or decreases, the total revenue remains constant. The elasticity coefficient for such demand curves is equal to one. Examples of unitary elastic demand curves occur when a person budgets a certain amount of money for, say, meat or magazines and will not deviate from that figure regardless of price. However, such cases are also unusual in that few demand curves have constant unitary elasticity.

4. Besides the three types of demand curves we have discussed there are two more types of demand curves.

Demand curves which have an elasticity coefficient between 0 and 1 are called relatively inelastic or simply inelastic. When the price falls, the quantity demanded expands but total revenue still decreases. Figure 4.3(a) shows D_a as an example of a



relatively inelastic curve.

Finally, demand curve D_b in Figure 4.3(b) is an example of a relatively elastic or simply elastic demand curve. Such demand curves have an elasticity coefficient between 1 and ∞ and have the property that when price decreases total revenue increases and vice-versa.

Believe it or not, in the real world, 99.99 per cent of the demand curves are either relatively elastic or relatively inelastic.

Table 4.1 summarises the discussion we have had so far. It tells us how the firm's total revenues

(and the consumer's total expenditures) for a product will change as prices are raised or lowered. As shown in the table the value of the elasticity coefficient, E_d , can be anything from zero to infinity and each value can immediately tell us the elasticity of the demand curve at the relevant price. For instance, if a demand curve has an elasticity coefficient of 0.5 at a given price, then we know that this is an inelastic demand curve at that price.

Price Elasticity of Demand (E_d)		How total revenues or expenditures are affected by price changes	
E_d Value	Term for Elasticity of Demand	Price increases	Price decreases
Zero	Perfectly inelastic	Increase proportionally with price	Decrease Proportionally with price
$0 < E_d < 1$	Relatively inelastic	Increase less than proportionally with price	Decrease less than proportionally with price
$E_d = 1$	Unitary elastic	Unaffected by price changes	
$A > E_d > 1$	Relatively elastic	Decrease but less than proportionally	Increase, but less than proportionally
∞	Perfectly elastic	Total Revenue falls to zero	Increase more than proportionally

table 4.1 showing relationship between price elasticity of demand and expenditure.

4.2.2 Numerical Measurement of Elasticity

What does it mean when we say that the elasticity of demand is 0.5? 0.4? 2.3? To answer this question, we have to examine the following definition for elasticity coefficient, E_d .

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

One calculates these percentage changes, of course, by dividing the change in price by the original price and the consequent change in quantity demanded by the original quantity demanded. Thus we can restate our formula as:

$$E_d = \frac{\frac{\text{Change in quantity demanded}}{\text{Original quantity demanded}}}{\frac{\text{Change in price}}{\text{Original in price}}}$$

This formula can also be written as:

$$E_d = \frac{\frac{Q_1 - Q_0}{Q_0}}{\frac{P_1 - P_0}{P_0}}$$

Where P_0 = Original price,

P_1 = New price

Q_0 = Original quantity demanded

Q_1 = New quantity demanded

Sometimes we may also find this written as:

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

Where is a notation used to denote change.

Let us answer a basic question about this formula: Why use percentages rather than absolute amounts in measuring consumer responsiveness? The answer is that if we use absolute changes, our impression of buyer responsiveness will be arbitrarily affected by the choice of units.

To illustrate, if the price of product X falls from \$3 to \$2 and consumers, as a result, increase their purchases from 60 to 100 pounds, we get the impression that the consumers are quite sensitive to price changes and therefore demand is elastic. After all, a price change of "one" has caused a change in the amount demanded of "forty". But by changing the monetary units from dollars to pennies (why not?), we find that a price change of "one hundred" causes a quantity change of "forty", giving the impression of inelasticity. The use of percentage changes avoids this problem. The given price decrease is 33 per cent whether measured in terms of dollars or in terms of pennies. Thus, the use of percentages gives us the nice property that the units in which the money or goods are measured — ¾ bushels or tons of wheat, dollars or cents or rupees — do not affect elasticity.

Interpreting the Formula

Caution Demand is elastic if a given percentage change in price results in a larger percentage change in quantity demanded. For example, if a two per cent decline in price results in a 4 per cent increase in quantity demanded, demand is then said to be elastic. If a given percentage change in price is accompanied by a relatively smaller change in the quantity demanded, demand is inelastic. For example, if a 3 per cent change in price gives rise to a 1 per cent increase in the amount demanded, demand is said to be inelastic. The borderline case of unitary elasticity, which separates elastic and inelastic demands, occurs where a percentage change in price and accompanying percentage change in quantity demanded happen to be equal.

CHECK YOUR PROGRESS

Fill in the Blanks

1. Demand in economic terms is defined as the quantity of a commodity that is desired to be bought at a given _____, per unit of time.
2. The importance of market demand for a business enterprise lies in its influence on decisions related to _____, advertising, cost allocation, and pricing.
3. The three key components required for demand are desire to acquire it, willingness to _____ for it, and ability to _____ for it.
4. In economics, mere desire to buy a product is not considered _____.

4.2.3 Computation of Elasticity Coefficients

We may use two measures of elasticity:

1. Arc elasticity, if the data is discrete and therefore incremental changes are measurable.
2. Point elasticity, if the demand function is continuous and therefore only marginal changes are calculable.



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.

Px (per unit)	6	5	4	3	2	1
Qx	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.

$$\Delta P = \text{New price} - \text{Old price} = 4 - 3 = 1$$

$$\Delta Q = \text{New quantity} - \text{Old quantity} = 2000 - 3250 = -1250$$

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

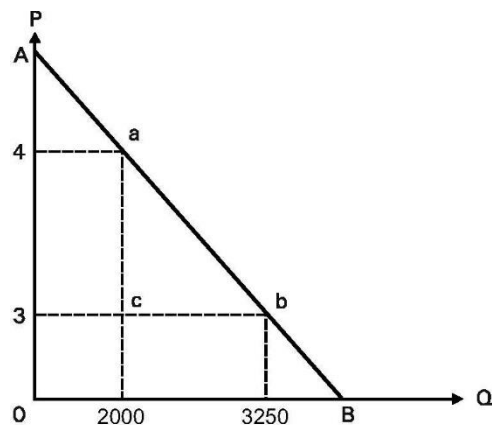
New quantity = 3250 units

$$\Delta P = \text{New price} - \text{Old price} = 3 - 4 = -1$$

$$\Delta Q = 3250 - 2000 = 1250$$

Substituting,

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



The question is, how is it that we get different demand responses for the same range of price change? The answer is that our initial quantity demanded and price have been different. When we calculate for price fall, they are 2000 for initial quantity demanded and 4 for initial price. When we calculate it for price rise they are 3250 for initial quantity demanded and 3 for initial price. Hence elasticity tends to depend on our choice of the initial situation. However, demand response should be the same for the same finite stretch of the demand curve. To get rid of this dilemma created by the choice of the initial situations, we take the arithmetic mean of the two quantities Q and the mean of the two prices P. This gives us the concept of arc elasticity of demand.

$$\text{Arc elasticity} = \frac{\Delta Q}{Q_0 + Q_1} \times \frac{P_0 + P_1}{\Delta P}$$

$$\text{or, } e = \frac{\Delta Q}{\Delta P} \times \frac{P_0 + P_1}{Q_0 + Q_1}$$

Where Q_0 and Q_1 are the two quantities corresponding to the two points on the demand curve. Similarly P_0 and P_1 are the two prices.

The measurement of elasticity is done by two methods, namely, Geometrical Method and Arithmetical Method.

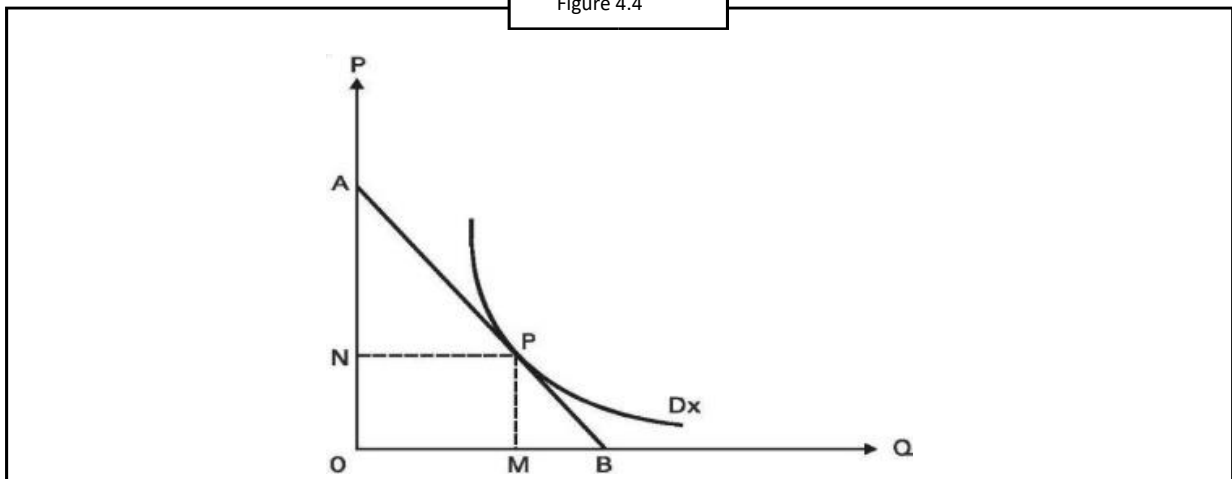
A geometrical way of measuring the elasticity at any point on a demand curve is now in order.

Consider point P on the demand curve Dx in Figure 5.4 (we have taken a non-linear demand curve). Draw a tangent line AB at point P on the demand curve. Applying point elasticity formula, it follows that the elasticity at point P is:

$$e = \frac{dQ}{dP} \times \frac{P}{Q} = \frac{\frac{dQ}{dP}}{\frac{Q}{P}}$$

$\frac{dQ}{dP}$ is the inverse of the slope of the demand curve, hence is equal to $\frac{MB}{PM}$.

Figure 4.4



Price is equal to PM and quantity is equal to OM.

$$e = \frac{\frac{MB}{PM}}{\frac{OM}{PM}} = \frac{MB}{PM} \cdot \frac{PM}{OM} = \frac{MB}{OM}$$

In other words, the price elasticity of demand is measured graphically by the ratio of the two segments of the horizontal axis identified by the intersection of the tangent to the point considered with the horizontal axis and by the perpendicular from that point to the same axis.

If we now consider the similar triangles APN and PBM then $AP/PM = PB/MB$ (from properties of similar triangles) or $MB/PN = PB/AP$. Hence elasticity = MB/ON can be written as equal to PB/AP , i.e., elasticity at P is also equal to PB/AP , the ratio of the lower segment of the demand curve to the upper segment.

In the same way we can show that elasticity is equal to ON/NA (taking again similar triangles and equating the ratio of sides).

Notes 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.

4.3 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 cigarettes 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 cigarettes. Thus salt and cigarettes 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 cigarettes 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) and 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, *ceteris paribus*, e_p is always likely to be negative.

Caution 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". For 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". 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".

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,

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

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

Let P = Old price

Q = Old quantity

ΔQ = New quantity - Old quantity

ΔP = New price - Old price

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

Task Given the following data, calculate the price elasticity of demand when (a) price increases from ₹ 5.00 per unit to ₹ 8.00 per unit and (b) the price falls from ₹ 8.00 per unit to ₹ 5.00 per unit.

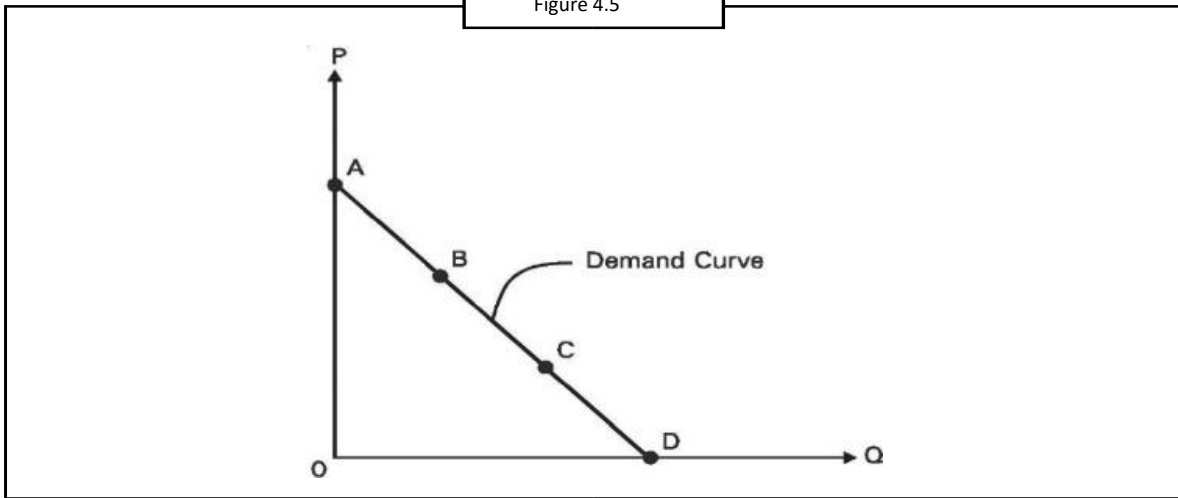
P_x (per unit)	6	5	4	3	2	1
Q_x	200	350	600	850	900	1200

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

Consider a straight-line demand curve cutting both the axes as shown in Figure 5.5. Elasticity of demand, e_p , is defined as the numerical measure of the degree to which quantity demanded responds to a change in price ceteris paribus.

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

Figure 4.5



Now the slope of the demand curve is dP/dQ (since the demand curve is a straight line and the slope of a straight line is given by change in Y divided by change in X).

Hence the term dQ/dP in the expression for e_p is the reciprocal of the slope of the demand curve.

Since the slope of a straight line is the same throughout, the reciprocal of the slope will also be the same throughout. Thus, for any straight-line demand curve, the elasticity at any point is a function of (depends upon) the P/Q ratio.

At the price axis, $Q = 0$ and P/Q is undefined, but as we let q approach zero, without ever reaching it, the ratio p/q increase without limit. In other words, e_p approaches infinity as q approaches 0. Thus, e_p is infinity at the price axis.

At the quantity axis, $P = 0$ and P/Q is zero. Thus $e_p = 0$ at the quantity axis.

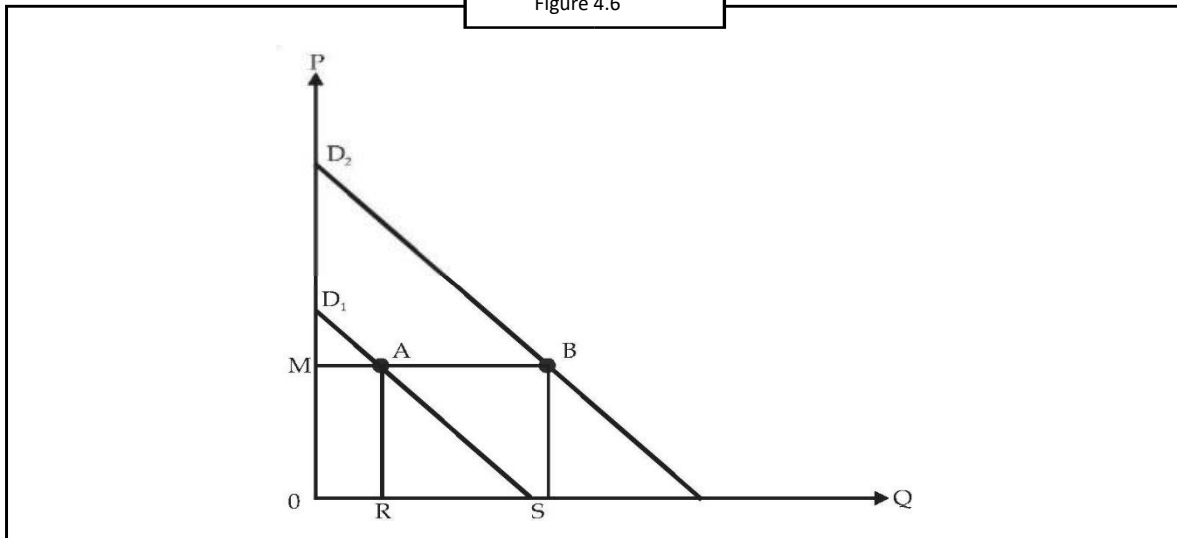
By a similar reasoning we conclude that as we move down a demand curve, the p/q ratio falls steadily as p keeps decreasing and q keeps increasing. Hence the coefficient of elasticity is greater at a higher point (point B) than at a lower point (point C) since the higher point will have a greater p/q ratio and dQ/dP is inconsequential.

Two parallel straight-line demand curves have a different elasticity at each price.

Explain why the (proposition above) is true?

Let D_1 and D_2 be two parallel straight-line demand curves, and let the (same) price at which their elasticities are being compared be OM (Figure 5.6).

Figure 4.6



Elasticity of demand, e_p , is defined as the numerical measure of the degree to which quantity demanded responds to a change in price, *ceteris paribus*. From the definition,

$$e_p = (-) \cdot \frac{dQ}{dP} \cdot \frac{P}{Q}$$

Since the slope of a demand curve is dP/dQ , the term dQ/dP in the expression for e_p is the reciprocal of the slope of a demand curve. Also, as the two demand curves are parallel, it follows that their slopes and hence the reciprocals of their slopes are the same.

Thus at any given price level the elasticities of the straight line demand curves can be compared by comparing their corresponding quantities.

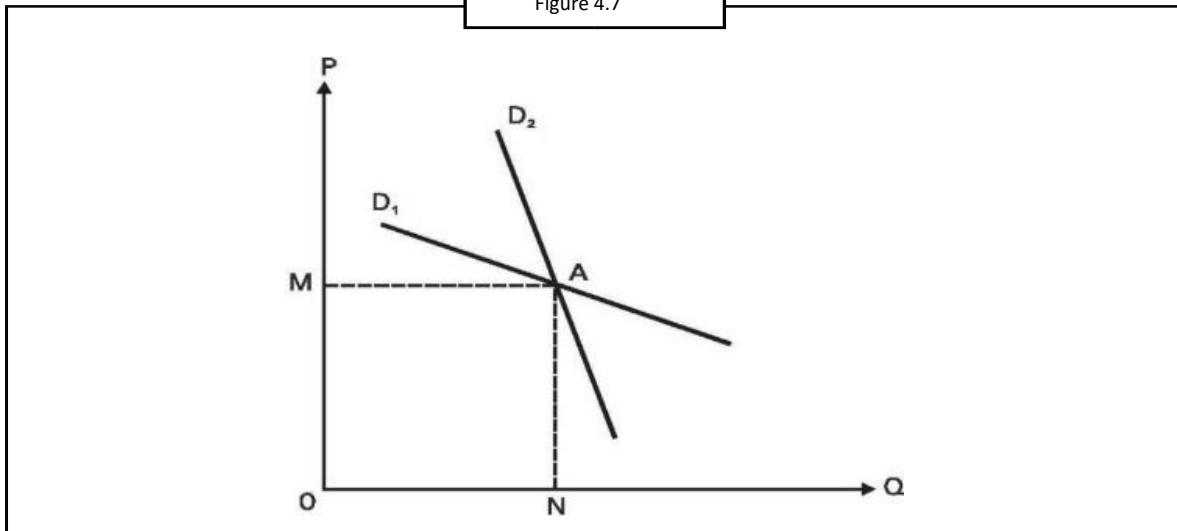
At point A (demand curve D_1) the quantity demanded is OR and at point B (demand curve D_2 , but at the same price as A) the quantity demanded is OS. Since $OS > OR$ the P/Q ratio is greater in the case of D_1 . Hence point A has a higher elasticity than point B or the demand curve further away from the origin is less elastic at each price than the one closer to the origin.

The elasticities of two intersecting straight line demand curves can be compared at the point of intersection merely by comparing slopes, the steeper curve being less elastic.

Let two straight line demand curves, D_1 and D_2 , having different slopes, intersect each other at A, as in Figure 4.7.

At the point of intersection, price (P) and quantity (Q) are the same for both demand curves. Hence the P/Q ratio is the same for both demand curves at the point of intersection (point).

Figure 4.7



Since the slope of a demand curve is dP/dQ , the term dP/dQ in the expression for e_p is the reciprocal of the slope. For both demand curves, since P/Q is the same, the elasticities can be compared by comparing dQ/dP .

As D_1 is steeper than D_2 , dQ/dP for D_1 is less than that for D_2 . (Remember that dQ/dP measures the reciprocal of the slope). Hence D_2 (the steeper curve) is less elastic than D_1 .

Arc Elasticity

The geometrical method of measurement of price elasticity of demand is applicable only for infinitesimal changes in price. If price changes appreciably then we use the arc elasticity of demand. Arc elasticity is calculated with the help of the following formula:

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

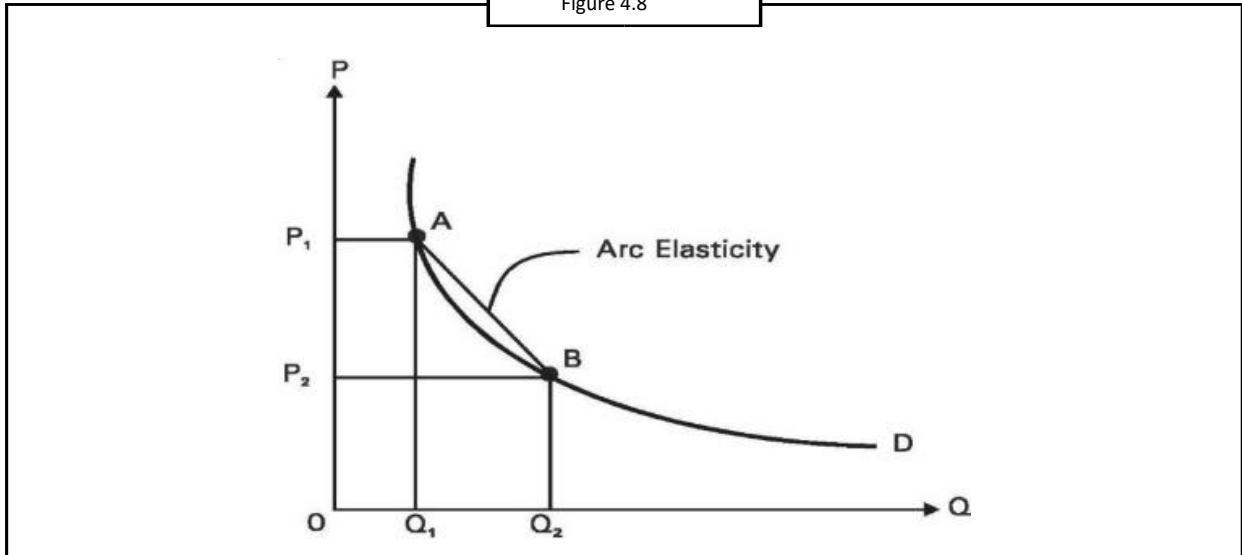
Where P_1 and Q_1 are initial price and quantity, P_2 and Q_2 are new price and quantity and ΔP and ΔQ are the changes in price and quantity respectively.

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 measure of arc elasticity is an approximation of the true elasticity of the section AB of the demand curve. The more convex to the origin the demand curve is, the poorer the linear approximation attained by the arc elasticity formula.

Caution It would be observed that the only difference between this formula and the point elasticity formula is in the use of the average quantities and average prices. A basic limitation of the point elasticity formula relates to the use of the base. If in Figure 5.8 we

have to measure elasticity of demand between the points A and B by the percentage method, it is difficult to say which one of those will make a better base. The choice will be entirely arbitrary. The problem can be solved by using average prices and average quantities.

Figure 4.8



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

4.5 Income Elasticity

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.

For 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 *ceteris paribus* causes a percentage increase in quantity demanded and vice-versa. Thus for normal goods (e.g., clothing, cigarettes) income and quantity demanded vary in direct proportion *ceteris paribus* due to which the income elasticity of demand is positive.

An inferior good is one where a percentage increase in income *ceteris paribus*, causes a percentage decrease in quantity demanded and vice-versa. Thus for inferior goods (e.g., cheap whisky, artificial jewellery, imitation shoes, etc.) income and quantity demanded vary in an inverse proportion *ceteris paribus* 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.

4.6 Cross Elasticity of Demand

Caution 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.

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 measures the degree to which quantity demanded is a function of the price of all other commodities. From the definition,

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

Example: If X and Y (say butter and bread) are complements, e_c will be negative. If the price of bread rose ceteris paribus, 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 ceteris paribus causes the quantity demanded of the complements to move in the opposite direction. 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 ceteris paribus, 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 ceteris paribus 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 ($-\infty$) for perfect complements to plus infinity ($+\infty$) for perfect substitutes.

$$e_c = \frac{dQ_x}{Q_x} \cdot \frac{dP_x}{P_x}$$

$$= \frac{dQ_x}{dP_x} \cdot \frac{P_x}{Q_x}$$

Check Your Progress (True or False)

1. Demand in economic terms is simply the desire to purchase a commodity, without considering purchasing power.
2. The demand for a commodity is influenced by the price of related goods, including both substitutes and complements.
3. A person's willingness to pay for a commodity is enough to constitute demand, even if they do not have the ability to pay.

4.9 Market 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. 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.

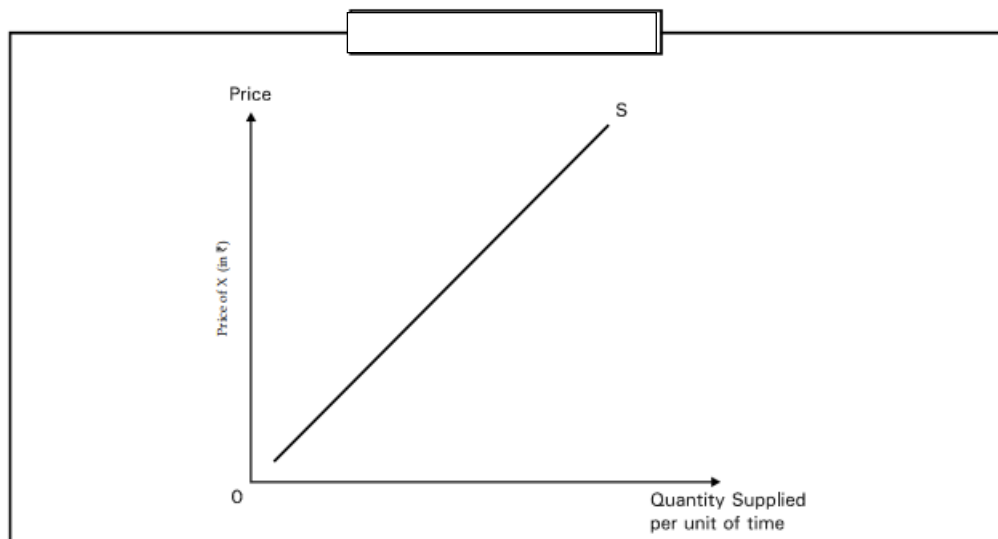
Law of Supply

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



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.

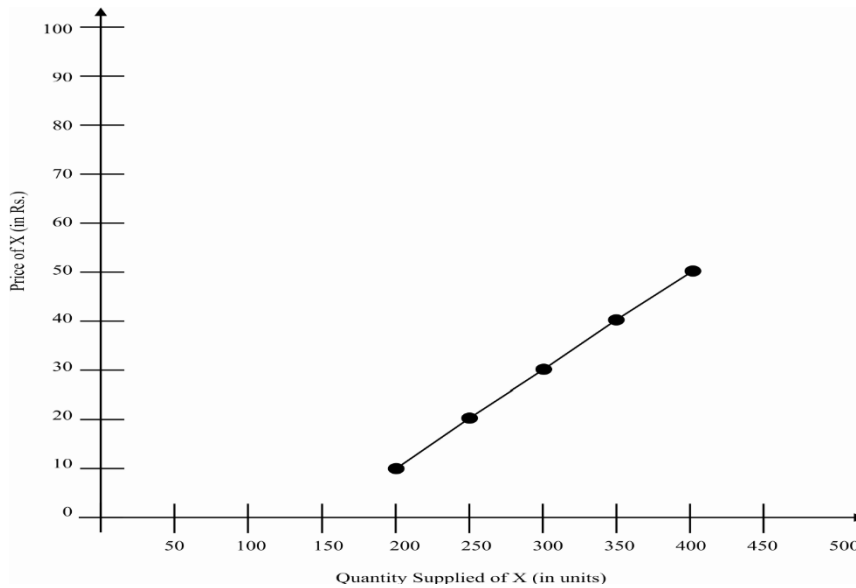
Market supply is the summation of all individual supplies at a given price. The market supply curve is the horizontal sum of the individual supply curve.

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.

4.10 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, give in Table 4.2.

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 3.2.

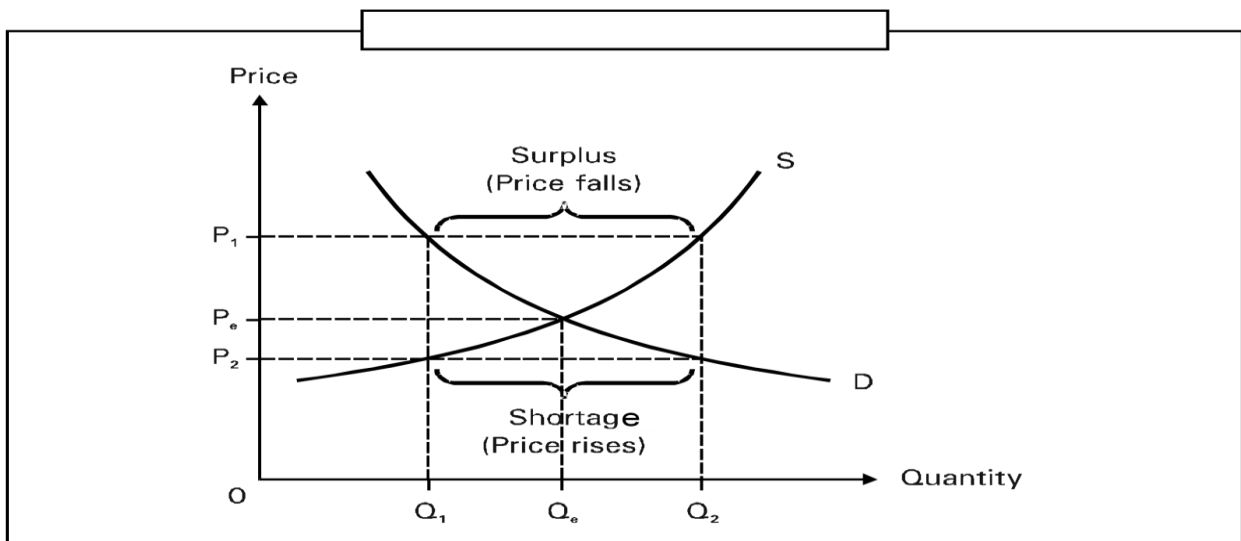


figure 4.9

Equilibrium Point

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 lead 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.

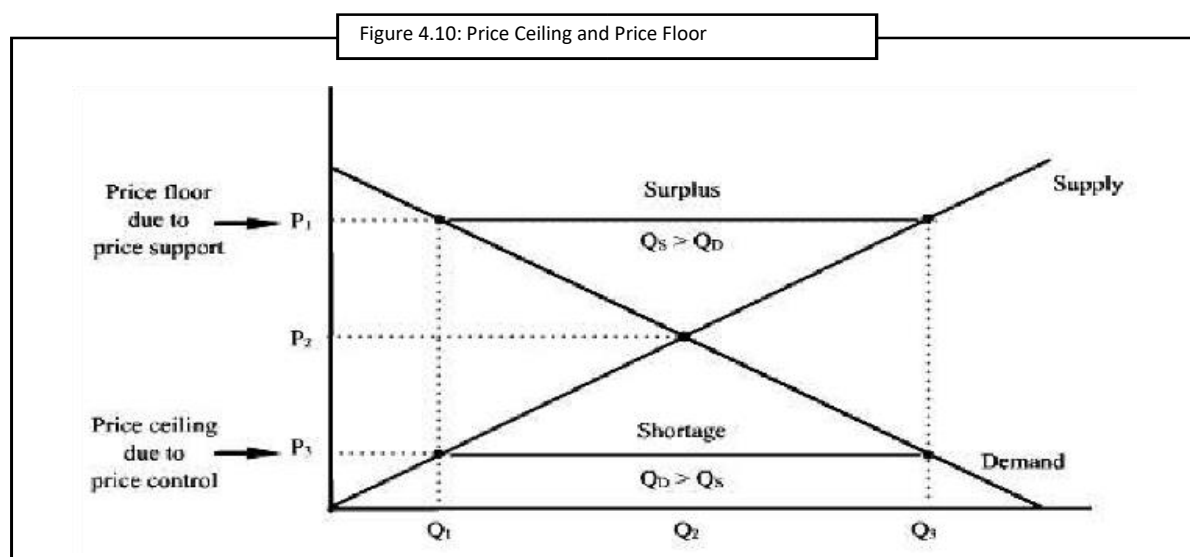
There is only one price, at which the quantity supplied is equal to the quantity demanded, there is no surplus or shortage, no rise or fall of price – OP_e . It is thus referred to as the equilibrium position.

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.

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 3.3 depicts the effect of price ceiling and price floor.



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.

4.11 Summary

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

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

- 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.

4.12 Keywords

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

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

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

- **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.

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.

Equilibrium: A state of balance.

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

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

4.13 LET'S SUM UP

This unit has provided a thorough understanding of the concepts of demand and supply, essential for grasping market dynamics. You have explored the nature of supply, learning how it is determined by the willingness and ability of producers to offer goods at various prices. The Law of Supply has been discussed, highlighting the positive relationship between price and quantity supplied.

4.14 MODEL QUESTION FOR PRACTICE

(I) Fill-in-the-Blanks

1. Demand for anything means the quantity of that commodity which is desired to be bought at a given _____, per unit of time.
2. A miser's desire for and his ability to pay for a car is not demand because he does not have the necessary _____ to pay for it.
3. 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 _____ to pay
4. 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 the _____ to have that commodity.
5. As demand for sweets goes up, the demand for sugar also goes up. This shows a _____ relationship between the demand for sweets and the demand for sugar.
6. If y is a substitute for x, then as the price of y increases, demand for x also _____.
7. If z is a complement of x, then as the price of z falls, the demand for x _____.
8. As income rises, consumers buy more of _____ goods and less of _____ goods.

9. Advertisement increases the sale of a firm up to a _____.
10. A firm's primary customer, the urban Indian woman, has become more and more _____ in her choices.
11. Supply is the specific quantity of output that producers are willing and able to make available to consumers at a particular _____ over a given period of time.
12. The quantity of a good desired to be sold at a given price is known as the _____ supplied.
13. According to the Law of Supply, other things remaining constant, higher the _____ of a commodity, higher will be the quantity supplied.
14. Market supply is the _____ of all individual supplies at a given price

(II) Multiple Choice Questions (MCQs)

1. What does the term "demand" in economic terms refer to?
 - a) Desire to buy a commodity

b) The quantity of a commodity desired at a given price

c) Ability to buy a commodity

d) Willingness to buy a commodity

2. Which of the following is a determinant of demand?

a) Consumer taste

b) Supply of goods

c) Production cost

d) None of the above

3. The demand for a commodity is inversely related to its own _____.

a) Quantity

b) Price

c) Demand

d) Supply

4. If the price of a substitute good rises, what happens to the demand for the related good?

a) It falls

b) It remains unchanged

c) It increases

d) It fluctuates

5. Complementary goods are those that:

a) Can replace each other

b) Are used together

c) Are not related

d) Have no effect on each other

6. An increase in consumer income typically leads to an increase in demand for:

a) Inferior goods

b) Normal goods

c) Complementary goods

d) Substitute goods

7. The effect of advertising on demand is generally:

a) Negative

b) Directly proportional

c) Indirectly proportional

d) Non-existent

8. Socio-psychological determinants of demand include:

a) Price of related goods

b) Consumer taste and preference

c) Consumer income

d) All of the above

9. The “Impure to Pure” exchange offer is an example of a:

a) Promotional scheme

b) Price effect

c) Substitution effect

d) Complementary effect

10. Which company had a growth of 40% for three successive years despite a decline in the overall jewellery market?

- a) Tanishq
- b) L'Oreal
- c) Wills Lifestyle
- d) Femina

(III) Descriptive Question

1. What is demand in economic terms?
2. How does the price of a commodity affect its demand?
3. What is the impact of a rise in the price of a substitute good on the demand for another good?
4. Explain the effect of complementary goods on demand.
5. How does consumer income affect the demand for normal and inferior goods?

Answers

(I) Fill in the Blanks

1. price
2. law of demand
3. normal good
4. Inferior goods
5. prices of related goods
6. demand
7. increase
8. Advertising
9. consumer preferences and future expectations

(II) Multiple Choice Questions (MCQ) Answers

1. a
2. c
3. b

4. b

5. a

6. b

7. a

8. d

9. c

10. a

4.15 Suggested Readings

BooksDr. Atmanand, Managerial Economics, Excel Books, Delhi.

Dominick Salvatore, Managerial Economics, Thomson.

Haynes, Mote and Paul, Managerial Economics — Analysis and Cases, Vakils.
Fellner and Simons Private Ltd., Bombay.

Malcolm P. McNair and Richard S. Meriam, Problems in Business Economics,
McGraw Hill Book Co., Inc.

Yogesh Maheshwari, Managerial Economics, Prentice Hall

Online links <http://economics.about.com/cs/microhelp/a/priceelasticity.htm>

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

ingrimayne.com/econ/elasticity/Elastic1.html

UNIT V

THEORY OF PRODUCTION AND COST

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5.18 Further Readings

Unit Objectives

After studying this unit, you will be able to:

- Describe production function with one and two variables
- State the concept of producer's equilibrium and expansion path
- Explain the behaviour of total, average and marginal revenue curves
- Discuss various types of costs
- Explain the behaviour of short run and long run cost curves
- State the concept of Economies of scales and economies of scope Discuss the revenue curves and their applications
- Discuss law of diminishing returns to factor and returns to scale
- Explain the law of returns of scale

Learning Outcome:

the unit will facilitate the students to:

- Comprehend the meaning of production and identify the factors involved.
- Explain the laws of production and their implications for business operations.
- Understand the different types of costs and how they influence production decisions.
- Apply these concepts to real-world business scenarios to determine optimal production levels and cost management.
-

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.

The cost which a firm incurs in the process of production of its goods and services is an important variable for decision making. Total cost together with total revenue determines the profit level of a business concern. In order to maximise profits a firm endeavours to increase its revenue and lower its costs. To this end, managers try to produce optimum levels of output, use the least cost combination factors of production, increase factor productivities and improve organisational efficiency.

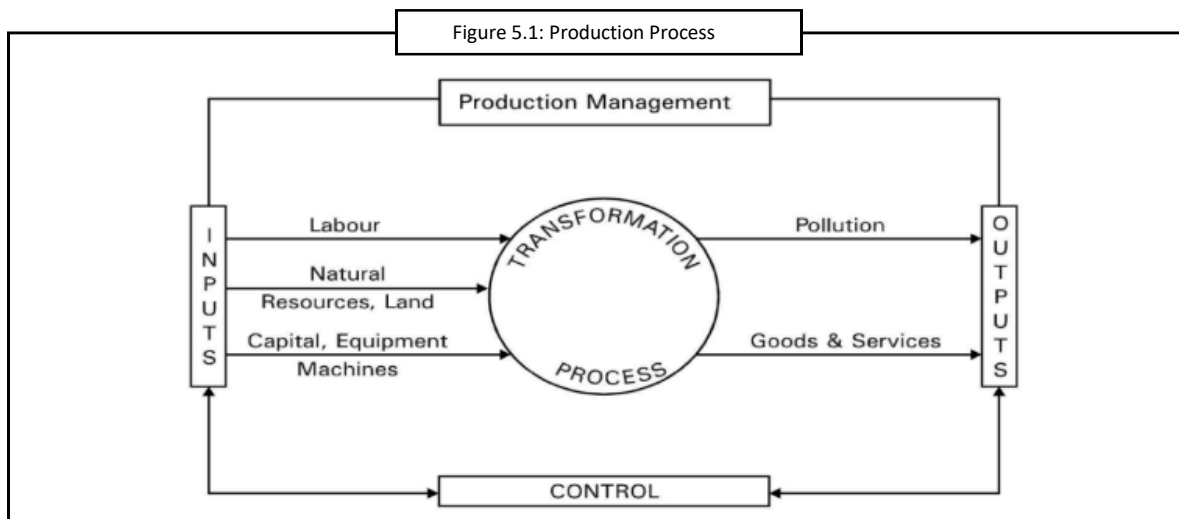
5.1 Meaning of Production

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 5.1 depicts a simple 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 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.

5.2 Production Function with One Variable Input

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:

Mathematically, the production function can be shown as:

$$Q = f (X_1, X_2, \dots, X_k)$$

where Q = Output, X_1, \dots, 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

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

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

where $Q = \text{Output}$
 $X = \text{Labour}$
 $Y = \text{Capital}$

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.

A form of production functions is the Constant Elasticity of Substitution, **CES function**,

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

where $h > -1$ and B, g and h are constants.

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

$$Q = \text{minimum} \left[\frac{K}{a}, \frac{L}{b} \right], \text{ where } a \text{ and } b \text{ are constants and 'minimum' means that } Q \text{ equals the smaller of the two ratios.}$$

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 , then the linear production function may be,

$$Q = aL, \text{ where 'a' is the constant term and } L \text{ stands for labour.}$$

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

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

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

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) 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 (MP) 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.

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

table 5.1 : long run production function

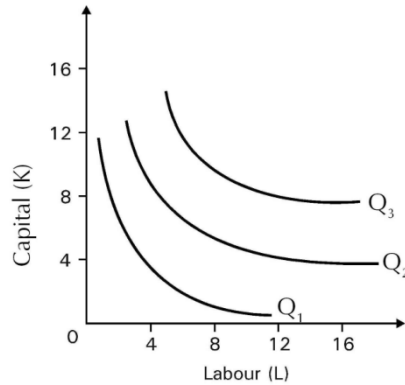
Labour (L)	Capital (K)											
	0	1	2	3	4	5	6	7	8	9	10	
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	5	15	35	47	55	62	61	59	56	52	
2	0	12	31	49	58	66	72	77	72	74	71	
3	0	35	48	59	68	75	82	87	91	89	87	
4	0	48	59	68	72	84	91	96	99	102	101	
5	0	56	68	76	85	92	99	104	108	111	113	
6	0	55	72	83	91	99	107	112	117	120	122	
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. Figure below gives 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

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.

Fill in the Blanks

1. Production refers to the transformation of _____ or _____ into _____ or _____.
2. Inputs are the _____ used in the production of goods and services and are generally classified into three broad categories: _____, _____, and _____.
3. 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 firm's _____.
4. Variable inputs are those that can be changed easily and on very short notice, e.g., most _____ and _____.

CHECK YOUR PROGRESS

5.3 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 chapter later).

5.4 Producer's Equilibrium

Before discussing the concept of producer's equilibrium, we must discuss the concepts of Isoquants, marginal rate of technical substitution and isocost line. After learning these concepts, you will be able to understand the concept of producer's equilibrium better.

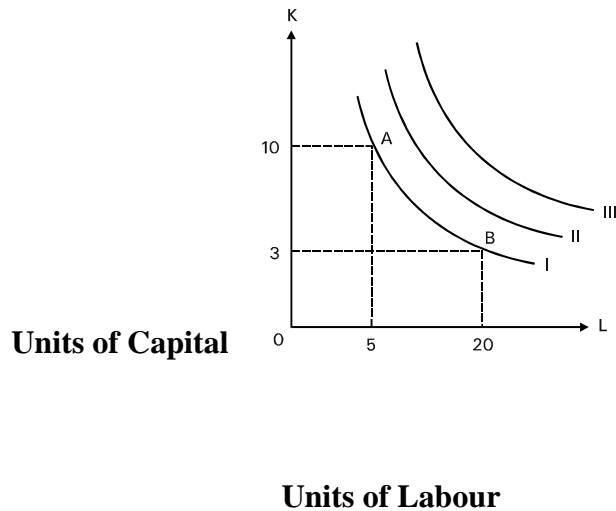
5.4.1 Isoquants

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.

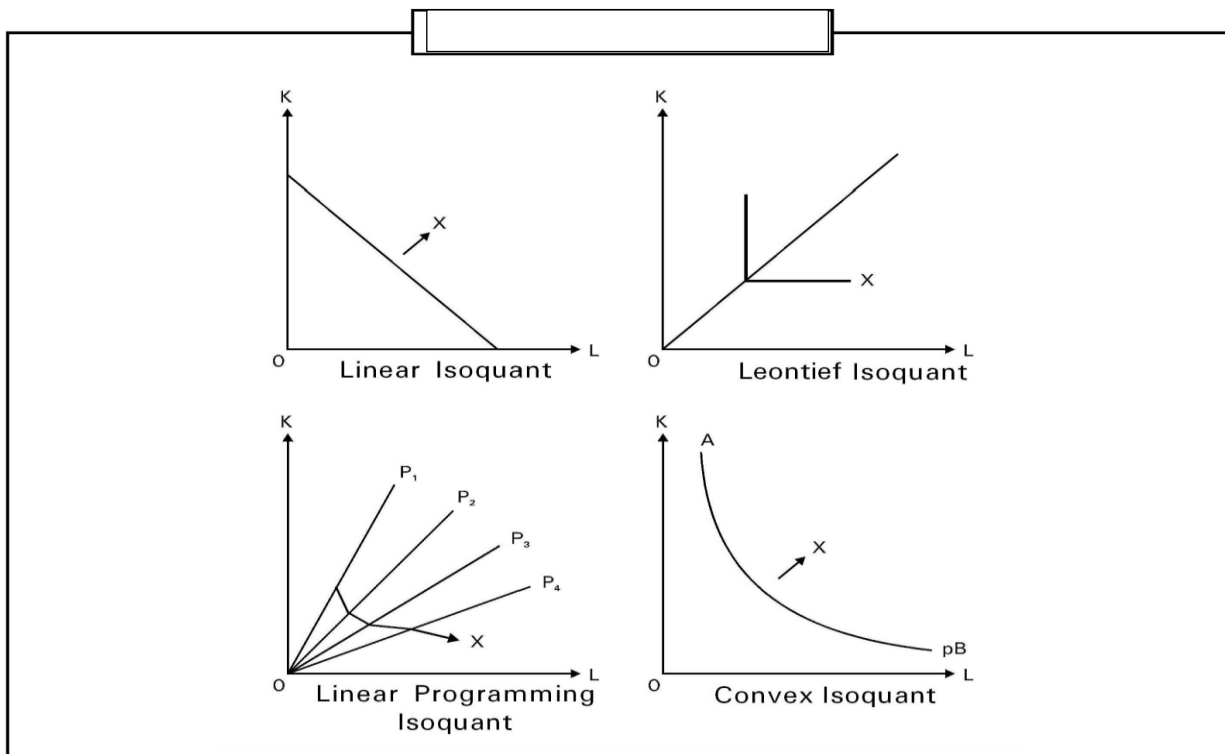


For movements along an isoquant, the level of output remains constant and the ratio of capital to labour changes continuously. However, a movement from the isoquant to another means that the level of output changes.

Types of Isoquants

The production isoquant may assume various shapes depending on the degree of substitutability of factors. The types are discussed in Table 6.2 and the matching graphs are shown in Figure 6.2.

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.



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 ($y = \bar{y}$).

$$\text{MRTS}(x_1, x_2) = -\frac{\Delta x_2}{\Delta x_1} = \frac{\text{MP}_1}{\text{MP}_2}$$

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 labour) 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.

Isocost Line

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

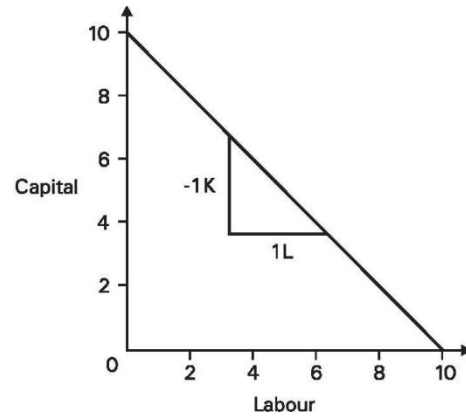
The equation shows that the total cost of the firm (C) is equal to the sum of its expenditures on labour (wL) and capital (rK). This equation is a general one of the firm's isocost line or equal-cost line. It shows the various combinations of labour and capital that the firm can hire or rent at a given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

state whether True or False

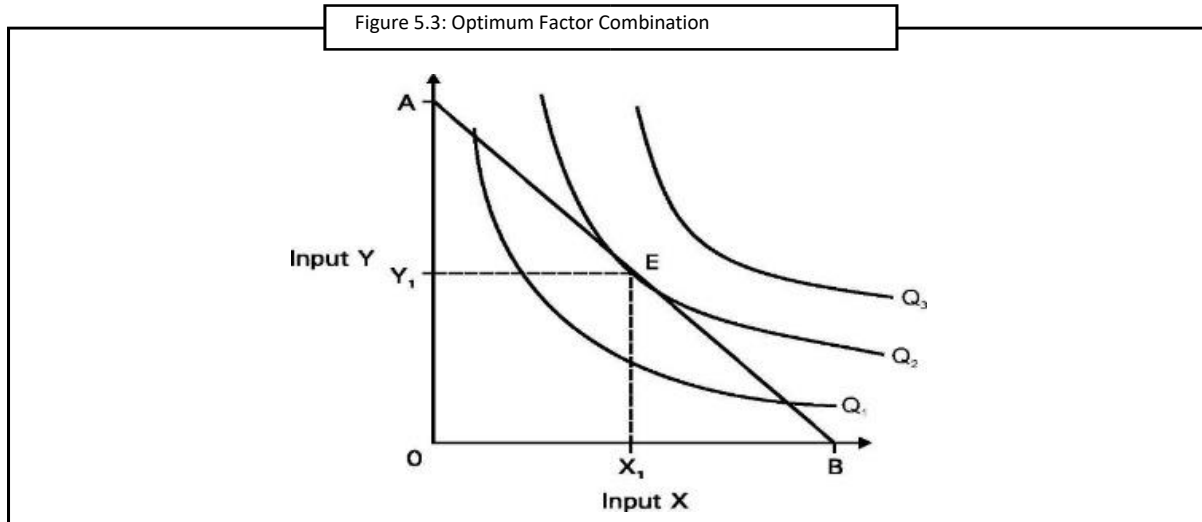
1. A firm may increase its output by using more of two variable inputs that are substitutes for each other, such as labour and capital.
2. Isoquants are a geometric representation of the production function, depicting the same level of output produced by various combinations of factor inputs.
3. The isoquant does tell us the combination of factor inputs the firm actually uses.
4. Points on an isoquant like A, which require more capital but less labour, represent capital-intensive methods of production.

CHECK YOUR PROGRESS

6.4.2 Concept of 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 6.3. The line AB is the budget line of the firm.



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

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

$$\begin{aligned} \text{Therefore, slope of AB} &= -\frac{OA}{OB} \\ &= \frac{\text{Price of X}}{\text{Price of Y}} = -\frac{P_X}{P_Y} \end{aligned}$$

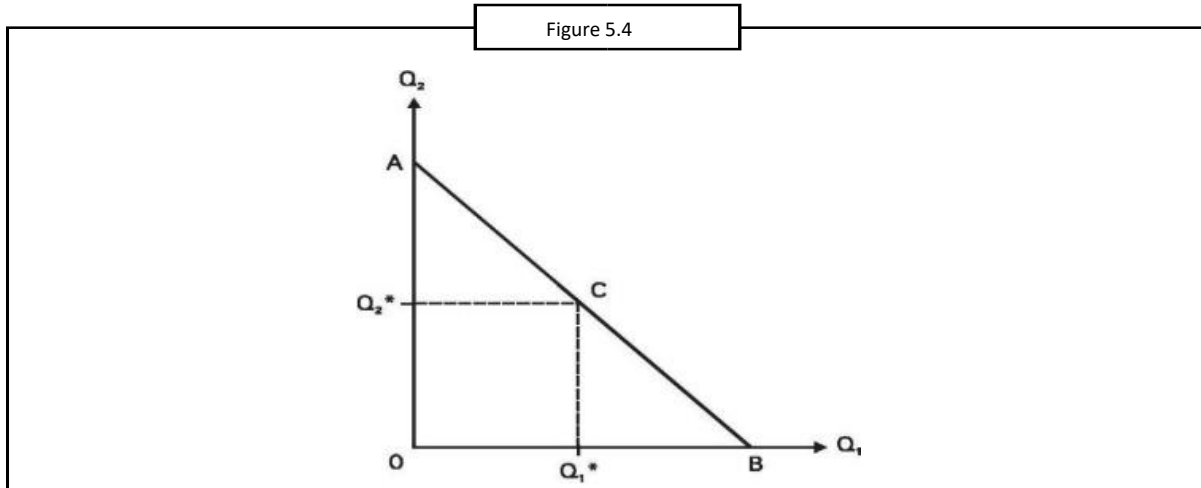
$$\text{Thus } MRTS_{XY} = \frac{MP_X}{MP_Y} = \frac{P_X}{P_Y}$$

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.

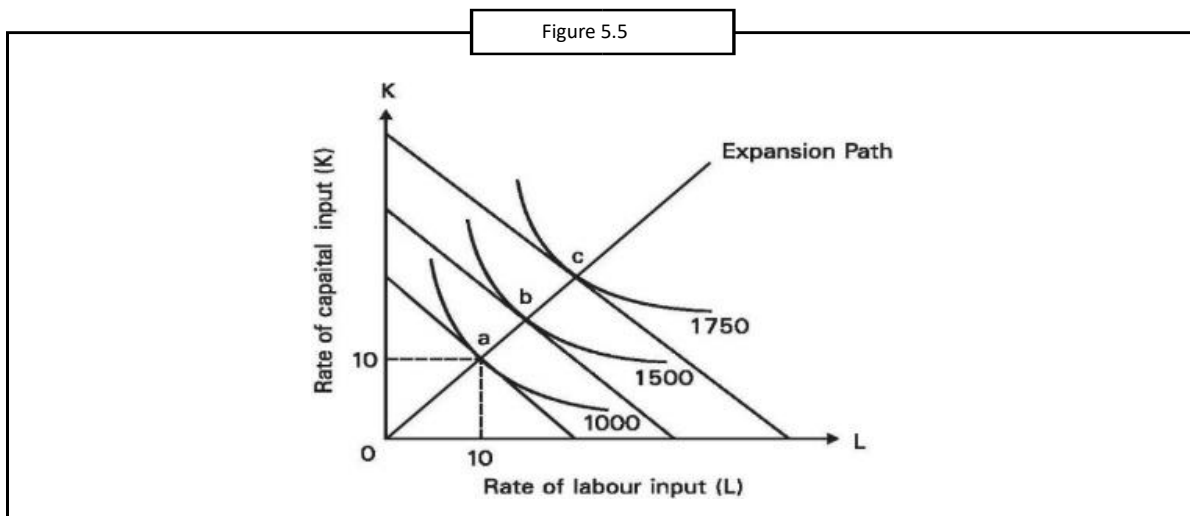
The budget line of the firm has been superimposed on its isoquant map. The firm would be in equilibrium at a point where an isoquant is tangent to the budget line AB, i.e., point E. Thus in equilibrium, the firm produces on the isoquant Q_2 and uses OX_1 units of input X and OY_1 units of input Y. At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

6.5 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 6.4 using isoquants and isocosts.



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.



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

$$\frac{MP_L}{MP_K} = \frac{P_L}{P_K}$$

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 $Q = 100 K^{1/2} L^{1/2}$, the corresponding marginal product functions are:

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

6.6 Total, Marginal and Average Revenue

Revenue is the amount generated from sale of goods or services, or any other use of capital or assets, associated with the main operations of firm before any costs or expenses are deducted. In economics, we have three types of revenues-total revenue, average revenue and marginal revenue-which are discussed in subsequent subsections.

6.6.1 Total Revenue (TR)

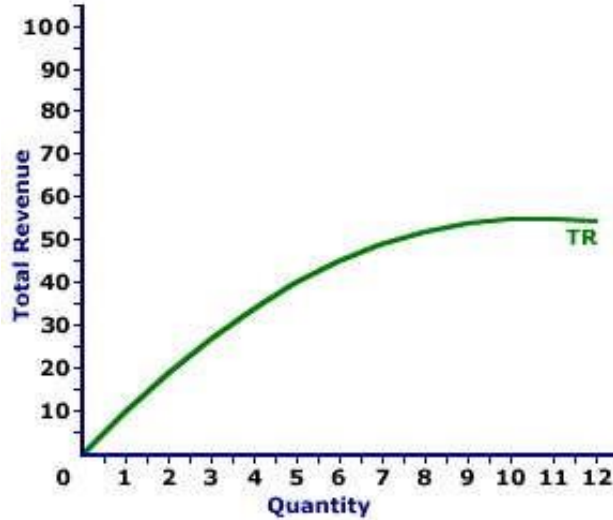
Total revenue is the total money received from the sale of any given quantity of output.

The total revenue is calculated by taking the price of the sale times the quantity sold, i.e.

$$TR = \text{Price} \times \text{Quantity}.$$

Example: If price is ₹ 10 and quantity sold is 100, then total revenue would be ₹ 1000.

Figure depicts a total revenue curve.



Total Revenue Curve

6.6.2 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.

$$AR = TR / \text{Quantity}$$

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. Average revenue is often shown by an average revenue curve, shown in Figure 5.6.

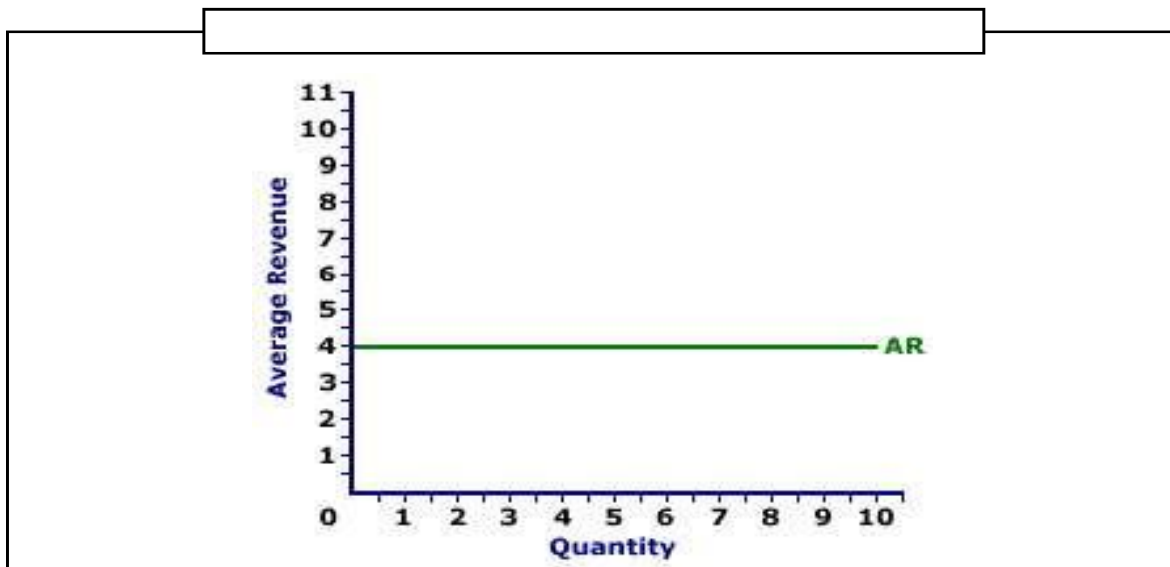


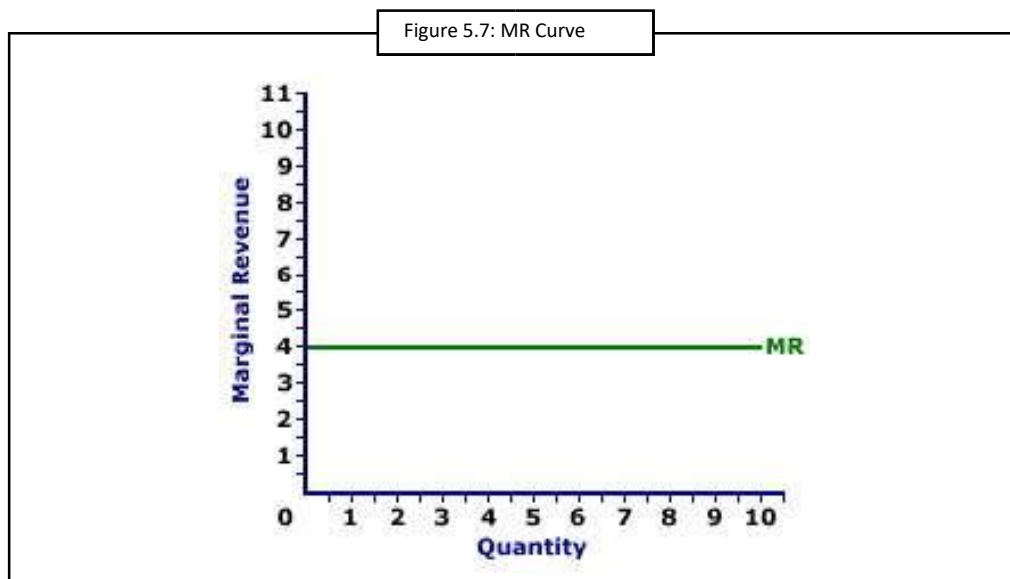
Figure 5. 6: Average Revenue Curve (Under Perfect Market)

6.6.3 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.

$$\text{MR} = \text{Change in TR} / \text{Change in Quantity}$$

Figure 5.7 depicts a MR curve under perfect market.



5.7 Law of Diminishing Returns to Factor (Law of Variable Proportions)

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 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.

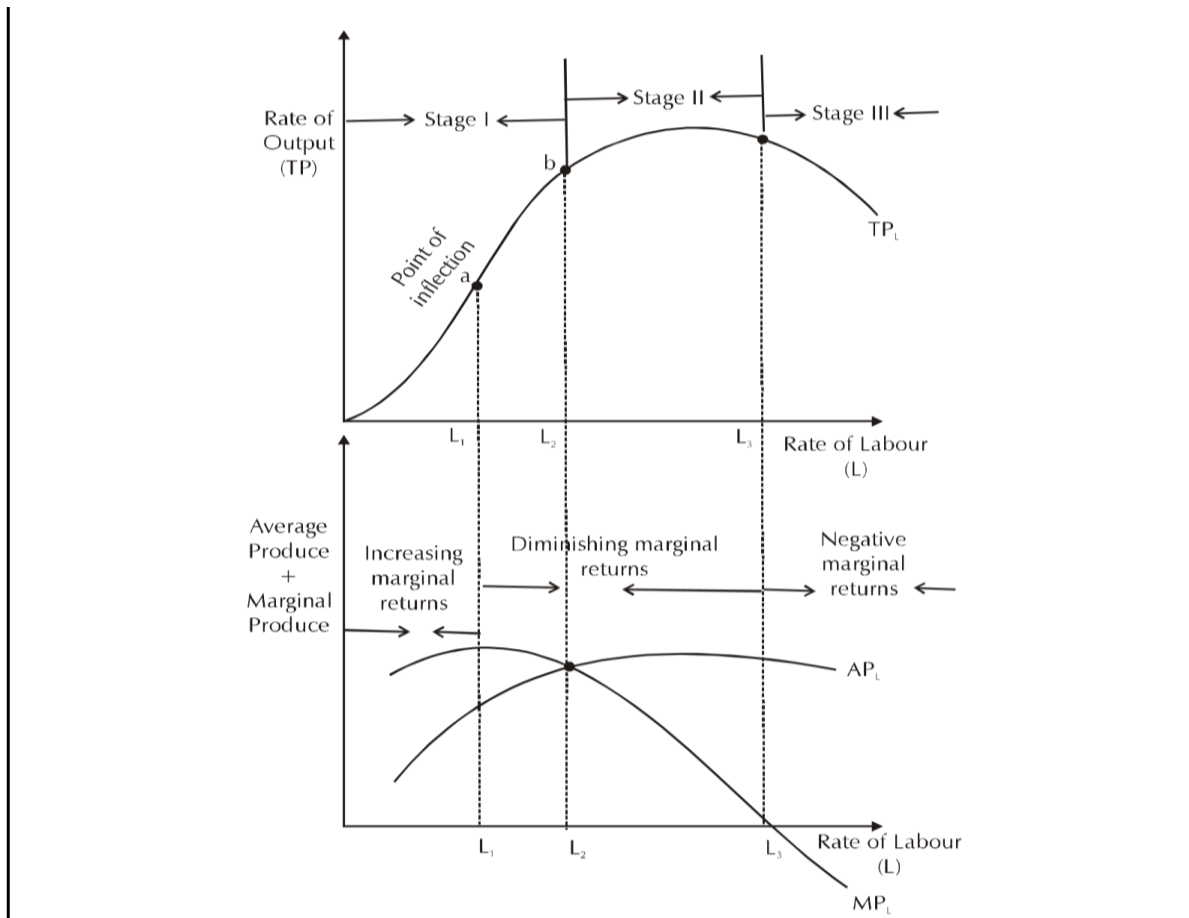
This underlines the short run production function. It can be shown in a Table 7.1 and Figure 7.1 as follows.

In Table 7.1 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. For 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.



5.7.1 Three Stages of Production

Diminishing returns to a factor can be graphically understood with the help of total and marginal product curves. In Figure 7.1, 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 7.2.

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

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.

Total Physical Product	Marginal Physical Product	Average Physical Product	Additional Information
<i>Stage I</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
<i>Stage II</i> 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
<i>Stage III</i> 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

5.7.2 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.

Task Production manager of a company estimates that their production process is currently characterises by the following production functions: $Q = 72x + 20x^2 - x^3$

1. Determine the equation for the MP and AP of the variable factor.
2. What is the MP when seven units of the variable input are employed?

5.8 Returns to Scale (Law of Returns to Scale)

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. For 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.

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

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

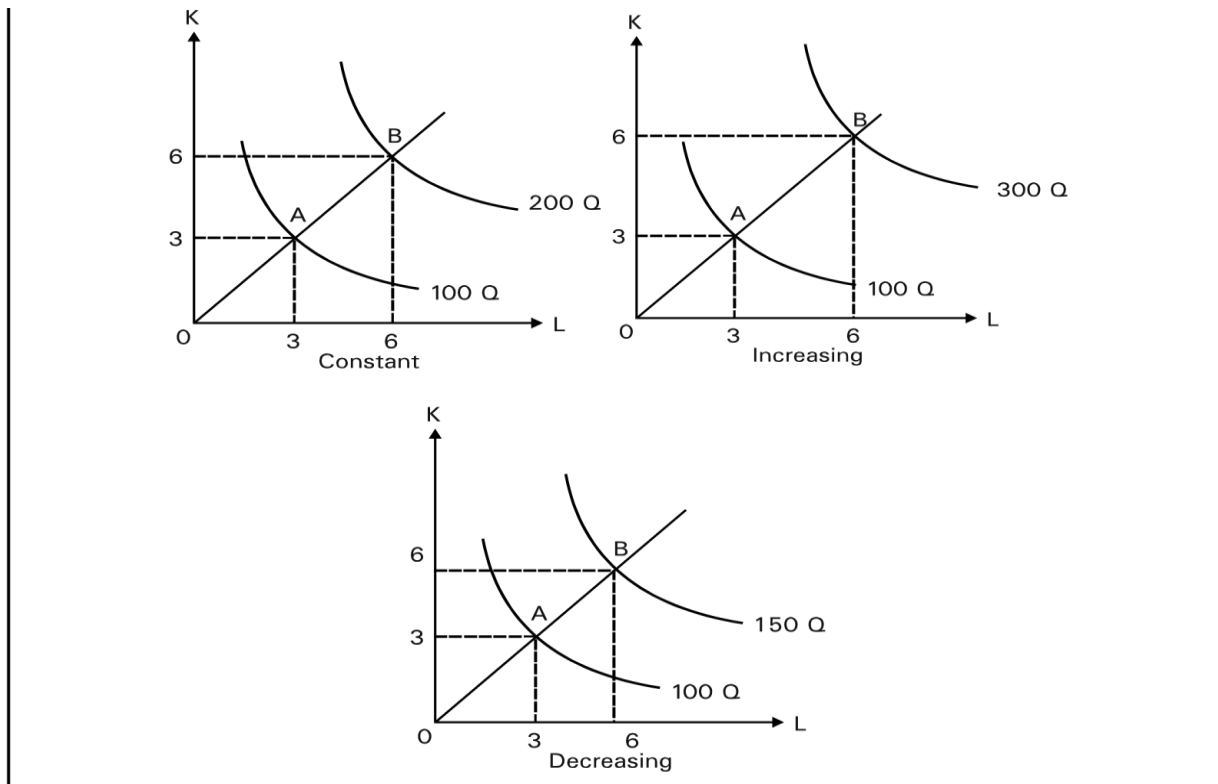
If land, K, and labour, L, is multiplied by h and Q increases by λ , we get, $Q =$

$$\lambda f(hL, hK)$$

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 7.2.

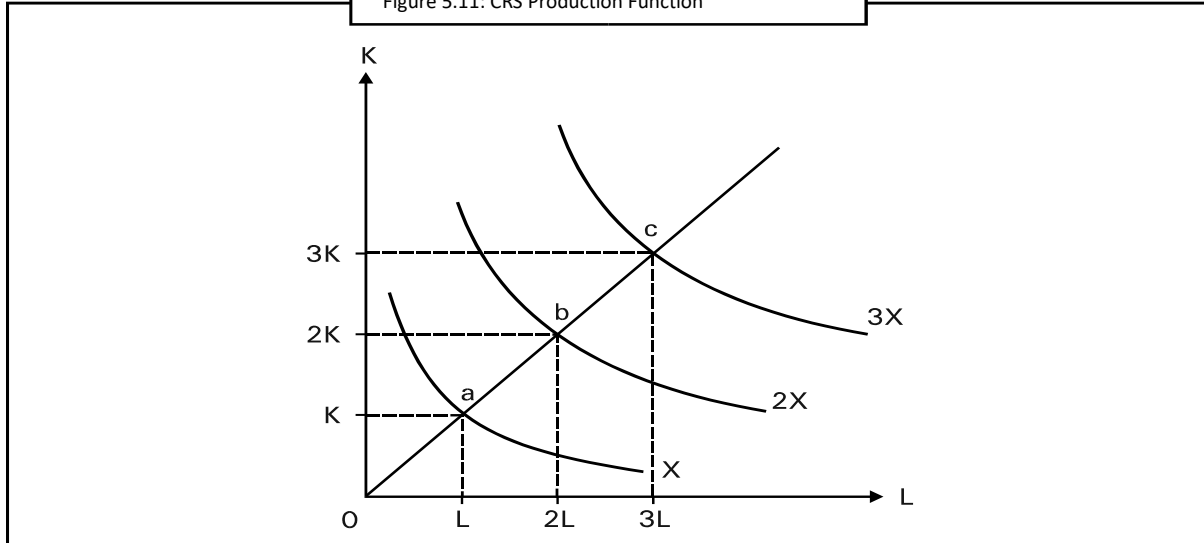


Increasing returns to scale arise because as the scale of operation increases, a greater division of labour and specialization can take place and more specialised and productive machinery can be used. Decreasing returns to scale arise primarily because as the scale of operation increases, it becomes 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 7.3, 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.

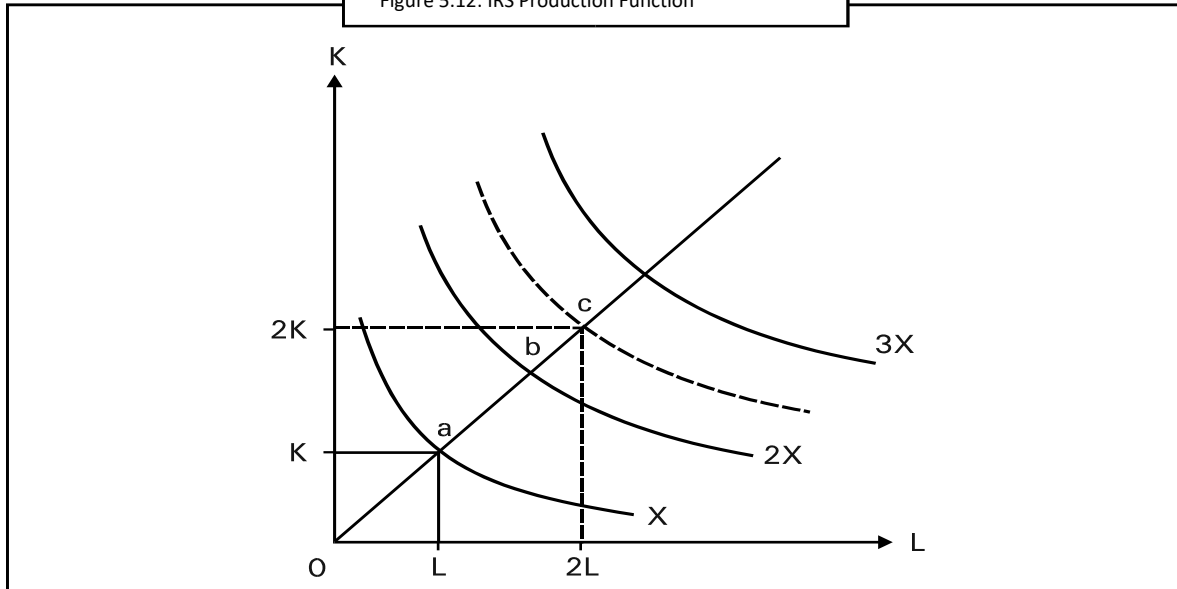
Figure 5.11: CRS Production Function



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 exhibit 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 7.4. 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).

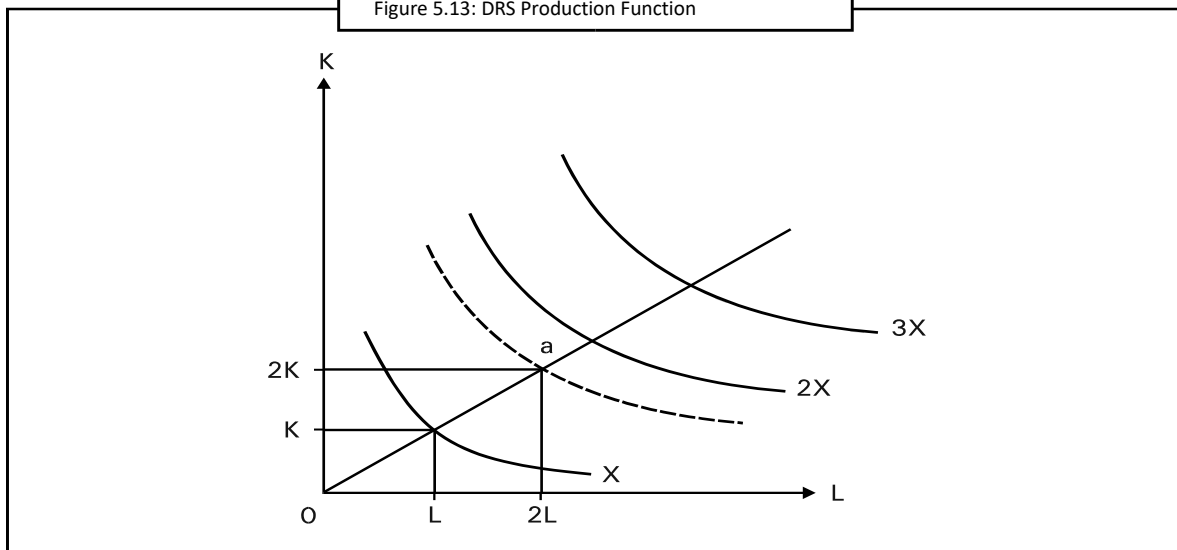
If the factors of production are increased in a particular proportion and the output increases by less than that proportion than the production function is said to exhibit DRS. For example, if capital and labour are increased by 10% and output rises by less than 10% the production function is said to exhibit decreasing returns to scale.

Figure 5.12: IRS Production Function



If you look at Figure 7.5, 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 $2X$.

Figure 5.13: DRS Production Function



It is also necessary for students to know the causes for increasing and decreasing returns to returns to scale.

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.

Answer the following questions

1. What is the equation for Marginal Product (MP) and Average Product (AP) of the variable factor in the given production function $Q=72x+20x^2-x^3$?
2. What is the Marginal Product (MP) when seven units of the variable input are employed?
3. What does the law of diminishing returns to factor state?
4. What are the three stages of production according to the law of diminishing returns?
5. Why won't a firm choose to operate in Stage I or Stage III of production?

Source: www.business-standard.com

5.9 Cost Concepts

Costs play a very important role in managerial decisions involving a selection between alternative courses of action. It helps in specifying various alternatives in terms of their quantitative values. The kind of cost to be used in a particular situation depends upon the business decisions to be made. Costs enter into almost every business decision and it is

important to use the right analysis of cost. Hence, it is important to understand what these various concepts of costs are, how these can be defined and operationalised. This requires the understanding of the two things, namely, (i) that cost estimates produced by conventional financial accounting are not appropriate for all managerial uses, and (ii) that different business problems call for different kinds of costs.

Future and Past Costs

Futurity is an important aspect 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. 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.

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. They are also called differential costs.

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.

Example: The most important example of sunk cost is the amortisation of past expenses, e.g., depreciation.

Out-of-Pocket and Book Costs

Out-of-pocket costs are those that involve immediate payments to outsiders as opposed to book costs that do not require current cash expenditure.

Example: Wages and salaries paid to the employees are out-of-pocket costs while salary of the owner manager.

If not paid, it is a book cost. The interest cost of owner's own fund and depreciation cost are other examples of book costs. Book costs can be converted into out-of-pocket costs by selling assets and leasing them back from the buyer.

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.

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.

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.

Notes 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. To take an 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".

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.

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. 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.

Private and Social Costs

Economic costs can be calculated at two levels: micro-level and macro-level. The micro-level economic costs relate to functioning of a firm as a production unit, while the macro-level economic costs are the ones that are generated by the decisions of the firm but are paid by the society and not the firm. Private costs are those which are actually incurred or provided for by an individual or a firm for its business activity. Social cost, on the other hand, is the total cost to the society on account of production of a good. Thus, the economic costs include both private and social costs.

Above are some concepts of costs. But the important cost concepts which play crucial role in managerial decision-making are as follows:

5.10 Fixed and Variable Costs

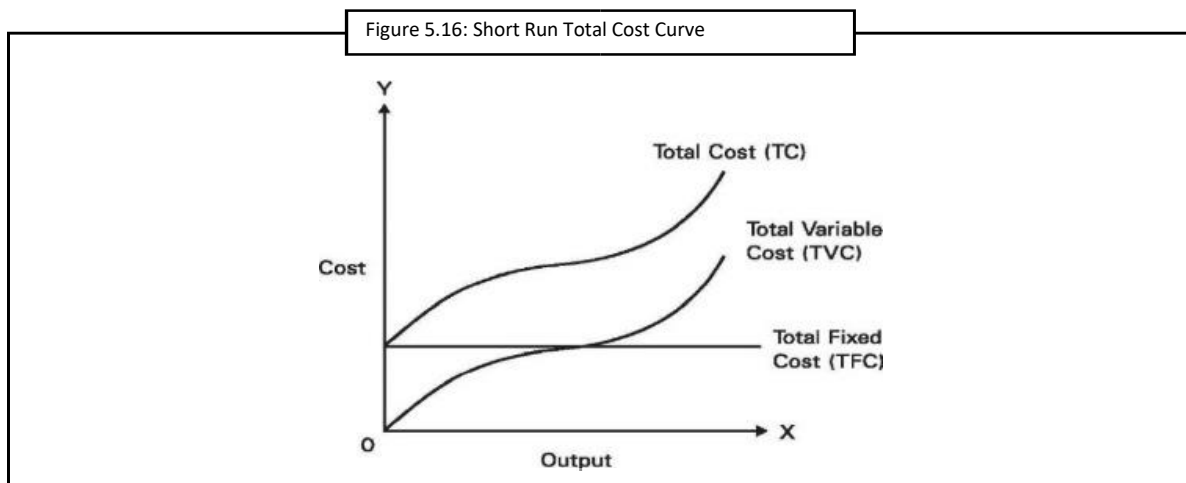
There are some inputs or factors which can be adjusted with the changes in the output level. Thus, a firm can readily employ more workers if it has to increase output. Likewise, it can secure and use more raw materials, more chemicals, without much delay, if it has to expand production. Thus, labour, raw materials, chemicals are the factors which can be readily varied with the change in output. Such factors are called variable factors. 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. The factors such as capital equipment, building, which cannot be readily varied and require a comparatively long time to make adjustment in them are called fixed factors. Therefore, 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 8.1, 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. On the other hand, the total variable cost curve (TVC) 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 nil. 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:

$$TC = f(q)$$



Total cost curve (TC) 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 (TC) is exactly the same as that of total variable cost curve (TVC) because the same vertical distance always separates the two curves.

5.11 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. It cannot increase output in the short run by expanding the capacity of its existing plant or building a new plant with larger capacity. 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.

5.11.1 Short Run Average Costs and Output

The cost concept is more frequently used both by businessmen and economists in the form of cost per unit or average cost rather than as totals. We, therefore pass on to the study of short run average cost curves.

Short Run Average Fixed Cost (AFC)

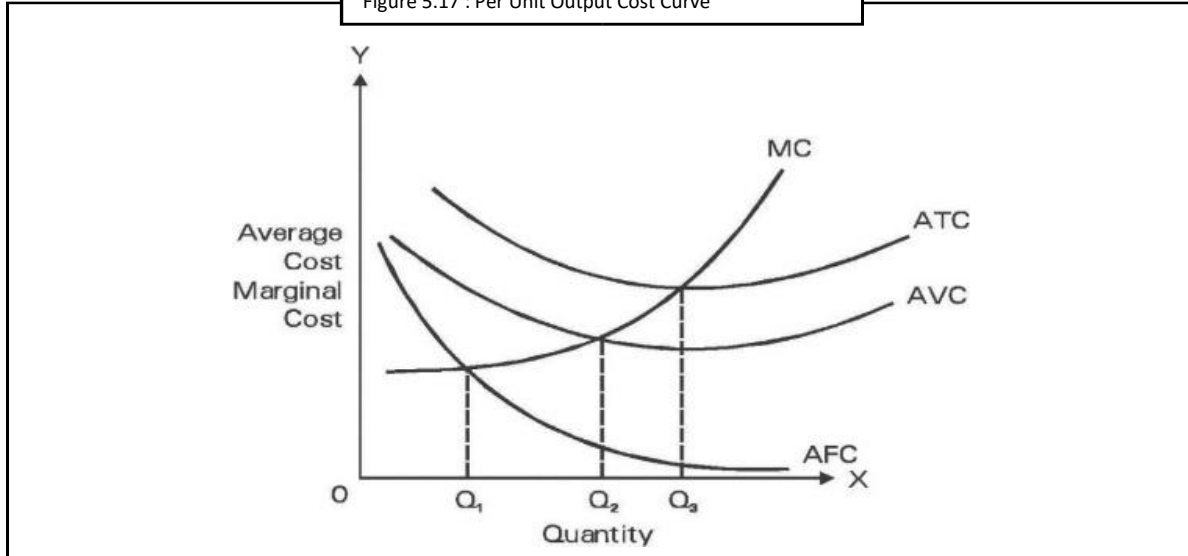
Average fixed cost is the total fixed cost divided by the number of units of output produced. Therefore,

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

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.

Figure 5.17 : 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 $TVC = P_1V_1 + P_2V_2 + \dots + P_nV_n$ 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:

$$AVC = \frac{TVC}{Q} = \frac{PV}{Q} = \left[P \frac{V}{Q} \right]$$

The term $\frac{V}{Q}$ is the number of units of input divided by the number of units of output. 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,

$$\frac{V}{Q} = \frac{1}{Q/V} = \frac{1}{AP}$$

$$AVC = P \left[\frac{V}{Q} \right] = P \left[\frac{1}{VP} \right]$$

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 8.2.

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:

Since	$ATC = \frac{TC}{Q}$
	$TC = TVC + TFC$
Therefore,	$ATC = \frac{TVC + TFC}{Q}$
	$= \frac{TVC}{Q} + \frac{TFC}{Q}$
	$= AVC + AFC$

Average total cost is also known as unit cost, since it is cost per unit of output produced.

5.11.2 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.

$$MC_n = TC_n - TC_{n-1}$$

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.

$$MC = \frac{d(TVC)}{dQ}$$

The independence of the marginal cost from the fixed cost can be proved algebraically as follows:

$$MC = \frac{d(TVC)}{dQ}$$

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 8.1, 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.

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

Table 5.4: The Relationship between MC, AC and TC

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

Caution 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.
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.

The laws governing costs are the same as the laws governing productivity. When output is increased in the short run, it can only be done by increasing the variable input. But as more and more of a variable input is added to a fixed input, the law of diminishing marginal productivity enters in. Marginal and average productivities fall.

5.11.4 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.

$$\begin{aligned} \text{If } & Q = f(L, K) \\ & TC = L.P_L + K.P_K \end{aligned}$$

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 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 8.3(a).
2. When returns to scale are decreasing, total cost increases at a faster rate than does output. This relationship is shown in Figure 8.3(b).
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 8.3(c).

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 8.4. 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,

$$LAC = \frac{LTC}{Q}$$

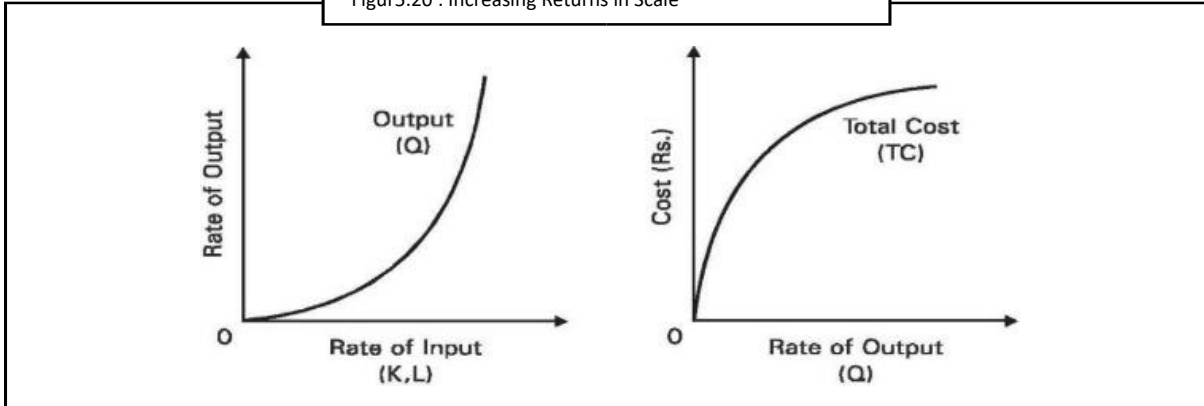
Similarly, from the LTC curve we can also derive the long run marginal cost (LMC) curve. This measures the change in LTC per unit change in output and is given by the slope of the LTC curve.

That is,

$$LMC = \frac{\Delta LTC}{\Delta Q} \text{ or } \frac{d(LTC)}{dQ}$$

The relationships among the long run total cost, long run marginal cost with respect to output are explained in the following table and Figure 8.5.

Figur5.20 : Increasing Returns in Scale



Figur5.21 : Decreasing Returns in Scale

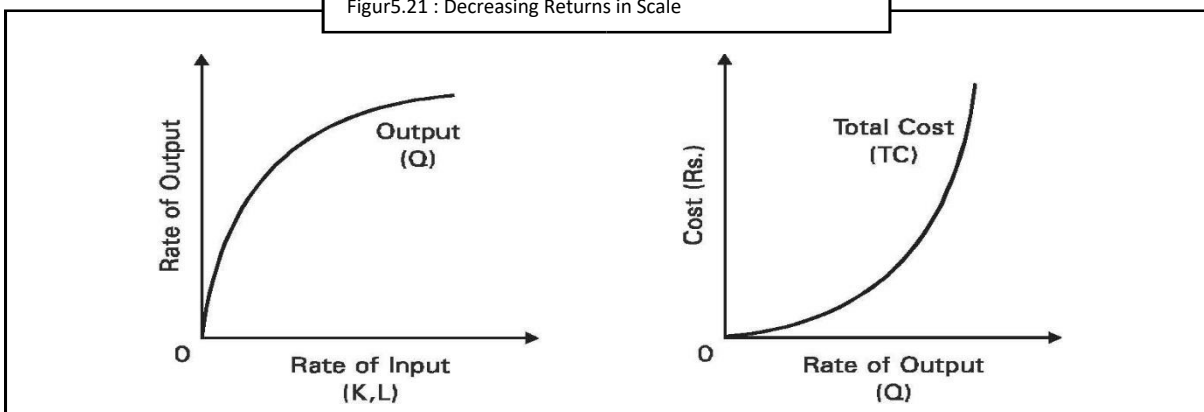
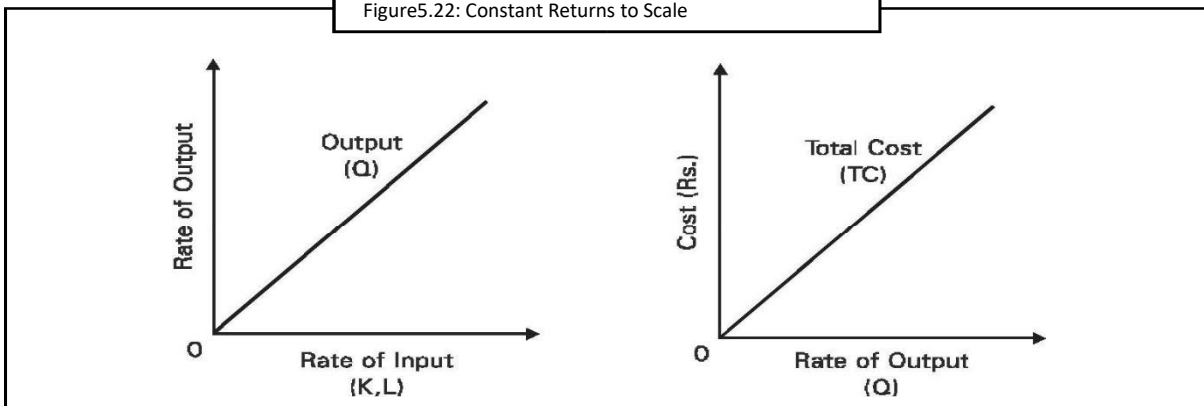


Figure5.22: Constant Returns to Scale



Did u know? Can average cost curve be stair shaped or L-shaped?

Economic theory often mentions U-shaped nature of average cost curve, but in reality, we come across various other types like the stair-shaped one, L-shaped learning curve or flat bottomed average cost curve. To take care of these empirical situations, the modern theory of costs has been developed.

Table 5.23

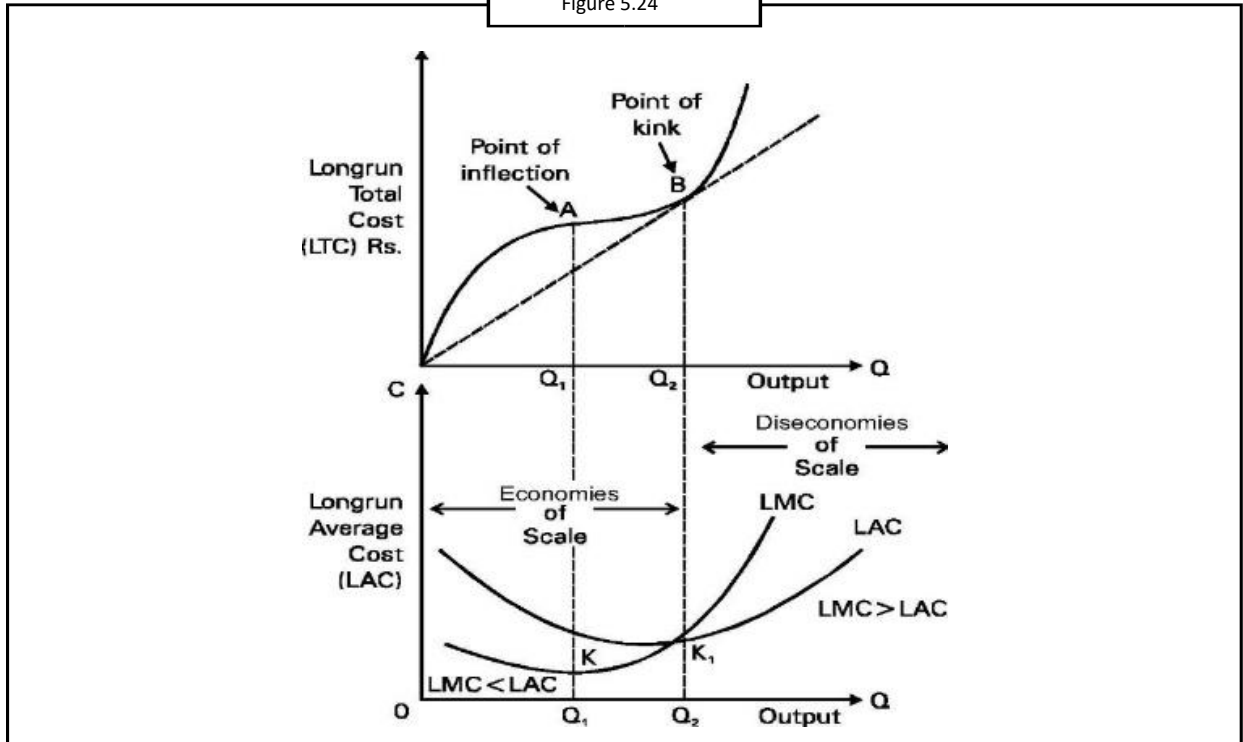
Q	LTC	LAC	LMC
0	0	-	-
5	25	5.00	5
10	45	4.50	4
15	60	4.00	3
20	85	4.25	5
25	120	4.85	7
30	180	6.00	12

The 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 5.24



ANSWER THE FOLLOWING QUESTIONS

1. Explain the difference between future costs and past costs. How are each of these used in managerial decision-making?
2. Define incremental costs and provide an example of a decision that would involve incremental costs.
3. What are sunk costs, and why are they irrelevant in decision-making?
4. Differentiate between out-of-pocket costs and book costs with examples.
5. What is the difference between historical cost and replacement cost? Provide an example illustrating both.

CHECK YOUR PROGRESS

5.12 Total Cost, Average Cost and Marginal Cost

Total cost includes all cash payments made to hired factors of production and all cash charges imputed for the use of the owner's factors of production in acquiring or producing a good or service. Thus, total cost of a firm is the sum total of the explicit plus implicit expenditures incurred for producing a given level of output. For example, a shoe maker's cost will include the amount he spends on leather, thread, rent for his workshop, wages, interest on borrowed capital, salaries of employees, etc., and the amount he charges for his services and his own funds invested in the business.

Average cost is the cost per unit of output assuming that production of each unit of output incurs the same cost. That is, it is obtained by dividing the total cost by the total quantity produced. If $TC=100$ and $X=10$, $AC = 10$.

Marginal cost is the extra cost of producing one additional unit. At a given level of output, one examines the additional costs being incurred in producing one extra unit and this yields the marginal cost. For example, if the total cost of a firm is ₹ 5,000 when it produces 10 units of a good but when 11 units of the good are produced, it increases to ₹ 5,300 then the marginal cost of the eleventh unit is ₹ $5,300 - 5,000 = ₹ 300$. In other words, marginal cost of nth units (MC_n) is the difference between total cost of nth unit (TC_n) and total cost of n-1th unit (TC_{n-1}).

$$MC_n = TC_n - TC_{n-1}$$

The relationship between MC, AC and TC is shown in the following table.

Units of goods produced (1)	Total Cost (TC) (2)	Average Cost (3 = 2/1)	Marginal Cost ($TC_n - TC_{n-1}$) (4)
10	5,000	500	-
11	5,300	481.82	300
12	5,550	462.5	250
13	5,700	438.46	150
14	5,950	425.00	250
15	6,350	423.33	400

The total cost concept is useful in break-even analysis and in finding out whether a firm is making profits or not. The average cost concept is significant for calculating the per unit profit of a business concern. The marginal and incremental cost concepts are needed in deciding whether a firm needs to expand its production or not. In fact, the relevant costs to be considered will differ from one situation to the other depending on the problem faced by the manager.



Example:

The Cost of Producing Rings

(₹)

Output	Fixed Costs (TFC)	Variable Costs (TVC)	Total Costs (TC) (TFC+TVC)	Average Fixed (TC) Costs (AFC=FC/Output)	Average Variable Costs (AVC=VC/Output)	Average Costs (ATC= AFC+AVC)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
4	50	50	100	12.50	12.50	25.00
5	50	60	110	10.00	12.00	22.00
10	50	100	150	5.00	10.00	15.00
11	50	106	156	4.54	9.64	14.18
17	50	150	200	2.94	8.82	11.76
18	50	157	207	2.78	8.72	11.50
21	50	182	232	2.38	8.67	11.05
23	50	200	250	2.17	8.70	10.87
24	50	210	260	2.08	8.75	10.83
28	50	250	300	1.79	8.93	10.72
29	50	265	315	1.72	9.14	10.86
32	50	350	400	1.56	10.94	12.50

TC = FC + VC
ATC = TC/Q

$$AFC = FC/Q$$

$$AVC = VC/Q$$

$$ATC = AFC + AVC$$

Managerial economics devotes a great deal of attention to the behaviour of costs. Total cost varies directly with output. The more output a firm produces, the higher will be its production cost and vice versa. This is because increased production requires increased use of raw materials, labour, etc., and if the increase is substantial even fixed inputs like plant and equipments and managerial staff may have to be increased. The relationship between cost and output is rather important.

Caselet  Input Costs and Profit Levels of Maruti Udyog Ltd. (MUL)

M

aruti 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.

5.13 Economies of Scale

A larger plant will lead to lower per unit cost in the long run. However, beyond some point, successive larger plants will mean higher average costs. Exactly, why is the long run ATC curve U-shaped, needs further explanation.

It must be emphasised, first of all, that the law of diminishing returns is not applicable here for it presumes that one resource is fixed in supply and also that in the long run resource prices are variable. Also, we assume that resource prices are constant in the short run. The U-shaped long run average cost curve is explainable, thus, in terms of “economies and diseconomies” of large scale production.

Economies and diseconomies of scale are concerned with the behaviour of average cost curve as the plant size 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.

But after sometime, expansion of a firm's output may give rise to diseconomies, and therefore, higher per unit cost. Further expansion of output beyond a reasonable level may lead to problems of over crowding of labour, managerial inefficiencies, etc., pushing up per unit cost.

All these are examples of internal economies and diseconomies of scale arising due to the firm's own expansion. According to Marshall, external economies and diseconomies of scale may arise due to the expansion of industry as a whole.

Example: Improved infrastructure facilities due to industrial expansion may lead to reduction in per unit cost of production in all the firms in an industry.

5.14 Economies of Scope

According to the concept of economies of scale, cost advantages follow from the increase in volume of production or what is called the scale of output. According to the concept of economies of scope, such cost advantages may follow from variety of output-product diversification within the given scale of plant. If the same plant can produce multiple products, there is the scope for a lot of cost savings because of joint use of inputs. Broad banding policy enables manufacturers to exploit economies of scope through product diversification.

Example: Escorts produces four wheelers from the same plant for two wheelers with small adjustments.

Instead of increasing the scale of production of an existing product, the firm can now add new and newer products if the size and type of plant allow this scope. In this process, the firms will have access to scope economies in place of scale economies. In certain processes, the firm can plan wisely to exploit both types of economies simultaneously.

8.7 Types of Revenue Curves and their Applications

We have already discussed the shapes of the revenue curves in the previous unit. Just to refresh your memories, we will define the terms once again.

Total revenue (TR) is the total money received from the sale of any given quantity of output during a given period of time. ($TR = P \times Q$, where P is the Price per unit and Q is the total quantity sold)

Average revenue (AR) is the total receipts from sales divided by the number of units sold, i.e., $AR = TR/Q$. It plays a major role in the determination of a firm's profit. The 'per unit profit' of a firm is determined as average revenue minus average (total) cost. A firm generally seeks to produce the quantity of output that maximises profit. (We will discuss this concept in subsequent units.)

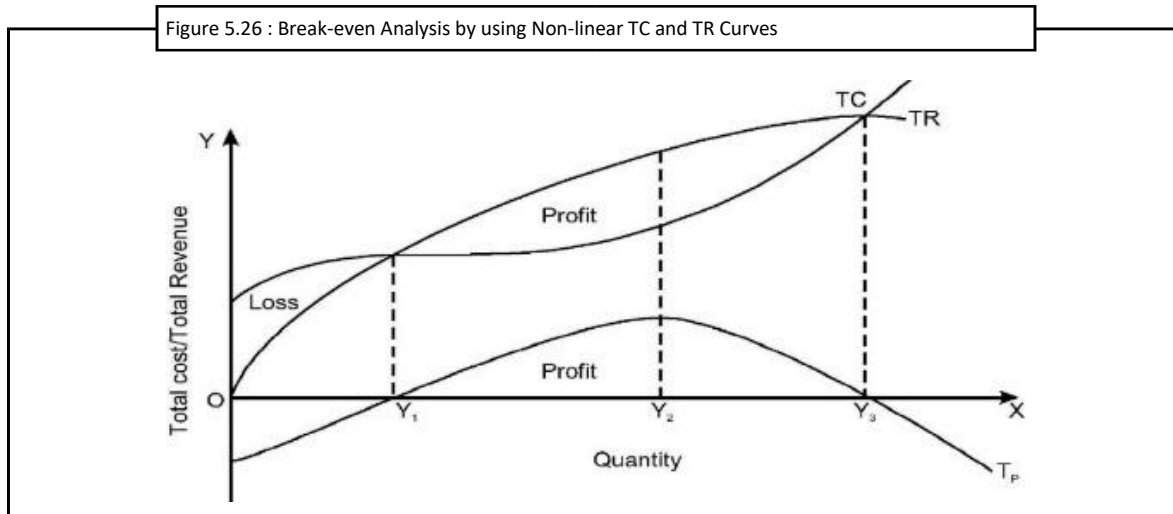
Marginal Revenue is the revenue associated with one additional unit of production. Marginal revenue is calculated as:

$$MR_n = TR_n - TR_{n-1}$$

Break-even Analysis

Many of the planning activities that take place within a firm are based on anticipated level of output. The study of the interrelationship among firm's sales, costs and operating profits at

various level of output levels is known as cost-volume profit analysis or break-even analysis. This analysis is often used by business executive to determine the sales volume required to break even and total profits and losses at different output levels. For illustrating the breakeven analysis. It is assumed that the cost and revenue curves are non-linear as shown in Figure 8.6. Total revenue is equal to the number of units of output sold multiplied by the price per unit. The concave form of revenue curve implies that the firm can sell additional units of output only by lowering the price. The total cost curve is based on traditional approach of relationship between cost and output in short-run.



The difference between total revenue and total cost at any level of output represents the total profit or loss that will be realised. The total profit (TP) at any level of output is given by vertical distance between the total revenue (TR) and total cost (TC) curves. A breakeven situation (zero profit) occurs whenever total revenue equals total cost. In Figure, breakeven condition occurs at two different output level- Y_1 and Y_3 . Below an output level Y_1 losses will incurred because $TR < TC$. Between Y_1 and Y_3 profits will be obtained because $TR > TC$. An output level above Y_3 , losses will occur again because $TR < TC$. Total profit aremaximised within the range of Y_1 to Y_3 , where the vertical distance between the TR and TC curves is greatest, that is at an output level of Y_2 .

For practical decision making the non-linear revenue output and cost output relationship of economic theory are generally replaced by linear functions. The breakeven analysis based on linear function is shown in Figure 8.7

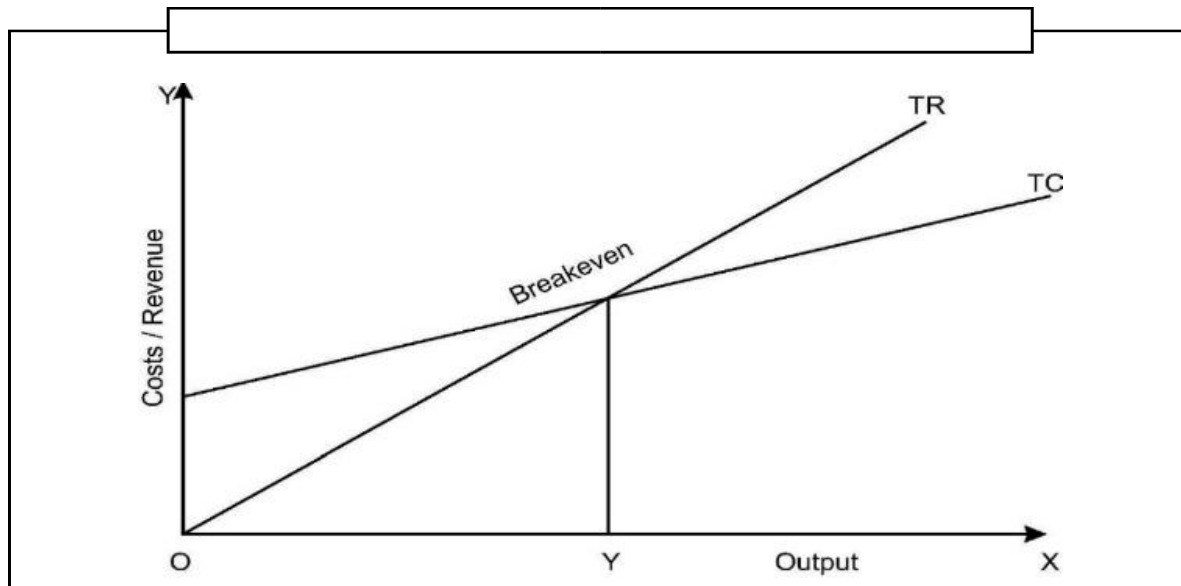


Figure 5.27 : Break-even Analysis by using Linear TC and TR Curves

Here TR is a straight line assuming that firms charge a constant selling price P per unit of output. In case of cost curve, total cost is taken as sum of fixed cost which are independent of the output level plus the variable costs which increases at a constant rate per unit of output. In this case the breakeven analysis occurs at point Y_b in Figure 5.27 where TR and TC intersect. If a firm's output level is below this breakeven point that is if $TR < TC$, it incurs operating losses. If firm's output level is above this breakeven point that is if $TR > TC$ it realises operating profits. Algebraically, it can be defined as:

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

$$TR = P \times Y$$

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

$$TC = TFC + AVC \times QY$$

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

$$TR = TC.$$

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

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

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

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

5.16 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.
-
- An expansion path is formally defined as the set of combinations of capital and labour that meet the efficiency condition.

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

- 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: (a) Increasing Returns to Scale (IRS), (b) Constant Returns to Scale (CRS) and (c) Decreasing Returns to Scale (DRS).
- 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 costs etc.
- Fixed costs are those costs which do not vary 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.

Economies of scope are reductions in average costs attributable to an increase in the number of goods produced.

5.17 Keywords

Isoquants: These are a geometric representation of the production function

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

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

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

Production: Transformation of inputs into output

Fixed inputs: Inputs that cannot be readily changed during the time period under consideration

Inputs: Resources used in the production of goods and services

Long-run: The time period when all inputs become variable

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

Abandonment costs: Costs incurred for disposing of the fixed assets, when any plant is to be permanently closed down.

Book costs: Costs that do not require current cash expenditure.

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).

Implicit costs: Theoretical costs which go unrecognized by the accounting system.

Incremental costs: Costs that are defined as the change in overall costs that result from particular decision being made.

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.

Shut-down costs: Costs incurred when the production operations are suspended and will not be incurred, if the production operations continue.

Sunk costs: Costs that are not affected or altered by a change in the level or nature of business activity.

Variable costs: Costs which are incurred on the employment of variable factors of production whose amount can be altered in the short-run.

5.18 LETS SUM UP

This unit has covered the essentials of production, highlighting the transformation of inputs like labour, capital, and natural resources into goods and services. You explored how entrepreneurs combine these inputs efficiently, as represented by the expansion path and isoquants. Key concepts such as the Marginal Rate of Technical Substitution (MRTS), the law of variable proportions, and returns to scale (IRS, CRS, DRS) were discussed. The importance of different cost analyses for business decisions was emphasized, including fixed and variable costs in the short run, and total, average, and marginal costs. Finally, economies of scope were introduced, explaining cost reductions through increased product variety.

5.19 MODEL QUESTION FOR PRACTICE

(I) Fill in the Blanks

1. The production function specifies the output of a firm for all combinations of _____.
2. In the short run, at least one input is _____, while in the long run, all inputs are _____.

3. The Marginal Rate of Technical Substitution (MRTS) is the rate at which one input can be _____ for another, while maintaining the same level of _____.
4. An _____ represents all possible combinations of inputs that produce a given level of output.
5. The _____ product is the change in total output resulting from a one-unit change in the variable factor.

(II) state whether true or false

1. In the long run, all inputs are fixed.
2. Isoquants can be used to show the different combinations of inputs that yield the same level of output.
3. Marginal product refers to the total output divided by the number of units of the variable factor.
4. The expansion path shows the set of input combinations that the firm uses to produce different levels of output efficiently.
5. The isocost line shows the various combinations of inputs that the firm can hire or rent at a given total cost.

(III) Multiple Choice Questions

1. Which of the following represents the technical possibilities of producing a given output using different combinations of inputs?
 - a) Marginal Rate of Technical Substitution
 - b) Isoquant
 - c) Isocost Line
 - d) Production Function
2. In the production function, if 'L' represents labor and 'K' represents capital, what does the equation $Q = AKaLb$ represent?
 - a) A linear production function
 - b) A fixed proportion production function
 - c) A Cobb-Douglas production function
 - d) A Constant Elasticity of Substitution function
3. What is the purpose of the isocost line in production theory?
 - a) To show the rate at which one input can be substituted for another
 - b) To represent different combinations of inputs that produce the same output
 - c) To show the combinations of inputs that the firm can afford at a given total cost
 - d) To depict the technical efficiency of production processes
4. Which term describes the change in total output resulting from a change in the variable input?
 - a) Average Product
 - b) Marginal Product
 - c) Total Product
 - d) Isoquant
5. The expansion path of a firm shows:
 - a) The maximum output that can be produced from a given set of inputs
 - b) The least cost combination of inputs for a given level of output

- c) The set of input combinations that are used to produce different levels of output efficiently
- d) The different ways to produce the same level of output

(IV) *Descriptive Questions and Answers*

1. Describe the concept of 'Production Function' and its significance in production theory.
2. Explain the difference between fixed inputs and variable inputs. Provide examples.
3. What is the Marginal Rate of Technical Substitution (MRTS) and how is it used in production analysis?
4. Discuss the concept of an 'Isoquant' and how it is useful for firms in production planning.
5. What is the role of the isocost line in determining the optimal combination of inputs?

5. Suggested Readings

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

H. Craig Patersen, Managerial Economics, Prentice Hall

Malcolm P. McNair and Richard S. Meriam, Problems in Business Economics, McGraw Hill Book Co., Inc.

Paul G. Keat, Managerial Economics, Pearson Education

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

[ingrimayne.com/econ/The Firm/ProductionFunct.html](http://ingrimayne.com/econ/TheFirm/ProductionFunct.html)

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