Introduction to Economics

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Chapter One

Basics of Economics

Introduction

Have you ever heard anything about Economics? Yes!!! It is obvious you heard about economics and even you talked a lot about economics in your day to day activities. And you may have questions such as: What are resources? What does efficient allocation mean? What are human needs? What does demand mean? What is economics? This course will answer those questions and introduce you to the nature of economics, demand and supply theories, theories of consumer, production, cost, market structure and fundamental concepts of macroeconomics at large.

In this chapter you will be introduced to the subject matter of economics and the rationale that motivates us to study economics.

Chapter objectives

After successful completion of this chapter, you will be able to:

- understand the concept and nature of economics;
- analyze how resources are efficiently used in producing output;
- identify the different methods of economic analysis ;
- distinguish and appreciate the different economic systems;
- understand the basic economic problems and how they can be solved; and
- identify the different decision making units and how they interact with each other

1.1 Definition of economics

Economics is one of the most exciting disciplines in social sciences. The word economy comes from the Greek phrase "one who manages a household". The science of economics in its current form is about two hundred years old. *Adam Smith* – generally known as the father of economics – brought out his famous book, "*An Inquiry into the Nature and Causes of Wealth of Nations*", in the year 1776. Though many other writers expressed important economic ideas before Adam Smith, economics as a distinct subject started with his book.

There is no universally accepted definition of economics (its definition is controversial). This is because different economists defined economics from different perspectives:

a. Wealth definition,
b. Welfare definition,
c. Scarcity definition, and
d. Growth definition

Hence, its definition varies as the nature and scope of the subject grow over time. But, the formal and commonly accepted definition is as follow.

Economics is a social science which studies about efficient allocation of scarce resources so as to attain the maximum fulfillment of unlimited human needs. As economics is a science of choice, it studies how people choose to use scarce or limited productive resources (land, labour, equipment, technical knowledge and the like) to produce various commodities.

The following statements are derived from the above definition.

- Economics studies about scarce resources;
- It studies about allocation of resources;
- Allocation should be efficient;
- Human needs are unlimited
- The aim (objective) of economics is to study how to satisfy the unlimited human needs up to the maximum possible degree by allocating the resources efficiently.

1.2 The rationales of economics

There are two fundamental facts that provide the foundation for the field of economics.

1) Human (society's) material wants are unlimited.
2) Economic resources are limited (scarce).

The **basic economic problem** is about **scarcity** and **choice** since there are only limited amount of resources available to produce the unlimited amount of goods and services we desire. Thus, economics is the study of how human beings make choices to use scarce resources as they seek to satisfy their unlimited wants. Therefore, choice is at the heart of all decision-making. As an individual, family, and nation, we confront difficult choices about how to use limited resources to meet our needs and wants. Economists study how these choices are made in various settings; evaluate the outcomes in terms of criteria such as efficiency, equity, and stability; and search for alternative forms of economic organization that might produce higher living standards or a more desirable distribution of material well-being.

1.3 Scope and method of analysis in economics

1.3.1 Scope of economics

The field and scope of economics is expanding rapidly and has come to include a vast range of topics and issues. In the recent past, many new branches of the subject have developed, including development economics, industrial economics, transport economics, welfare economics, environmental economics, and so on. However, the core of modern economics is

formed by its two major branches: microeconomics and macroeconomics. That means economics can be analyzed at micro and macro level.

A. Microeconomics is concerned with the economic behavior of individual decision making units such as households, firms, markets and industries. In other words, it deals with how households and firms make decisions and how they interact in specific markets.

B. Macroeconomics is a branch of economics that deals with the effects and consequences of the aggregate behaviour of all decision making units in a certain economy. In other words, it is an aggregative economics that examines the interrelations among various aggregates, their determination and the causes of fluctuations in them. It looks at the economy as a whole and discusses about the economy-wide phenomena.

Microeconomics	Macroeconomics
❖ Studies individual economic units of an economy. ❖ Deals with individual income, individual prices, individual outputs, etc. ❖ Its central problem is price determination and allocation of resources. ❖ Its main tools are the demand and supply of particular commodities and factors. ❖ It helps to solve the central problem of 'what, how and for whom to produce' in an economy so as to maximize profits ❖ Discusses how the equilibrium of a consumer, a producer or an industry is attained. Examples: Individual income, individual savings, individual prices, an individual firm's output, individual consumption, etc.	❖ Studies an economy as a whole and its aggregates. ❖ Deals with national income and output and general price level ❖ Its central problem is determination of level of income and employment. ❖ Its main tools are aggregate demand and aggregate supply of an economy as a whole. ❖ Helps to solve the central problem of 'full employment of resources in the economy.' ❖ Concerned with the determination of equilibrium levels of income and employment at aggregate level. Examples: national income, national savings, general price level, national output, aggregate consumption, etc.

Note: Both microeconomics and macroeconomics are complementary to each other. That is, macroeconomics cannot be studied in isolation from microeconomics.

1.3.2 Positive and normative analysis

Is economics a positive science or normative science, or both? What is your justification?

Economics can be analyzed from two perspectives: positive economics and normative economics.

Positive economics: it is concerned with analysis of facts and attempts to describe the world as it is. It tries to answer the questions what was; what is; or what will be? It does not judge a system as good or bad, better or worse.

Example:

- The current inflation rate in Ethiopia is 12 percent.
- Poverty and unemployment are the biggest problems in Ethiopia.
- The life expectancy at birth in Ethiopia is rising.

All the above statements are known as positive statements. These statements are all concerned with real facts and information. Any disagreement on positive statements can be checked by looking in to facts.

Normative economics: It deals with the questions like, what ought to be? Or what the economy should be? It evaluates the desirability of alternative outcomes based on one's value judgments about what is good or what is bad. In this situation since normative economics is loaded with judgments, what is good for one may not be the case for the other. Normative analysis is a matter of opinion (subjective in nature) which cannot be proved or rejected with reference to facts.

Example:

- The poor should pay no taxes.
- There is a need for intervention of government in the economy.
- Females ought to be given job opportunities.

Any disagreement on a normative statement can be solved by voting.

1.3.3 Inductive and deductive reasoning in economics

The fundamental objective of economics, like any science, is the establishment of valid generalizations about certain aspects of human behaviour. Those generalizations are known as theories. A theory is a simplified picture of reality. Economic theory provides the basis for economic analysis which uses logical reasoning. There are two methods of logical reasoning: inductive and deductive.

a) **Inductive reasoning** is a logical method of reaching at a correct general statement or theory based on several independent and specific correct statements. In short, it is the process of deriving a principle or theory by moving from facts to theories and from particular to general economic analysis.

Inductive method involves the following steps.

1. Selecting problem for analysis
2. Collection, classification, and analysis of data
3. Establishing cause and effect relationship between economic phenomena.

b) **Deductive reasoning** is a logical way of arriving at a particular or specific correct statement starting from a correct general statement. In short, it deals with conclusions about economic phenomenon from certain fundamental assumptions or truths or axioms through a process of logical arguments. The theory may agree or disagree with the real world and we should check the validity of the theory to facts by moving from general to particular. Major steps in the deductive approach include:

1. Problem identification
2. Specification of the assumptions
3. Formulating hypotheses
4. Testing the validity of the hypotheses

1.4 Scarcity, choice, opportunity cost and production possibilities frontier

1. *Have you ever faced a problem of choice among different alternatives? If yes, what was your decision?*
2. *What is scarcity? Do you think that it is different from shortage? Why?*

It is often said that the central purpose of economic activity is the production of goods and services to satisfy consumer's needs and wants i.e. to meet people's need for consumption both as a means of survival and also to meet their ever-growing demand for an improved lifestyle or standard of living.

1. Scarcity

The fundamental economic problem that any human society faces is the problem of scarcity. Scarcity refers to the fact that all economic resources that a society needs to produce goods and services are finite or limited in supply. But their being limited should be expressed in relation to human wants. Thus, the term scarcity reflects the imbalance between our wants and the means to satisfy those wants.

Resources

Free resources: A resource is said to be free if the amount available to a society is greater than the amount people desire at zero price. E.g. sunshine

Scarce (economic) resources: A resource is said to be scarce or economic resource when the amount available to a society is less than what people want to have at zero price.

The following are examples of *scarce resources.*

- All types of human resources: manual, intellectual, skilled and specialized labor;
- Most natural resources like land (especially, fertile land), minerals, clean water, forests and wild - animals;
- All types of capital resources (like machines, intermediate goods, infrastructure); and
- All types of entrepreneurial resources.

Economic resources are usually classified into four categories.

- **Labour:** refers to the physical as well as mental efforts of human beings in the production and distribution of goods and services. The reward for labour is called **wage.**
- **Land:** refers to the natural resources or all the free gifts of nature usable in the production of goods and services. The reward for the services of land is known as **rent.**
- **Capital**: refers to all the manufactured inputs that can be used to produce other goods and services. Example: equipment, machinery, transport and communication facilities, etc. The reward for the services of capital is called **interest.**
- **Entrepreneurship**: refers to a special type of human talent that helps to organize and manage other factors of production to produce goods and services and takes risk of making loses. The reward for entrepreneurship is called **profit.**

Entrepreneurs are individuals who:

- Organize factors of production to produce goods and services.
- Make basic business policy decisions.
- Introduce new inventions and technologies into business practice.
- Look for new business opportunities.
- Take risks of making losses.

Note: *Scarcity does not mean shortage.* We have already said that a good is said to be scarce if the amount available is less than the amount people wish to have at zero price. But we say that there is shortage of goods and services when people are unable to get the amount they want at the prevailing or on going price. Shortage is a specific and short term problem but scarcity is a universal and everlasting problem.

2. Choice

If resources are scarce, then output will be limited. If output is limited, then we cannot satisfy all of our wants. Thus, choice must be made. Due to the problem of scarcity, individuals, firms and government are forced to choose as to what output to produce, in what quantity, and what output not to produce. In short, **scarcity implies choice.** Choice, in turn, implies cost. That means whenever choice is made, an alternative opportunity is sacrificed. This cost is known as opportunity cost.

Scarcity → limited resource → limited output → we might not satisfy all our wants →choice involves costs → opportunity cost

3. Opportunity cost

In a world of scarcity, a decision to have more of one thing, at the same time, means a decision to have less of another thing. The value of the next best alternative that must be sacrificed is, therefore, the opportunity cost of the decision.

Definition: Opportunity cost is the amount or value of the next best alternative that must be sacrificed (forgone) in order to obtain one more unit of a product.

For example, suppose the country spends all of its limited resources on the production of cloth or computer. If a given amount of resources can produce either one meter of cloth or 20 units of computer, then the cost of one meter of cloth is the 20 units of computer that must be sacrificed in order to produce a meter of cloth.

When we say opportunity cost, we mean that:

- ✓ It is measured in goods & services but not in money costs
- ✓ It should be in line with the principle of substitution.

In conclusion, when opportunity cost of an activity increases people substitute other activities in its place.

4. The Production Possibilities Frontier or Curve (PPF/ PPC)

The production possibilities frontier (PPF) is a curve that shows the various possible combinations of goods and services that the society can produce given its resources and technology. To draw the PPF we need the following assumptions.

a. The quantity as well as quality of economic resource available for use during the year is fixed.
b. There are two broad classes of output to be produced over the year.
c. The economy is operating at full employment and is achieving full production (efficiency).

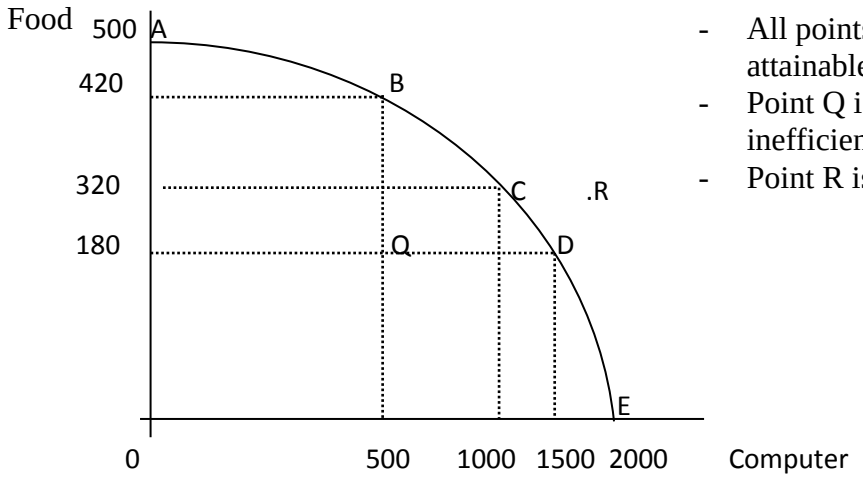
d. Technology does not change during the year.
e. Some inputs are better adapted to the production of one good than to the production of the other (specialization).

Suppose a hypothetical economy produces food and computer given its limited resources and available technology (table 1.1).

Table 1.1: Alternative production possibilities of a certain nation

Types of products	**Unit**	**Production alternatives**				
		A	B	C	D	E
Food	metric tons	500	420	320	180	0
Computer	number	0	500	1000	1500	2000

We can also display the above information with a graph.



- All points on the PPF are attainable and efficient
- Point Q is attainable but inefficient
- Point R is unattainable

Figure 1.1: Production Possibilities Frontier

The PPF describes three important concepts:

i) **The concepts of scarcity**: - the society cannot have unlimited amount of outputs even if it employs all of its resources and utilizes them in the best possible way.

ii) **The concept of choice**: - any movement along the curve indicates the change in choice.

iii)**The concept of opportunity cost**: - when the economy produces on the PPF, production of more of one good requires sacrificing some of another product which is reflected by the downward sloping PPF. Related to the opportunity cost we have a law known as the **law of increasing opportunity cost.** This law states that as we produce more and more of a product, the opportunity cost per unit of the additional output increases. This makes the shape of the PPF **concave** to the origin.

The reason why opportunity cost increases when we produce more of one good is that economic resources are not completely adaptable to alternative uses (specialization effect).

$$Opportunity\ cost\ of\ a\ good = \frac{\text{the amount of the next best alternative sacrified}}{\text{the amount of the good gained}}$$

Example: Referring to table 1.1 above, if the economy is initially operating at point B, what is the opportunity cost of producing one more unit of computer?

Solution: Moving from production alternative B to C we have:

$OC = \frac{320-420}{1000-500} = \left|\frac{-100}{500}\right| = \underline{\underline{0.2}}$ (The economy gives up 0.2 metric tons of food per computer)

5. Economic Growth and the PPF

Economic growth or an increase in the total output level occurs when one or both of the following conditions occur.

1. Increase in the quantity or/and quality of economic resources.
2. Advances in technology.

Economic growth is represented by outward shift of the PPF.

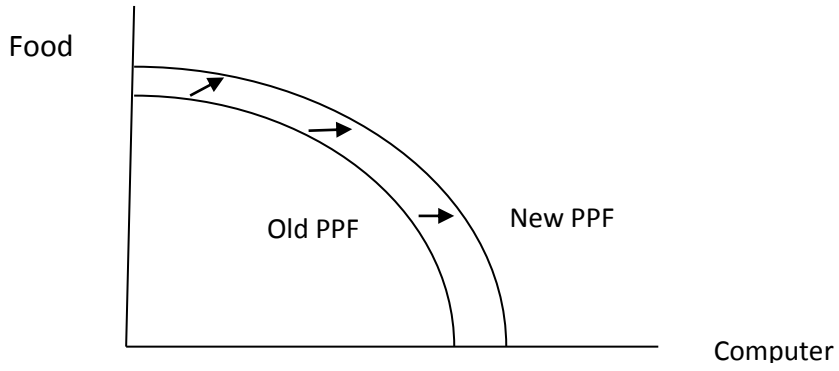


Figure 1.2: Economic growths with a new PPC

An economy can grow because of an increase in productivity in one sector of the economy. For example, an improvement in technology applied to either food or computer would be illustrated by a shift of the PPF along the Y- axis or X-axis. This is called *asymmetric growth* (figure 1.3).

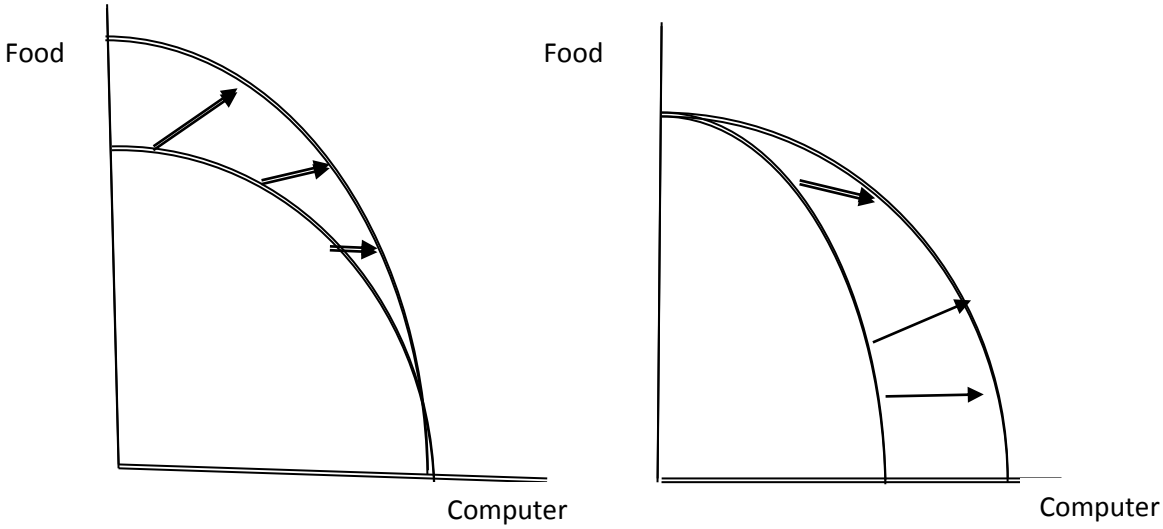


Figure 1.3: improvements in technology and quantity and/or quality of resources on national output

1.5 Basic economic questions

Economic problems faced by an economic system due to scarcity of resources are known as basic economic problems. These problems are common to all economic systems. They are also known as central problems of an economy. Therefore, any human society should answer the following three basic questions.

What to Produce?

This problem is also known as the *problem of allocation of resources*. It implies that every economy must decide which goods and in what quantities are to be produced. The economy must make choices such as consumption goods versus capital goods, civil goods versus military goods, and necessity goods versus luxury goods. As economic resources are limited we must reduce the production of one type of good if we want more of another type. Generally, the final choice of any economy is a combination of the various types of goods but the exact nature of the combination depends upon the specific circumstances and objectives of the economy.

How to Produce?

This problem is also known as the *problem of choice of technique*. Once an economy has reached a decision regarding the types of goods to be produced, and has determined their respective quantities, the economy must decide how to produce them - choosing between alternative methods or techniques of production. For example, cotton cloth can be produced with hand looms, power looms, or automatic looms. Similarly, wheat can be grown with primitive tools and manual labour, or with modern machinery and little labour.

Broadly speaking, the various techniques of production can be classified into two groups: *labour-intensive techniques* and *capital-intensive techniques*. A labour-intensive technique involves the use of more labour relative to capital, per unit of output. A capital-intensive technique involves the use of more capital relative to labour, per unit of output. The choice between different techniques depends on the available supplies of different factors of production and their relative prices. Making good choices is essential for making the best possible use of limited resources to produce maximum amounts of goods and services.

For Whom to Produce?

This problem is also known as the *problem of distribution of national product*. It relates to how a material product is to be distributed among the members of a society. The economy must decide, for example, whether to produce for the benefit of the few rich people or for the large number of poor people. An economy that wants to benefit the maximum number of persons would first try to produce the necessities of the whole population and then to proceed to the production of luxury goods.

All these and other fundamental economic problems center around human needs and wants. Many human efforts in society are directed towards the production of goods and services to satisfy human needs and wants. These human efforts result in economic activities that occur within the framework of an *economic system*.

1.6 Economic systems

The way a society tries to answer the above fundamental questions is summarized by a concept known as economic system. An **economic system** is a set of organizational and institutional arrangements established to answer the basic economic questions. Customarily, we can identify three types of economic system. These are capitalism, command and mixed economy.

1.6.1 Capitalist economy

Capitalism is the oldest formal economic system in the world. It became widespread in the middle of the 19th century. In this economic system, all means of production are privately owned, and production takes place at the initiative of individual private entrepreneurs who work mainly for private profit. Government intervention in the economy is minimal. This system is also called *free market economy* or *market system* or *laissez faire*.

Features of Capitalistic Economy

- ✓ **The right to private property:** The right to private property is a fundamental feature of a capitalist economy. As part of that principle, economic or productive factors such as land, factories, machinery, mines etc. are under private ownership.

- ✓ **Freedom of choice by consumers:** Consumers can buy the goods and services that suit their tastes and preferences. Producers produce goods in accordance with the wishes of the consumers. This is known as the principle of consumer sovereignty.
- ✓ **Profit motive:** Entrepreneurs, in their productive activity, are guided by the motive of profit-making.
- ✓ **Competition:** In a capitalist economy, competition exists among sellers or producers of similar goods to attract customers. Among buyers, there is competition to obtain goods. Among workers, the competition is to get jobs. Among employers, it is to get workers and investment funds.
- ✓ **Price mechanism:** All basic economic problems are solved through the price mechanism.
- ✓ **Minor role of government:** The government does not interfere in day-to-day economic activities and confines itself to defense and maintenance of law and order.
- ✓ **Self-interest:** Each individual is guided by self-interest and motivated by the desire for economic gain.
- ✓ **Inequalities of income:** There is a wide economic gap between the rich and the poor.
- ✓ **Existence of negative externalities:** A negative externality is the harm, cost, or inconvenience suffered by a third party because of actions by others. In capitalistic economy, decision of firms may result in negative externalities against another firm or society in general.

Advantages of Capitalistic Economy

- ❖ **Flexibility or adaptability:** It successfully adapts itself to changing environments.
- ❖ **Decentralization of economic power:** Market mechanisms work as a decentralizing force against the concentration of economic power.
- ❖ **Increase in per-capita income and standard of living:** Rapid growth in levels of production and income leads to higher per-capita income and standards of living.
- ❖ **New types of consumer goods:** Varieties of new consumer goods are developed and produced at large scale.
- ❖ **Growth of entrepreneurship:** Profit motive creates and supports new entrepreneurial skills and approaches.
- ❖ **Optimum utilization of productive resources:** Full utilization of productive resources is possible due to innovations and technological progress.
- ❖ **High rate of capital formation:** The right to private property helps in capital formation.

Disadvantages of Capitalistic Economy

- **Inequality of income:** Capitalism promotes economic inequalities and creates social imbalance.
- **Unbalanced economic activity:** As there is no check on the economic system, the economy can develop in an unbalanced way in terms of different geographic regions and different sections of society.
- **Exploitation of labour:** In a capitalistic economy, exploitation of labour (for example by paying low wages) is common.
- **Negative externalities:** are problems in capitalistic economy where profit maximization is the main objective of firms. If economic makes sense for a firm to force others to pay the impacts of negative externalities such as pollution.

1.6.2 Command economy

Command economy is also known as socialistic economy. Under this economic system, the economic institutions that are engaged in production and distribution are owned and controlled by the state. In the recent past, socialism has lost its popularity and most of the socialist countries are trying free market economies.

Main Features of Command Economy

- **Collective ownership:** All means of production are owned by the society as a whole, and there is no right to private property.
- **Central economic planning:** Planning for resource allocation is performed by the controlling authority according to given socio-economic goals.
- **Strong government role:** Government has complete control over all economic activities.
- **Maximum social welfare:** Command economy aims at maximizing social welfare and does not allow the exploitation of labour.
- **Relative equality of incomes:** Private property does not exist in a command economy, the profit motive is absent, and there are no opportunities for accumulation of wealth. All these factors lead to greater equality in income distribution, in comparison with capitalism.

Advantages of Command Economy

- **Absence of wasteful competition:** There is no place for wasteful use of productive resources through unhealthy competition.
- **Balanced economic growth:** Allocation of resources through centralized planning leads to balanced economic development. Different regions and different sectors of the economy can develop equally.

- **Elimination of private monopolies and inequalities:** Command economies avoid the major evils of capitalism such as inequality of income and wealth, private monopolies, and concentration of economic, political and social power.

Disadvantages of Command Economy

- **Absence of automatic price determination:** Since all economic activities are controlled by the government, there is no automatic price mechanism.
- **Absence of incentives for hard work and efficiency:** The entire system depends on bureaucrats who are considered inefficient in running businesses. There is no financial incentive for hard work and efficiency. The economy grows at a relatively slow rate.
- **Lack of economic freedom:** Economic freedom for consumers, producers, investors, and employers is totally absent, and all economic powers are concentrated in the hands of the government.
- **Red-tapism:** it is widely prevalent in a command economy because all decisions are made by government officials.

1.6.3 Mixed economy

A mixed economy is an attempt to combine the advantages of both the capitalistic economy and the command economy. It incorporates some of the features of both and allows private and public sectors to co-exist.

Main Features of Mixed Economy

- ✓ **Co-existence of public and private sectors:** Public and private sectors co-exist in this system. Their respective roles and aims are well-defined. Industries of national and strategic importance, such as heavy and basic industry, defense production, power generation, etc. are set up in the public sector, whereas consumer-goods industry and small-scale industry are developed through the private sector.
- ✓ **Economic welfare:** Economic welfare is the most important criterion of the success of a mixed economy. The public sector tries to remove regional imbalances, provides large employment opportunities and seeks economic welfare through its price policy. Government control over the private sector leads to economic welfare of society at large.
- ✓ **Economic planning:** The government uses instruments of economic planning to achieve co-ordinated rapid economic development, making use of both the private and the public sector.
- ✓ **Price mechanism:** The price mechanism operates for goods produced in the private sector, but not for essential commodities and goods produced in the public sector. Those prices are defined and regulated by the government.

- ✓ **Economic equality:** Private property is allowed, but rules exist to prevent concentration of wealth. Limits are fixed for owning land and property. Progressive taxation, concessions and subsides are implemented to achieve economic equality.

Advantages of Mixed Economy

- ❖ **Private property, profit motive and price mechanism:** All the advantages of a capitalistic economy, such as the right to private property, motivation through the profit motive, and control of economic activity through the price mechanism, are available in a mixed economy. At the same time, government control ensures that they do not lead to exploitation.
- ❖ **Adequate freedom:** Mixed economies allow adequate freedom to different economic units such as consumers, employees, producers, and investors.
- ❖ **Rapid and planned economic development:** Planned economic growth takes place, resources are properly and efficiently utilized, and fast economic development takes place because the private and public sector complement each other.
- ❖ **Social welfare and fewer economic inequalities:** The government's restricted control over economic activities helps in achieving social welfare and economic equality.

Disadvantages of Mixed Economy

- ❖ **Ineffectiveness and inefficiency:** A mixed economy might not actually have the usual advantages of either the public sector or the private sector. The public sector might be inefficient due to lack of incentive and responsibility, and the private sector might be made ineffective by government regulation and control.
- ❖ **Economic fluctuations:** If the private sector is not properly controlled by the government, economic fluctuations and unemployment can occur.
- ❖ **Corruption and black markets:** if government policies, rules and directives are not effectively implemented, the economy can be vulnerable to increased corruption and black market activities.

1.7 Decision making units and the circular flow model

There are three decision making units in a closed economy. These are households, firms and the government.

i) **Household:** A household can be one person or more who live under one roof and make joint financial decisions. Households make two decisions.
   a) Selling of their resources, and
   b) Buying of goods and services.

ii) **Firm:** A firm is a production unit that uses economic resources to produce goods and services. Firms also make two decisions:

   a) Buying of economic resources
   b) Selling of their products.

iii) **Government**: A government is an organization that has legal and political power to control or influence households, firms and markets. Government also provides some types of goods and services known as **public goods and services** for the society.

The three economic agents interact in two markets:

- **Product market:** it is a market where goods and services are transacted/ exchanged. That is, a market where households and governments buy goods and services from business firms.
- **Factor market (input market):** it is a market where economic units transact/exchange factors of production (inputs). In this market, owners of resources (households) sell their resources to business firms and governments.

The **circular-flow diagram** is a visual model of the economy that shows how money (Birr), economic resources and goods and services flows through markets among the decision making units.

For simplicity, let's first see a two sector model where we have only households and business firms. In this case, therefore, we see the flow of goods and services from producers to households and a flow of resources from households to business firms.

In the following diagram, the clock – wise direction shows the flow of economic resources and final goods and services. Business firms sell goods and services to households in product markets (upper part of the diagram). On the other hand, the lower part shows, where households sell factors of production to business firms through factor market. The anti – clock wise direction indicates the flow of birr (in the form of revenue, income and spending on consumption). Firms, by selling goods and services to households, receive money in the form of revenue which is consumption expenditure for households in the product market. On the other hand, households by supplying their resources to firms receive income. This represents expenditure by firms to purchase factors of production which is used as an input to produce goods and services.

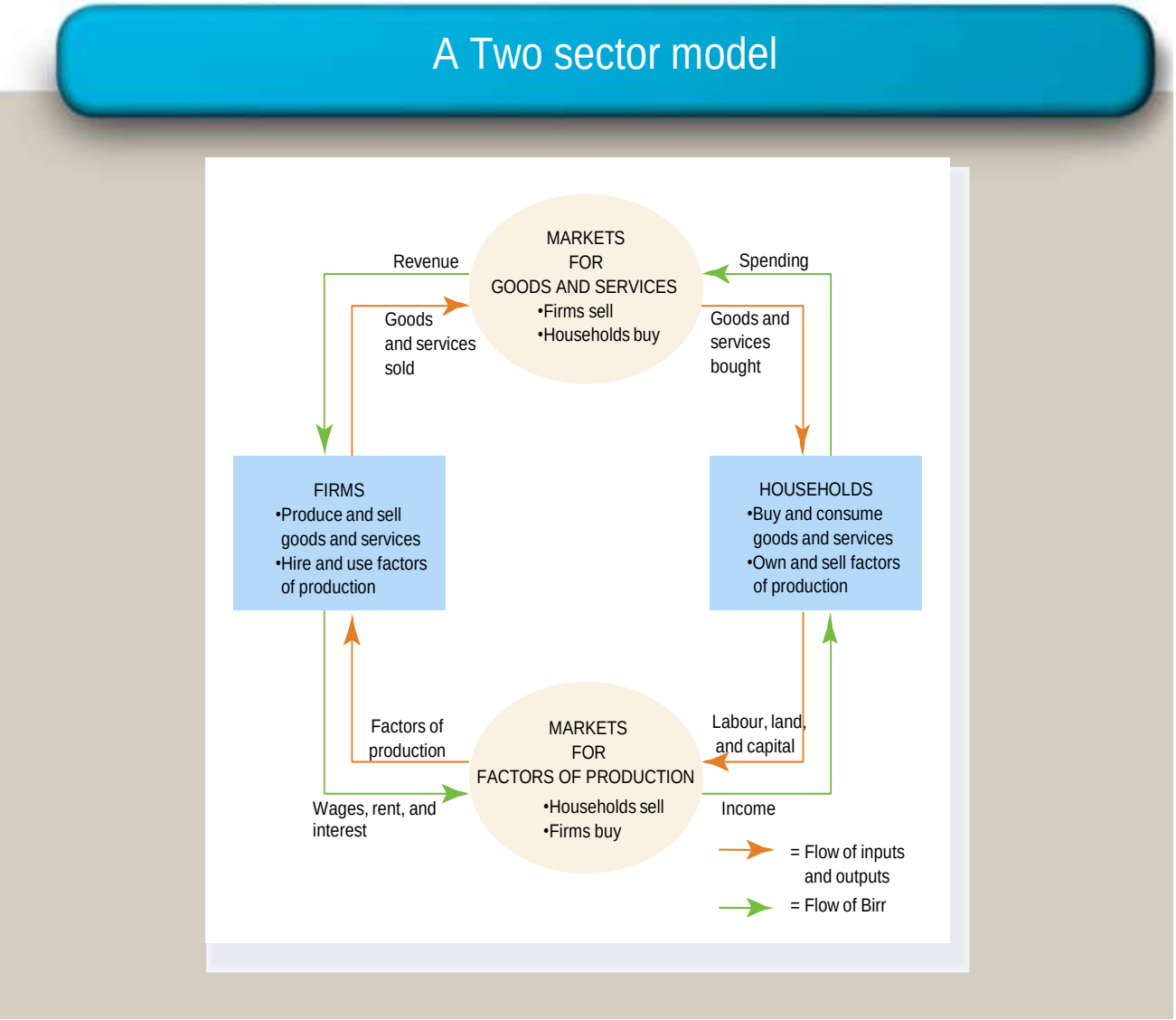


Figure 1.4: Circular flow of income with two sector model

We have also a three sector model in which the government is involved in the economic activities. As shown in figure 1.5 below, the only difference of the three sector model from the two sector model is that it involves government participation in the market. The government to provide public services purchase goods and services from business firms through the product market with a given amount of expenditure. On the other hand, the government also needs resources required for the provision of the services. This resource is purchased from the factor market by making payments to the resource owners (households).

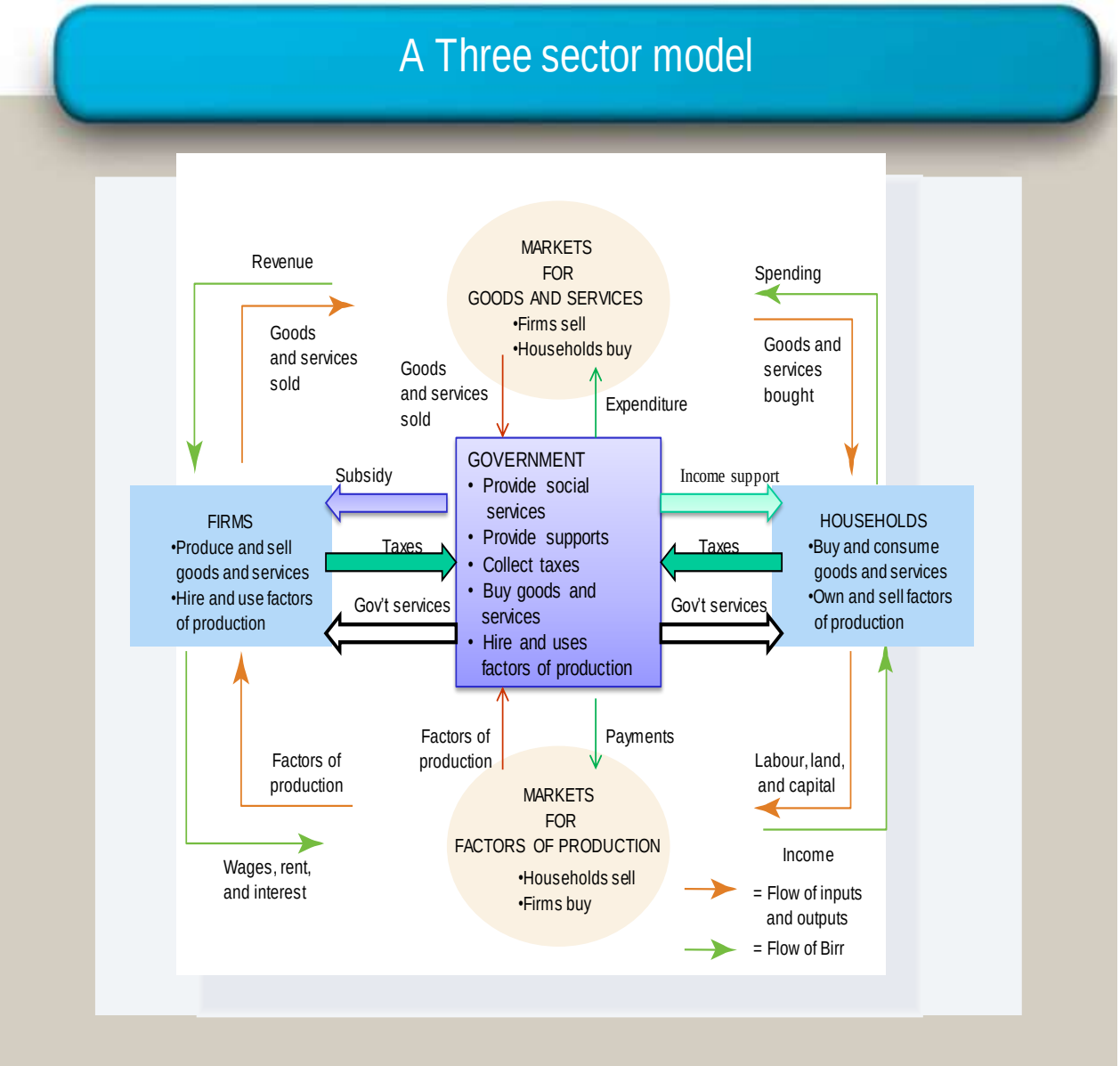


Figure 1.5: Three sector circular flow of resources

The service provided by the government goes to the households and business firms. The government might also support the economy by providing income support to the households and subsidies to the business firms. At this point you might ask the source of government finance to make the expenditures, payments and additional supports to the firms and households. The main source of revenue to the government is the tax collected from households and firms.

Chapter summary

Economics is a social science which studies about efficient allocation of scarce resources so as to attain the maximum fulfillment of unlimited human needs. Economics has two main ranches: Microeconomics (deals with the economic behavior of individual economic units and individual economic variables) and Macroeconomics (deals with the functions of the economy as a whole).

Resources can be categorized as *free resources* (that are free gifts of nature, are unlimited in supply) and *economic resources* (that are scarce such as land, labor, capital and entrepreneurship).

Production Possibility Curve (PPC) is a curve that depicts all possible combinations of the maximum output that can be produced in an economy with given resources and technology.

Economic system is a legal and institutional framework within which various economic activities take place. In economics there are three basic alternative economic systems such as Capitalistic economy, Command economy and Mixed economy. In a closed economy, the major decision-making units are households, firms, and the government.

Review questions

Part I: Discussion questions

1. Define economics from perspective of Wealth, Welfare, Scarcity, and Growth. Which definition more suits for economics? Why?
2. Why we study economics? Have you gained anything from this chapter? Would you discuss them please?
3. Define scarcity, choice and opportunity cost. Can you link them in your day to day lives?
4. What do you understand by *positive economics* and *normative economics*?
5. Explain why economics deals with allocation and efficient utilization of scarce resources only?
6. In recent years, especially around big cities, there is the problem of air pollution and the likelihood of poisoning is high. Given this scenario, do you think that air is free resource? Justify your answer.
7. Describe the four categories of economic resources. Which category of resources you and your family owned?
8. What is a production possibility curve?
9. Discuss the economic system in Ethiopia over the recent three regimes (EPRDF, Derg and imperial regime)
10. What are the central problems of an economy? Discuss them in detail.

Part II: Work out items

1. Assume that a certain simplified economy produces only two goods, X and Y, with given resources and technology. The following table gives the various possible combinations of the production of the two goods (all units are measured in millions of tons).

Production Possibility	***Good X***	***Good Y***	***Opportunity Cost of Good X***
A	0	100	
B	2	90	
C	4	60	
D	6	20	

a) Calculate the opportunity cost of the production of good X at each point. What law does the trend in those values exhibit?

b) What changes are required for this economy to shift the PPF outward?

Suggested reading materials

- A. Koutsoyiannis, Modern Microeconomics, 2nd edition, 1979
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- R. S. Pindyck and D. L. Rubinfeld, Microeconomics, 2nd edition,1992
- Varian, 2010, Intermediate Microeconomics: A Modern Approach, 8th edition
- C.L.Cole, *Micro Economics: A Contemporary Approach*.
- Ferguson & Gould's, 1989, *Microeconomic Theory*, 6th edition.
- E. Mansfield, 1988, Microeconomics:Theory and Applications
- Arnold, 2008, Microeconomics, 8th edition, International student edition

Chapter Two
Theory of Demand and Supply

Introduction

Having learnt about the concept and meaning of economics as a subject and its nature, scope, different systems and various other fundamentals in the previous chapter, we now resort to a very important issue in economics. This is the issue of how free markets operate. In this chapter we will forward our exploration and understanding of the vast field of economics by focusing on two very powerful tools, namely, theory of demand and theory of supply.

The purpose of this chapter is to explain what demand and supply are and show how they determine equilibrium price and quantity. We will also show how the concepts of demand and supply reveal consumers' and producers' sensitivity to price change.

Chapter objectives

After covering this chapter, you will be able to:

- understand the concept of demand and the factors affecting it;
- explain the supply side of a market and the determinants of supply;
- understand how the market reaches equilibrium condition, and the possible factors that could cause a change in equilibrium and
- explain the elasticity of demand and supply

2.1 Theory of demand

1. *Are demand and want similar? Why?*
2. *Why can't we purchase all that we need or we desire to have?*
3. *Can we say that, with a decrease in the price of a commodity, a consumer normally buys more of it? Why?*
4. *Explain why demand curves always slope downwards from left to right. Are there any exceptions to this?*

Demand is one of the forces determining prices. The theory of demand is related to the economic activities of consumers-consumption. Hence, the purpose of the theory of demand is to determine the various factors that affect demand.

In our day-to-day life we use the word 'demand' in a loose sense to mean a desire of a person to purchase a commodity or service. But in economics it has a specific meaning, which is different from what we use it in our day to day activities.

Demand implies more than a mere desire to purchase a commodity. It states that the consumer must be willing and able to purchase the commodity, which he/she desires. His/her desire should be backed by his/her purchasing power. A poor person is willing to buy a car; it has no significance, since he/she has no ability to pay for it. On the other hand, if his/her desire to buy the car is backed by the purchasing power then this constitutes demand. Demand, thus, means the desire of the consumer for a commodity backed by purchasing power. These two factors are essential. If a consumer is willing to buy but is not able to pay, his/her desire will not become demand. Similarly, if the consumer has the ability to pay but is not willing to pay, his/her desire will not be called demand.

More specifically, **demand** refers to various quantities of a commodity or service that a consumer would purchase at a given time in a market at various prices, given other things unchanged (ceteris paribus). The quantity demanded of a particular commodity depends on the price of that commodity.

Law of demand: This is the principle of demand, which states that , price of a commodity and its quantity demanded are inversely related i.e., as price of a commodity increases (decreases) quantity demanded for that commodity decreases (increases), ceteris paribus.

2.1.1 Demand schedule (table), demand curve and demand function

The relationship that exists between price and the amount of a commodity purchased can be represented by a table (schedule) or a curve or an equation.

Demand schedule can be constructed for any commodity if the list of prices and quantities purchased at those prices are known. An individual demand schedule is a list of the various quantities of a commodity, which an individual consumer purchases at various levels of prices in the market. A demand schedule states the relationship between price and quantity demanded in a table form.

Table 2.1 Individual household demand for orange per week

Combinations	A	B	C	D	E
Price per kg	5	4	3	2	1
Quantity demand/week	5	7	9	11	13

Demand curve is a graphical representation of the relationship between different quantities of a commodity demanded by an individual at different prices per time period.

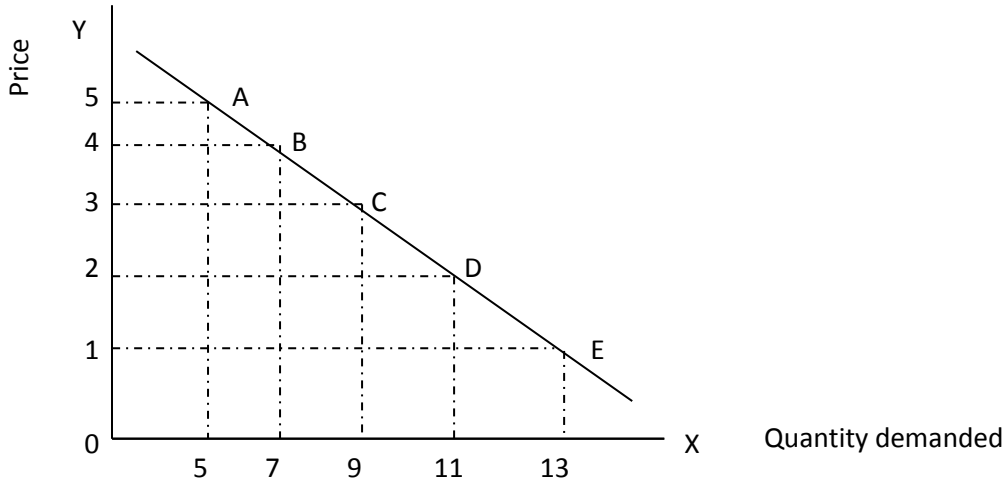


Figure 2.1: Individual demand curve

In the above diagram prices of oranges are given on 'OY' axis and quantity demanded on 'OX' axis. For example, when the price per kilogram is birr 1 the quantity demanded is 13 kilograms. From the above figure you may notice that as the price declines quantity demanded increases and vice-versa.

Demand function is a mathematical relationship between price and quantity demanded, all other things remaining the same. A typical demand function is given by:

$Q_d=f(P)$

where Q_d is quantity demanded and P is price of the commodity, in our case price of orange.

Example: Let the demand function be Q = a+ bP

$$b = \frac{\Delta Q}{\Delta P}$$ (e.g. moving from point A to B on figure 2.1 above)

$$b = \frac{7-5}{4-5} = -2$$, where b is the slope of the demand curve

Q = a-2P, to find a, substitute price either at point A or B.

7= a-2(4), a = 15

Therefore, Q=15-2P is the demand function for orange in the above numerical example.

Market Demand: The market demand schedule, curve or function is derived by horizontally adding the quantity demanded for the product by all buyers at each price.

Table 2.2: Individual and market demand for a commodity

Price	Individual demand			Market demand
	Consumer-1	Consumer-2	Consumer-3	
8	0	0	0	0
5	3	5	1	9
3	5	7	2	14
0	7	9	4	20

The following graph depicts market demand curve at price equal to 3

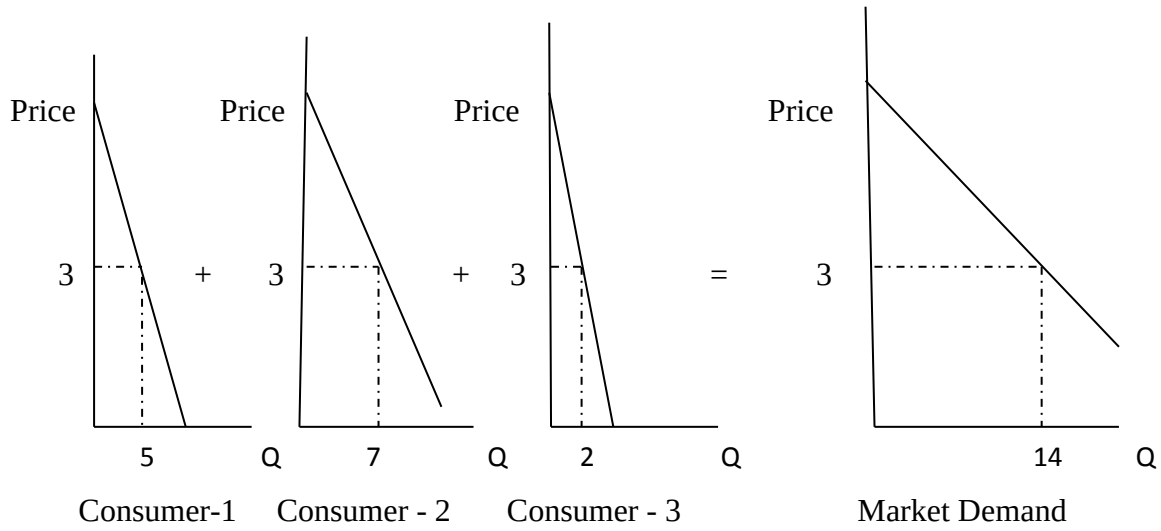


Figure 2.2: Individual and Market demand curve

Numerical Example: Suppose the individual demand function of a product is given by: P=10 - Q /2 and there are about 100 identical buyers in the market. Then the market demand function is given by:

P= 10 - Q /2 ↔ Q /2 =10-P ↔ Q= 20 - 2P and Q_m = (20 – 2P) 100 = 2000-200P

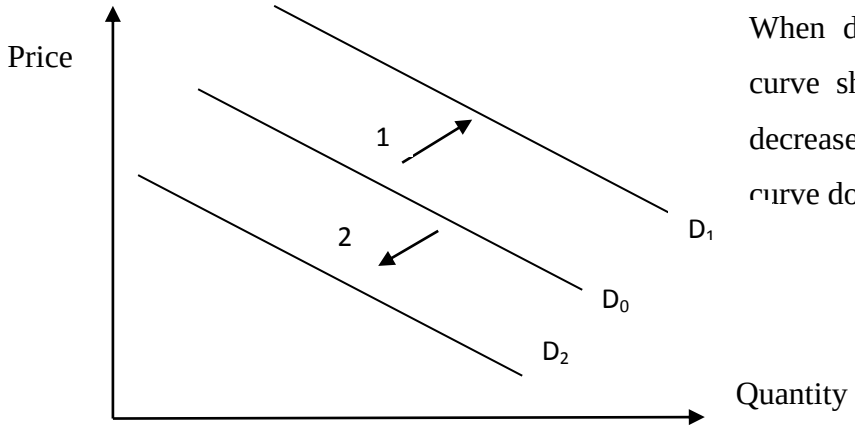
2.1.2 Determinants of demand

The demand for a product is influenced by many factors. Some of these factors are:

I. Price of the product
II. Taste or preference of consumers
III. Income of the consumers
IV. Price of related goods
V. Consumers expectation of income and price
VI. Number of buyers in the market

When we state the law of demand, we kept all the factors to remain constant except the price of the good. A change in any of the above listed factors except the price of the good will change the demand, while a change in the price, other factors remain constant will bring change in quantity demanded. A change in demand will shift the demand curve from its original location. For this reason those factors listed above other than price are called demand shifters. A change in own price is only a movement along the same demand curve.

Changes in demand: a change in any determinant of demand—except for the good's price-causes the demand curve to shift. We call this a change in demand. If buyers choose to purchase more at any price, the demand curve shifts rightward—an increase in demand. If buyers choose to purchase less at any price, the demand curve shifts leftward—a decrease in demand.



When demand increases, demand curve shifts upward (D_1) while a decrease in demand shifts demand curve downwards (D_2).

Figure 2.3: Shift in demand curve

Now let us examine how each factor affect demand.

I. Taste or preference

When the taste of a consumer changes in favour of a good, her/his demand will increase and the opposite is true.

II. Income of the consumer

Goods are classified into two categories depending on how a change in income affects their demand. These are normal goods and inferior goods. ***Normal Goods*** are goods whose demand increases as income increase, while ***inferior goods*** are those whose demand is inversely related with income. In general, inferior goods are poor quality goods with relatively lower price and buyers of such goods are expected to shift to better quality goods as their income increases. However, the classification of goods into normal and inferior is subjective and it is usually dependent on the socio-economic development of the nation.

III. Price of related goods

Two goods are said to be related if a change in the price of one good affects the demand for another good.

There are two types of related goods. These are substitute and complimentary goods. ***Substitute goods*** are goods which satisfy the same desire of the consumer. For example, tea and coffee or Pepsi and Coca-Cola are substitute goods. If two goods are substitutes, then price of one and the demand for the other are directly related. ***Complimentary goods,*** on the other hand, are those goods which are jointly consumed. For example, car and fuel or tea and sugar are considered as compliments. If two goods are complements, then price of one and the demand for the other are inversely related.

IV. Consumer expectation of income and price

Higher price expectation will increase demand while a lower future price expectation will decrease the demand for the good.

V. Number of buyer in the market

Since market demand is the horizontal sum of individual demand, an increase in the number of buyers will increase demand while a decrease in the number of buyers will decrease demand.

2.1.3 Elasticity of demand

1. *List some goods/commodities you think that increase in their prices will not significantly decrease their quantity demanded.*
2. *Can you list some products for which increase in their prices will significantly decrease/increase their quantity demanded?*

In economics, the concept of elasticity is very crucial and is used to analyze the quantitative relationship between price and quantity purchased or sold. Elasticity is a measure of responsiveness of a dependent variable to changes in an independent variable. Accordingly, we have the concepts of elasticity of demand and elasticity of supply.

Elasticity of demand refers to the degree of responsiveness of quantity demanded of a good to a change in its price, or change in income, or change in prices of related goods. Commonly, there are three kinds of demand elasticity: price elasticity, income elasticity, and cross elasticity.

i. Price Elasticity of Demand

Price elasticity of demand means degree of responsiveness of demand to change in price. It indicates how consumers react to changes in price. The greater the reaction the greater will be the elasticity, and the lesser the reaction, the smaller will be the elasticity. Price elasticity of demand is a measure of how much the quantity demanded of a good responds to a change in the price of that good, computed as the percentage change in quantity demanded divided by the percentage change in price.

Demand for commodities like clothes, fruit etc. changes when there is even a small change in their price, whereas demand for commodities which are basic necessities of life, like salt, food grains etc., may not change even if price changes, or it may change, but not in proportion to the change in price.

Price elasticity demand can be measured in two ways. These are point and arc elasticity.

a. Point Price Elasticity of Demand

This is calculated to find elasticity at a given point. The price elasticity of demand can be determined by the following formula.

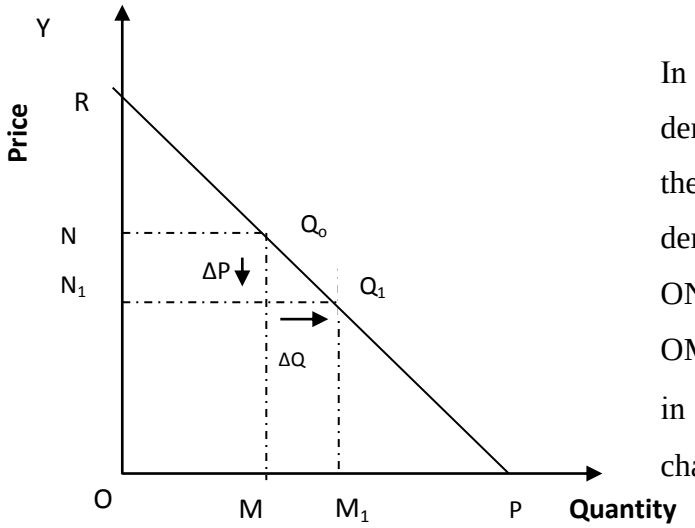
$$E_d^P = \frac{Percentage\ change\ in\ quantity\ demanded}{percentage\ change\ in\ price} = \frac{\%\Delta Q_d}{\%\Delta P}$$

where $\%\Delta Qd = \frac{Q_1 - Q_0}{Q0} X100$ and

$$\%\Delta P = \frac{P_1 - P_0}{P_0} X100$$

Thus, $E_d^P = \frac{\frac{Q_1 - Q_0}{Q_0} X100}{\frac{P_1 - P_0}{P_0} X100} = \frac{Q_1 - Q_0}{P_1 - P_0} \cdot \frac{P_0}{Q_0} = \frac{\Delta Q}{\Delta P} \cdot \frac{P_0}{Q_0}$

In this method, we take a straight-line demand curve joining the two axes, and measure the elasticity between two points Q_o and Q_1 which are assumed to be intimately close to each other.



In the diagram 'RP' is the straight-line demand curve, which connects both axes. In the beginning at the price ON the quantity demanded is OM. Then the price changes to ON_1 and the new quantity demanded will be OM_1. The symbol 'ΔP' represents the change in price while the symbol 'ΔQ' shows the change in quantity demanded.

Figure 2.4: Point elasticity of demand

On a straight-line demand curve we can make use of this formula to find out the price elasticity at any particular point. We can find out numerical elasticities also on different points of the demand curve with the help of the above formula. It should be remembered that the point elasticity of demand on a straight line is different at every point.

b. Arc price elasticity of demand

The main drawback of the point elasticity method is that it is applicable only when we have information about even the slight changes in the price and the quantity demanded of the commodity. But in practice, we do not acquire such information about minute changes. We may possess demand schedules in which there are big gaps in price as well as the quantity demanded. In such cases, there is an alternative method known as arc method of elasticity measurement.

In arc price elasticity of demand, the midpoints of the old and the new values of both price and quantity demanded are used. It measures a portion or a segment of the demand curve between the two points. An arc is a portion of a curve line, hence, a portion or segment of a demand curve.

The formula for measuring arc elasticity is given below.

$$E_d = \frac{Change\ in\ quantity\ demanded}{Original\ quantity\ plus\ new\ quantity\ demanded} \div \frac{Change\ in\ price}{Original\ price\ plus\ new\ price}$$

Symbolically, the formula may be expressed thus:

$$E_d = \frac{Q_1 - Q_0}{Q_o + Q_1} \div \frac{P_1 - P_0}{P_o + P_1}$$

Here, Q_o = Original quantity demanded

Q_1 = New quantity demanded

P_o = Original price

P_1 = New price

We can take a numerical example to illustrate arc elasticity. Suppose that the price of a commodity is Br. 5 and the quantity demanded at that price is 100 units of a commodity. Now assume that the price of the commodity falls to Br. 4 and the quantity demanded rises to 110 units. In terms of the above formula, the value of the arc elasticity will be

$$\text{Ed} = \frac{110-100}{100+110} \div \frac{4-5}{4+5} = \frac{10}{210} \div \frac{-1}{9} = -\frac{9}{21} = -\frac{3}{7}$$

Note that:

- ✓ Elasticity of demand is unit free because it is a ratio of percentage change.
- ✓ Elasticity of demand is usually a negative number because of the law of demand. If the price elasticity of demand is positive the product is inferior.

i) If $|\varepsilon| > 1$, demand is said to be elastic and the product is luxury product

ii) If $0 \le |\varepsilon| < 1$, demand is inelastic and the product is necessity

iii) If $|\varepsilon| = 1$, demand is unitary elastic.

iv) If $|\varepsilon| = 0$, demand is said to be perfectly inelastic.

v) If $|\varepsilon| = \infty$, demand is said to be perfectly elastic.

Determinants of price Elasticity of Demand

The following factors make price elasticity of demand elastic or inelastic other than changes in the price of the product.

i) **The availability of substitutes:** the more substitutes available for a product, the more *elastic* will be the price elasticity of demand.

ii) **Time:** In the long- run, price elasticity of demand tends to be elastic. Because:
- More substitute goods could be produced.
- People tend to adjust their consumption pattern.

iii) **The proportion of income consumers spend for a product:**-the smaller the proportion of income spent for a good, the less price elastic will be.

iv) **The importance of the commodity in the consumers' budget :**
- Luxury goods → tend to be more **elastic,** example: gold.
- Necessity goods → tend to be **less elastic** example: Salt.

ii. Income Elasticity of Demand

It is a measure of responsiveness of demand to change in income.

$$\varepsilon_d^I = \frac{\%\Delta Qd}{\%\Delta I} = \frac{\Delta Q}{\Delta I}.\frac{I}{Q}$$

Point income elasticity of demand:

i) If $\varepsilon_d^I > 1$, the good is **luxury** good.

ii) If $\varepsilon_d^I < 1$(and positive), the good is **necessity** good,

iii) If $\varepsilon_d^I < 0,$(negative), the good is **inferior** good.

iii. Cross price Elasticity of Demand

Measures how much the demand for a product is affected by a change in price of another good.

$$\varepsilon_{xy} = \frac{\%\Delta Qx}{\%\Delta P_y} = \frac{Q_{x_1} - Q_{x_o}}{P_{y_1} - P_{y_0}}.\frac{P_{y_0}}{Q_{x_0}}$$

i) The cross – price elasticity of demand for substitute goods is **positive.**

ii) The cross – price elasticity of demand for complementary goods is **negative.**

iii) The cross – price elasticity of demand for unrelated goods is **zero.**

Example: Consider the following data which shows the changes in quantity demanded of good X in response to changes in the price of good Y.

Unit price of Y	Quantity demanded of X
10	1500
15	1000

Calculate the cross –price elasticity of demand between the two goods. What can you say about the two goods?

$$\varepsilon_{xy} = \frac{\Delta Qx}{\Delta P_y} * \frac{Py_o}{Qx_o} = \left(\frac{1000-1500}{15-10}\right).* \frac{10}{1500} = \frac{-500}{5}.\frac{10}{1500} = -0.67$$

Therefore, the two goods are complements.

2.2 Theory of supply

Supply indicates various quantities of a product that sellers (producers) are willing and able to provide at different prices in a given period of time, other things remaining unchanged.

The law of supply: states that, ceteris paribus, as price of a product increase, quantity supplied of the product increases, and as price decreases, quantity supplied decreases. It tells us there is a positive relationship between price and quantity supplied.

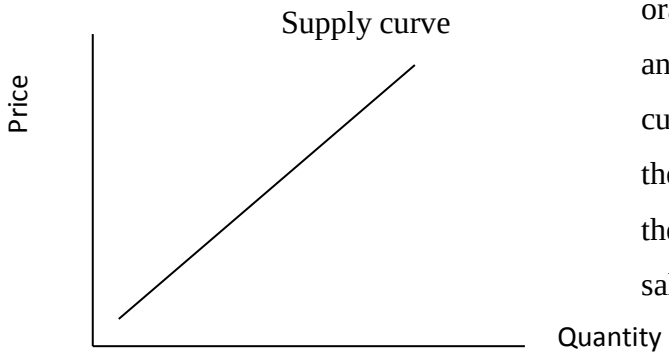
2.2.1 Supply schedule, supply curve and supply function

A supply schedule is a tabular statement that states the different quantities of a commodity offered for sale at different prices.

Table 2.3: an individual seller's supply schedule for butter

Price (birr per kg)	30	25	20	15	10
Quantity supplied kg/week	100	90	80	70	60

A supply curve conveys the same information as a supply schedule. But it shows the information graphically rather than in a tabular form.



In this diagram the quantities of oranges are measured along X axis and prices along Y axis. The supply curve slopes upward as we go from the left to the right. This means, as the price rises, more is offered for sale and vice-versa.

Figure 2.5 supply curve

The supply of a commodity can be briefly expressed in the following functional relationship:

S = f(P), where S is quantity supplied and P is price of the commodity.

Market supply: It is derived by horizontally adding the quantity supplied of the product by all sellers at each price.

Table 2.4: Derivation of the market supply of good X

Price per unit	Quantity supplied by seller 1	Quantity supplied by seller 2	Quantity supplied by seller 3	Market supply per week
5	11	15	8	34
4	10.5	13	7	30.5
3	8	11.5	5.5	25
2	6	8.5	4	18.5
1	4	6	2	12

2.2.2 Determinants of supply

Apart from the change in price which causes a change in quantity demanded, the supply of a particular product is determined by:

i) price of inputs (cost of inputs)

ii) technology

iii) prices of related goods

iv) sellers' expectation of price of the product

v) taxes & subsidies

vi) number of sellers in the market

vii) weather, etc.

i) Effect of change in input price on supply of a product

An increase in the price of inputs such as labour, raw materials, capital, etc causes a decrease in the supply of the product which is represented by a leftward shift of the supply curve. Likewise, a decrease in input price causes an increase in supply.

ii) Effect of change in Technology

Technological advancement enables a firm to produce and supply more in the market. This shifts the supply curve outward.

iii) Effect of change in weather condition

A change in weather condition will have an impact on the supply of a number of products, especially agricultural products. For example, other things remain unchanged, good weather

condition boosts the supply of agricultural products. This shifts the supply curve of a given agricultural product outward. Bad weather condition will have the opposite impact.

Activity: *Discuss how supply is affected by the changes in prices of related goods, taxes & subsidies, sellers' expectations of future price of the product, and the number of sellers in the market?*

2.2.3 Elasticity of supply

It is the degree of responsiveness of the supply to change in price. It may be defined as the percentage change in quantity supplied divided by the percentage change in price. As the case with price elasticity of demand, we can measure the price elasticity of supply using point and arc elasticity methods. However, a simple and most commonly used method is point method.

The point price elasticity of supply can be calculated as the ratio of proportionate change in quantity supplied of a commodity to a given proportionate change in its price. Thus, the formula for measuring price elasticity of supply is:

$$Es = \frac{\%\, change\ \ in\ quantity\ \ supplied}{\%\, change\ \ in\ price} = \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} = \frac{\Delta Q}{\Delta P} * \frac{P}{Q}$$

Like elasticity of demand, price elasticity of supply can be elastic, inelastic, unitary elastic, perfectly elastic or perfectly inelastic. The supply is elastic when a small change on price leads to great change in supply. It is inelastic or less elastic when a great change in price induces only a slight change in supply. If the supply is *perfectly inelastic*, it will be represented by a vertical line shown as below. If supply is *perfectly elastic* it will be represented by a horizontal straight line as in second diagram.

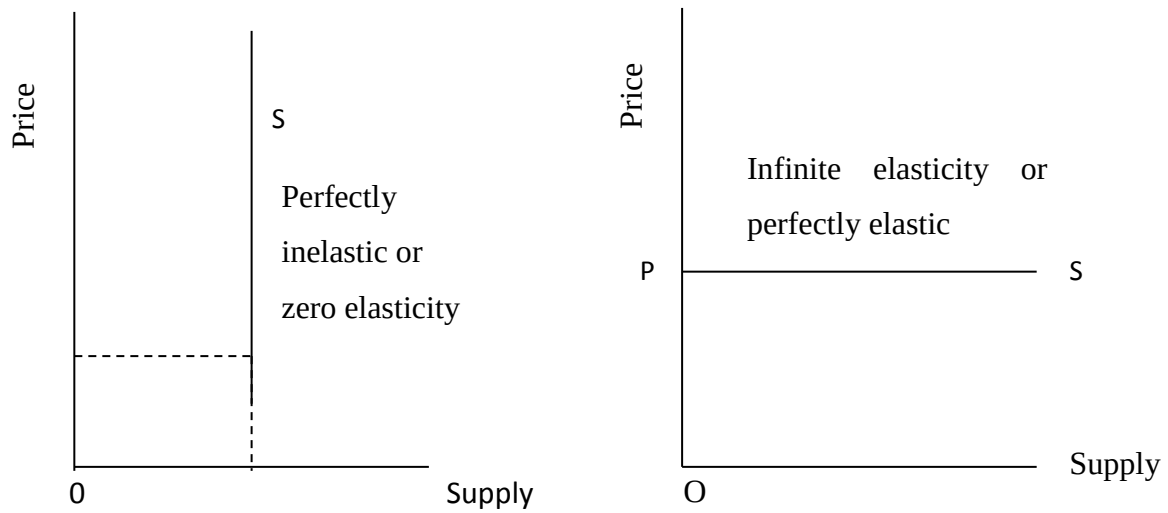
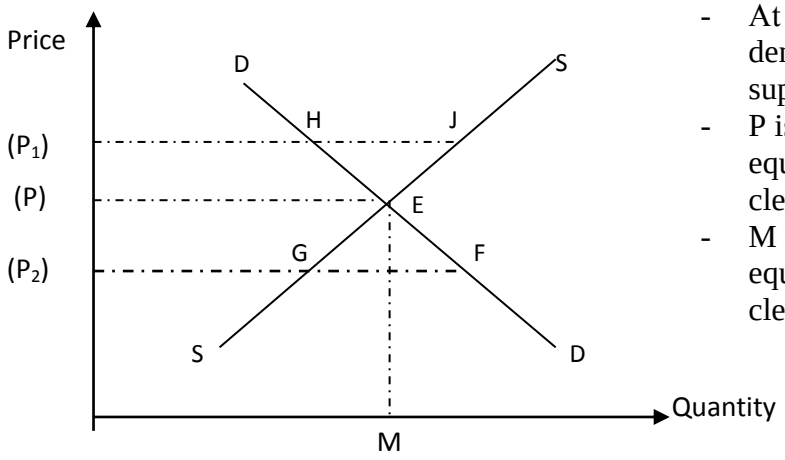


Figure 2.6: Perfectly inelastic and perfectly elastic supply curves

2.3 Market equilibrium

Having seen the demand and supply side of the market, now let's bring demand and supply together so as to see how the market price of a product is determined. Market equilibrium occurs when market demand equals market supply.



- At point 'E' market demand equals market supply (equilibrium point)
- P is the market equilibrium (market clearing) price.
- M is the market equilibrium (market clearing) quantity.

Figure 2.7: market equilibrium

In the above graph, any price greater than P will lead to market surplus. As the price of the commodity increases, consumers demand less of the product. On the other hand, as the price of increases, producers supply more of the good. Therefore, if price increases to P_1 the market will have a surplus of HJ. If the price decreases to P_2 buyers demand to buy more and suppliers prefer to decrease their supply leading to shortage in the market which is equal to GF.

Numerical example: Given market demand: Q_d= 100-2P, and market supply: P =(Q_s /2) + 10

a) Calculate the market equilibrium price and quantity
b) Determine, whether there is surplus or shortage at P= 25 and P= 35.

Solution:

a) At equilibrium, $Q_d = Q_s$

$100 - 2P = 2P - 20$

$4P = 120$

$\underline{\underline{\overline{P} = 30}}$, and $\underline{\underline{\overline{Q} = 40}}$

b) Q_d(at P = 25) = 100-2(25) =50 and Q_s(at P = 25) = 2(25) -20 =30

Therefore, there is a shortage of: 50 -30 =**<u>20</u> units**

Q_d(at P=35) = 100-2(35) = 30 and Q_s (at p = 35) = 2(35)-20 = 50, a surplus of **20 units**

Effects of shift in demand and supply on equilibrium

Given demand and supply the equilibrium price and quantity are stable. However, when these market forces change what will happen to the equilibrium price and quantity? Changes in demand and supply bring about changes in the equilibrium price level and the equilibrium quantity.

i) when demand changes and supply remains constant

Factors such as changes in income, tastes, and prices of related goods will lead to a change in demand. The figure below shows the effects of a change in demand and the resultant equilibrium price and quantity. DD is the demand curve and SS is the supply curve.

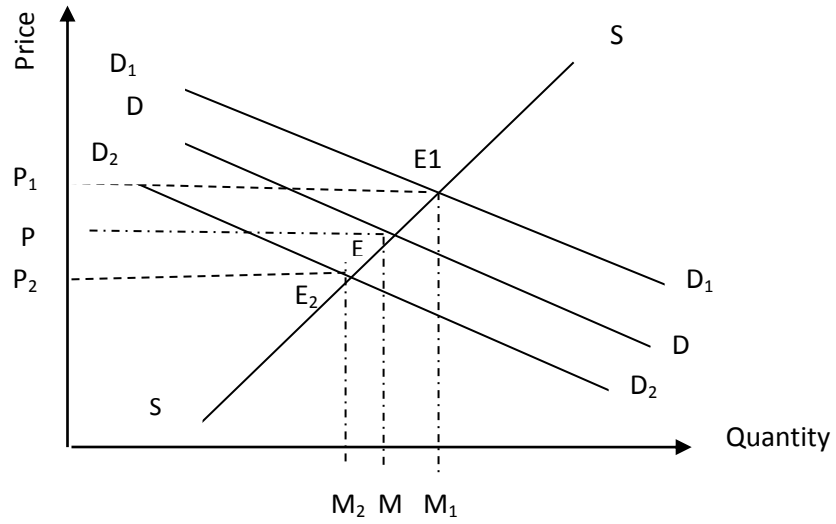


Figure 2.8: The effect of change in demand on market equilibrium

DD and SS curves intersect at point E and the quantity demanded and supplied is OM at OP equilibrium price. Given the supply, if the demand increases the demand curve will shift upward to the right. Due to a change in demand, the demand curve D_1D_1 intersects SS supply curve at point E_1. The equilibrium price increases from OP to OP_1 and the equilibrium quantity from OM to OM_1. On the other hand, if demand falls, the demand curve shifts downwards to the left. Due to a change in demand, the curve D_2D_2 intersects the supply curve SS at point E_2. The equilibrium price decreases from OP to OP_2 and the equilibrium quantity decreases from OM to OM_2. Supply being given, a decrease in demand reduces both the equilibrium price and the quantity and vice versa.

ii. When supply changes and demand remains constant

Changes in supply are brought by changes in technical knowledge and factor prices. The following graph explains the effects of changes in supply.

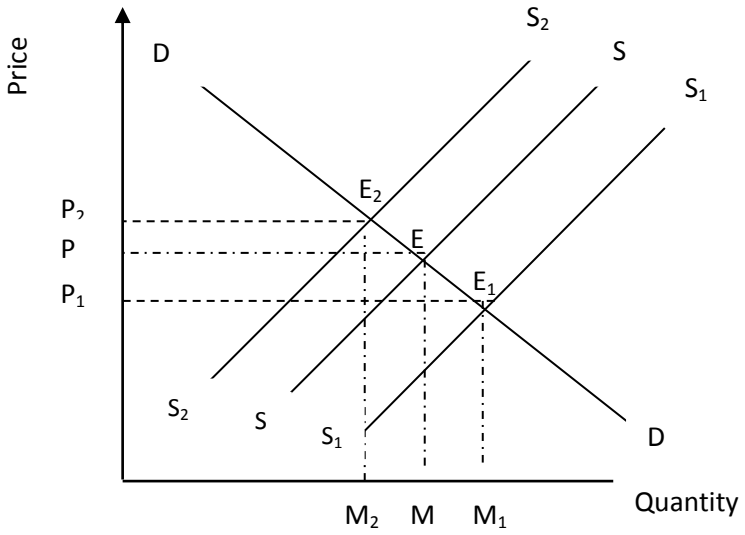


Figure 2.9: The effect of change in supply on market equilibrium

SS and DD intersect at point E, where supply and demand are equal at OM quantity at OP equilibrium price. Given the demand, if the supply increases, the supply curve shifts to the right (S_1S_1). The new supply curve, which intersects DD curve at E_1, reduces the equilibrium price from OP to OP_1 and increases the equilibrium quantity from OM to OM_1. On the contrary, when the supply falls, the supply curve moves to the left (S_2S_2) and intersects the DD curve at point E_2 raising the equilibrium price from OP to OP_2 and reducing the equilibrium quantity from OM to OM_2.

III) Effects of combined changes in demand and supply

When both demand and supply increase, the quantity of the product will increase definitely. But it is not certain whether the price will rise or fall. If an increase in demand is more than an increase in supply, then the price goes up. On the other hand, if an increase in supply is more than an increase in demand, the price falls but the quantity increases. If the increase in demand and supply is same, then the price remains the same.

When demand and supply decline, the quantity decreases. But the change in price will depend upon the relative fall in demand and supply. When the fall in demand is more than the fall in supply, the price will decrease. On the other hand, when the fall in supply is more than the fall in demand, the price will rise. If both demand and supply decline in the same ratio, there is no change in the equilibrium price, but the quantity decreases.

Activity: *Considering the initial market equilibrium of figure 2.9 above, show the new equilibrium*

1. *if there is an increase in supply and proportionate increase in demand*
2. *if the magnitude of an increment in demand is less than an increment in supply*
3. *if demand and supply change in the opposite directions*

Chapter summary

Demand for a commodity refers to the amount that will be purchased at a particular price during a particular period of time. Price of the commodity, income of the consumer, prices of related goods, consumer's tastes and preferences, consumers' expectations and number of buyers are considered the main determinants of demand for a commodity. *The law of demand* states that, other things remaining constant, the quantity demanded of a commodity increases when its price falls and decreases when the price rises.

Supply refers to the quantity of a commodity which producers are willing to produce and offer for sale at a particular price during a particular period of time. Price of a commodity, input prices, prices of related products, techniques of production, policy of taxation and subsidy, expectations of future prices, and the number of sellers are the main determinants of supply. Law of supply states that other things remaining the same, the quantity of any commodity that firms will produce and offer for sale rises with a rise in price and falls with a fall in price.

Market equilibrium refers to a situation in which quantity demanded of a commodity equals the quantity supplied of a commodity.

Goods can be categorized as *normal good* (a good for which the demand increases with increases in income), *an inferior good* (a good for which the demand tends to fall with an increase in the income of the consumer), *substitute goods(*are those goods which satisfy the same type of demand and can be used in place of one another), *complementary goods(* are those goods which are used jointly or together), and *giffen goods(*whose demand falls with a fall in their prices).

Elasticity of demand refers to the degree of responsiveness of quantity demanded of a commodity to change in any of its determinants. There are three types of elasticity of demand: *Price elasticity of demand, income elasticity of demand and cross price elasticity of demand.* Price elasticity of demand is determined by *availability of substitutes, nature of the commodity, proportion of income spent and time.*

Review questions

Part I: Distinguish between the following:

1. Normal goods and inferior goods
2. Complementary goods and substitute goods
3. Market demand and individual demand
4. Individual supply and market supply
5. Excess demand and excess supply

Part II: Short answer and workout

1. Why does the quantity of salt demanded tend to be unresponsive to changes in its price?
2. Why is the quantity of education demanded in private universities much more responsive than salt is to changes in price?
3. To get the market demand curve for a product, why do we add individual demand curves horizontally rather than vertically?
4. The market for lemon has 10 potential consumers, each having an individual demand curve $P = 101 - 10Q_i$, where P is price in dollars per cup and Q_i is the number of cups demanded per week by the i^{th} consumer. Find the market demand curve using algebra. Draw an individual demand curve and the market demand curve. What is the quantity demanded by each consumer and in the market as a whole when lemon is priced at P = \$1/cup?
5. The demand for tickets to an Ethiopian Camparada film is given by D(p)= 200,000-10,000p, where p is the price of tickets.If the price of tickets is 12 birr, calculate price elasticity of demand for tickets and draw the demand curve
6. Given market demand $Q_d = 50 - P$, and market supply $P = Q_s + 5$

   A) Find the market equilibrium price and quantity?

   B) What would be the state of the market if market price was fixed at Birr 25 per unit?

   C) Calculate and interpret price elasticity of demand at the equilibrium point.

7. Based on the following table which indicates expenditure of the household on a commodity, answer the questions that follow (The price of the good is Br.10)

Income (Br. / month)	Quantity Demanded (units / month)
10,000	50
20,000	60
30,000	70
40,000	80
50,000	90

   A) Calculate income elasticity of demand, if income increases from Br.10, 000 to Br. 20,000 and if income increases from Br.40, 000 to Br. 50,000.
   B) Is this a normal or an inferior or a luxury good? Justify.
   C) Does the proportion of household income spent on this good increase or decrease as income increases? .Why?

8. When price of tea in local café rises from Br. 10 to 15 per cup, demand for coffee rises from 3000 cups to 5000 cups a day despite no change in coffee prices.
   A) Determine cross price elasticity.
   B) Based on the result, what kind of relation exists between the two goods?

Suggested reading materials

- A. Koutsoyiannis, Modern Microeconomics, 2nd edition, 1979
- D.N.Dwivedi, 1997, *Micro Economic Theory*, 3rd edition., Vikas Publishing
- R. S. Pindyck and D. L. Rubinfeld, Microeconomics, 2nd edition,1992
- Varian, 2010, Intermediate Microeconomics: A Modern Approach, 8th edition
- C.L.Cole, *Micro Economics: A Contemporary Approach*.
- Ferguson & Gould's, 1989, *Microeconomic Theory,* 6th edition.
- E. Mansfield, 1988, Microeconomics:Theory and Applications
- Arnold, 2008, Microeconomics, 8th edition, International student edition

Chapter Three

Theory of Consumer Behaviour

Introduction

In our day –to- day life, we buy different goods and services for consumption. As consumer, we act to derive satisfaction by using goods and services. But, have ever thought of how your mother or any other person whom you know decides to buy those consumption goods and services? Consumer theory is based on what people like, so it begins with something that we can't directly measure, but must infer. That is, consumer theory is based on the premise that we can infer what people like from the choices they make.

Consumer behaviour can be best understood in three steps. First, by examining consumer's preference, we need a practical way to describe how people prefer one good to another. Second, we must take into account that consumers face budget constraints – they have limited incomes that restrict the quantities of goods they can buy. Third, we will put consumer preference and budget constraint together to determine consumer choice.

Chapter objectives

After successful completion of this chapter, you will be able to:

- explain consumer preferences and utility
- differentiate between cardinal and ordinal utility approach
- define indifference curve and discuss its properties
- derive and explain the budget line
- describe the equilibrium condition of a consumer

3.1 Consumer preferences

A consumer makes choices by comparing bundle of goods. Given any two consumption bundles, the consumer either decides that one of the consumption bundles is strictly better than the other, or decides that she is indifferent between the two bundles.

In order to tell whether one bundle is preferred to another, we see how the consumer behaves in choice situations involving two bundles. If she always chooses X when Y is available, then it is natural to say that this consumer prefers X to Y. We use the symbol $\succ$ to mean that one bundle is strictly preferred to another, so that $X \succ Y$ should be interpreted as saying that the consumer strictly prefers X to Y, in the sense that she definitely wants the X-bundle rather than the Y-bundle. If the consumer is indifferent between two bundles of goods, we use the symbol

~ and write X~Y. Indifference means that the consumer would be just as satisfied, according to her own preferences, consuming the bundle X as she would be consuming bundle Y. If the consumer prefers or is indifferent between the two bundles we say that she weakly prefers X to Y and write X ≥ Y.

The relations of strict preference, weak preference, and indifference are not independent concepts; the relations are themselves related. For example, if X ≥ Y and Y ≥ X, we can conclude that X ~Y. That is, if the consumer thinks that X is at least as good as Y and that Y is at least as good as X, then she must be indifferent between the two bundles of goods. Similarly, if X ≥ Y but we know that it is not the case that X~ Y, we can conclude that X≻Y. This just says that if the consumer thinks that X is at least as good as Y, and she is not indifferent between the two bundles, then she thinks that X is strictly better than Y.

3.2 The concept of utility

Economists use the term *utility* to describe the satisfaction or pleasure derived from the consumption of a good or service. In other words, utility is the power of the product to satisfy human wants. Given any two consumption bundles X and Y, the consumer definitely wants the X-bundle than the Y-bundle if and only if the utility of X is better than the utility of Y.

Do you think that utility and usefulness are synonymous? Do two individuals always derive equal satisfaction from consuming the same level of a product?

In defining utility, it is important to bear in mind the following points.

- '*Utility' and 'Usefulness' are not synonymous*. For example, paintings by Picasso may be useless functionally but offer great utility to art lovers. Hence, *usefulness* is product centric whereas *utility* is consumer centric.
- *Utility is subjective.* The utility of a product will vary from person to person. That means, the utility that two individuals derive from consuming the same level of a product may not be the same. For example, non-smokers do not derive any utility from cigarettes.
- *Utility can be different at different places and time.* For example, the utility that we get from drinking coffee early in the morning may be different from the utility we get during lunch time.

3.3 Approaches of measuring utility

How do you measure or compare the level of satisfaction (utility) that you obtain from goods and services?

There are two major approaches to measure or compare consumer's utility: cardinal and ordinal approaches. The cardinalist school postulated that utility can be measured objectively. According to the ordinalist school, utility is not measurable in cardinal numbers rather the consumer can rank or order the utility he derives from different goods and services.

3.3.1 The cardinal utility theory

According to the cardinal utility theory, utility is measurable by arbitrary unit of measurement called **utils** in the form of 1, 2, 3 etc. For example, we may say that consumption of an orange gives Bilen 10 utils and a banana gives her 8 utils, and so on. From this, we can assert that Bilen gets more satisfaction from orange than from banana.

3.3.1.1 Assumptions of cardinal utility theory

The cardinal approach is based on the following major assumptions.

1. **Rationality of consumers**. The main objective of the consumer is to maximize his/her satisfaction given his/her limited budget or income. Thus, in order to maximize his/her satisfaction, the consumer has to be rational.
2. **Utility is cardinally measurable.** According to the cardinal approach, the utility or satisfaction of each commodity is measurable. Utility is measured in subjective units called utils.
3. **Constant marginal utility of money.** A given unit of money deserves the same value at any time or place it is to be spent. A person at the start of the month where he has received monthly salary gives equal value to 1 birr with what he may give it after three weeks or so.
4. **Diminishing marginal utility (DMU).** The utility derived from each successive units of a commodity diminishes. In other words, the marginal utility of a commodity diminishes as the consumer acquires larger quantities of it.
5. **The total utility of a basket of goods depends on the quantities of the individual commodities**. If there are n commodities in the bundle with quantities $X_1, X_2, ...X_n$, the total utility is given by TU = f ($X_1, X_2 .....X_n$).

3.3.1.2 Total and marginal utility

Total Utility (TU) is the total satisfaction a consumer gets from consuming some specific quantities of a commodity at a particular time. As the consumer consumes more of a good per time period, his/her total utility increases. However, there is a saturation point for that commodity beyond which the consumer will not be capable of enjoying any greater satisfaction from it.

Marginal Utility (MU) is the *extra satisfaction* a consumer realizes from an additional unit of the product. In other words, marginal utility is the change in total utility that results from the consumption of one more unit of a product. Graphically, it is the slope of total utility.

Mathematically, marginal utility is:

$$MU = \frac{\Delta TU}{\Delta Q}$$

where, ΔTU is the change in total utility, and ΔQ is the change in the amount of product consumed.

To explain the relationship between TU and MU, let us consider the following hypothetical example.

Table 3.1: Total and marginal utility

Quantity	Total utility (TU)	Marginal utility (MU)
0	0	-
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	-2

The total utility first increases, reaches the maximum (when the consumer consumes 6 units) and then declines as the quantity consumed increases. On the other hand, the marginal utility continuously declines (even becomes zero or negative) as quantity consumed increases.

Graphically, the above data can be depicted as follows.

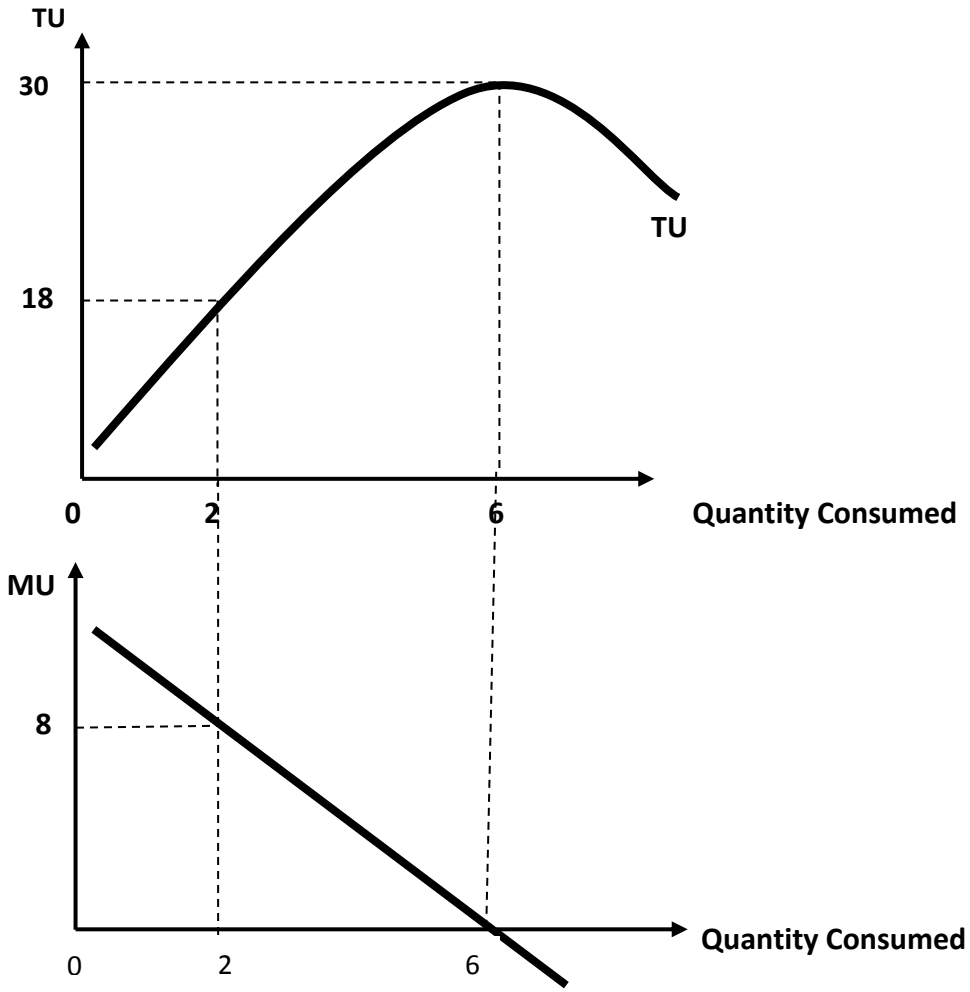


Figure 3.1: Total and marginal utility curves

As it can be observed from the above figure,

- When TU is increasing, MU is positive.
- When TU is maximized, MU is zero.
- When TU is decreasing, MU is negative.

3.3.1.3 Law of diminishing marginal utility (LDMU)

Is the utility you get from consumption of the first orange the same as the second or the third orange?

The *law of diminishing marginal utility* states that as the quantity consumed of a commodity increases per unit of time, the utility derived from each successive unit decreases, consumption of all other commodities remaining constant. In other words, the extra satisfaction that a consumer derives declines as he/she consumes more and more of the product in a given period of time. This gives sense in that the first banana a person consumes gives him more marginal utility than the second and the second banana also gives him higher marginal utility than the third and so on (see figure 3.1).

The law of diminishing marginal utility is based on the following assumptions.

- The consumer is rational
- The consumer consumes identical or homogenous product. The commodity to be consumed should have similar quality, color, design, etc.
- There is no time gap in consumption of the good
- The consumer taste/preferences remain unchanged

3.3.1.4 Equilibrium of a consumer

The objective of a rational consumer is to maximize total utility. As long as the additional unit consumed brings a positive marginal utility, the consumer wants to consumer more of the product because total utility increases. However, given his limited income and the price level of goods and services, what combination of goods and services should he consume so as to get the maximum total utility?

a) the case of one commodity

The equilibrium condition of a consumer that consumes a single good X occurs when the marginal utility of X is equal to its market price.

$$MU_X = P_X$$

Proof

Given the utility function

$$U = f(X)$$

If the consumer buys commodity X, then his expenditure will be $Q_X P_X$. The consumer maximizes the difference between his utility and expenditure.

$$Max(U - Q_X P_X)$$

The necessary condition for maximization is equating the derivative of a function to zero. Thus,

$$\frac{dU}{dQ_X} - \frac{d(Q_X P_X)}{dQ_X} = 0$$

$$\frac{dU}{dQ_X} - P_X = 0 \Rightarrow MU_X = P_X$$

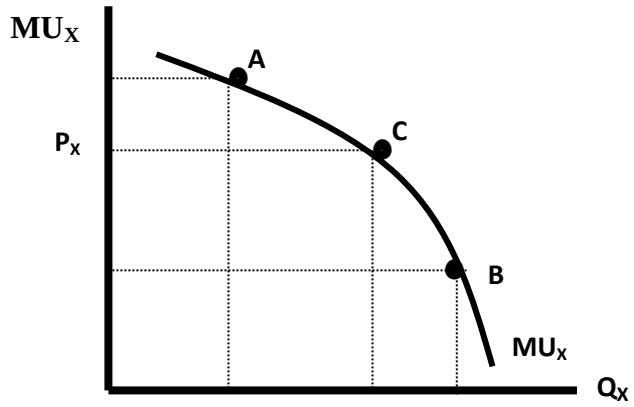


Figure 3.2: Equilibrium condition of consumer with only one commodity

At any point above point C (like point A) where $MU_X > P_X$, it pays the consumer to consume more. When $MU_X < P_X$ (like point B), the consumer should consume less of X. At point C where $MU_X = P_X$ the consumer is at equilibrium.

b) the case of two or more commodities

For the case of two or more goods, the consumer's equilibrium is achieved when the marginal utility per money spent is equal for each good purchased and his money income available for the purchase of the goods is exhausted. That is,

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \cdots = \frac{MU_N}{P_N} \quad \text{and} \quad P_X Q_X + P_Y Q_Y + \cdots + P_N Q_N = M$$

where, M is the income of the consumer.

Example: Suppose Saron has 7 Birr to be spent on two goods: banana and bread. The unit price of banana is 1 Birr and the unit price of a loaf of bread is 4 Birr. The total utility she obtains from consumption of each good is given below.

Table 3.2: Utility schedule for two commodities

Income = 7 Birr, Price of banana = 1 Birr, Price of bread = 4 Birr							
Banana				*Bread*			
Quantity	*TU*	*MU*	*MU/P*	*Quantity*	*TU*	*MU*	*MU/P*
0	0	-	-	0	0	-	-
1	6	6	6	1	12	12	3
2	11	5	5	2	20	8	2
3	14	3	3	3	26	6	1.5
4	16	2	2	4	29	3	0.75
5	16	0	0	5	31	2	0.5
6	14	-2	-2	6	32	1	0.25

Recall that utility is maximized when the condition of marginal utility of one commodity divided by its market price is equal to the marginal utility of the other commodity divided by its market price.

$$\frac{MU_1}{P_1} = \frac{MU_2}{P_2}$$

In table 3.2, there are two different combinations of the two goods where the MU of the last birr spent on each commodity is equal. However, only one of the two combinations is consistent with the prices of the goods and her income. Saron will be at equilibrium when she consumes 3 units of banana and 1 loaf of bread. At this equilibrium,

i) $MU_1/P_1 = MU_2/P_2$

$$\frac{MU_{banana}}{P_{banana}} = \frac{MU_{bread}}{P_{bread}} = \frac{3}{1} = \frac{12}{4} = 3$$

ii) $P_1.Q_1 + P_2.Q_2 = M$

$(1*3) + (4*1) = 7$

The total utility that Saron derives from this combination can be given by:

$TU = TU_1 + TU_2$

$TU = 14 + 12$

$TU = 26$

Given her fixed income and the price level of the two goods, no combination of the two goods will give her higher TU than this level of utility.

Limitation of the cardinal approach

1. The assumption of cardinal utility is doubtful because utility may not be quantified. Utility cannot be measured absolutely (objectively).
2. The assumption of constant MU of money is unrealistic because as income increases, the marginal utility of money changes.

3.3.2 The ordinal utility theory

In the ordinal utility approach, it is not possible for consumers to express the utility of various commodities they consume in absolute terms, like 1 util, 2 utils, or 3 utils but it is possible to express the utility in relative terms. The consumers can rank commodities in the order of their preferences as 1st, 2nd, 3rd and so on. Therefore, the consumer need not know in specific units the utility of various commodities to make his choice. It suffices for him to be able to rank the various baskets of goods according to the satisfaction that each bundle gives him.

3.3.2.1 Assumptions of ordinal utility theory

The ordinal approach is based on the following assumptions.

- **Consumers are rational** - they maximize their satisfaction or utility given their income and market prices.
- **Utility is ordinal** - utility is not absolutely (cardinally) measurable. Consumers are required only to order or rank their preference for various bundles of commodities.
- **Diminishing marginal rate of substitution:** The marginal rate of substitution is the rate at which a consumer is willing to substitute one commodity for another commodity so that his total satisfaction remains the same. The rate at which one good can be substituted for another in consumer's basket of goods diminishes as the consumer consumes more and more of the good.
- The **total utility** of a consumer is measured by the amount (quantities) of all items he/she consumes from his/her **consumption basket.**
- **Consumer's preferences are consistent.** For example, if there are three goods in a given consumer's basket, say, X, Y, Z and if he prefers X to Y and Y to Z, then the consumer is expected to prefer X to Z. This property is known as axioms of ***transitivity*.**

The ordinal utility approach is explained with the help of indifference curves. Therefore, the ordinal utility theory is also known as the *indifference curve approach.*

3.3.2.2 Indifference set, curve and map

Indifference set/ schedule is a combination of goods for which the consumer is indifferent. It shows the various combinations of goods from which the consumer derives the same level of satisfaction.

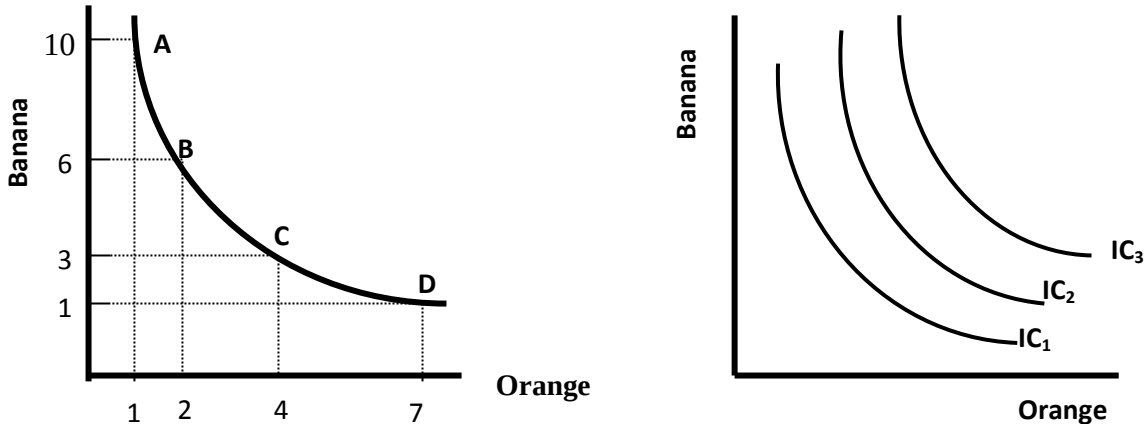
Consider a consumer who consumes two goods X and Y (table 3.3).

Table 3.3: Indifference schedule

Bundle (Combination)	A	B	C	D
Orange	1	2	4	7
Banana	10	6	3	1

In table 3.3 above, each combination of good X and Y gives the consumer equal level of total utility. Thus, the individual is indifferent whether he consumes combination A, B, C or D.

Indifference curve: When the indifference set/schedule is expressed graphically, it is called an *indifference curve*. An indifference curve shows different combinations of two goods which yield the same utility (level of satisfaction) to the consumer. A set of indifference curves is called **indifference map.**



i) Indifference curve ii) Indifference map

Figure 3.3: Indifference curve and indifference map

3.3.2.3 Properties of indifference curves

1. **Indifference curves have negative slope (downward sloping to the right).** Indifference curves are negatively sloped because the consumption level of one commodity can be increased only by reducing the consumption level of the other commodity. In other words, in order to keep the utility of the consumer constant, as the quantity of one commodity is increased the quantity of the other must be decreased.

2. **Indifference curves are convex to the origin.** This implies that the slope of an indifference curve decreases (in absolute terms) as we move along the curve from the left downwards to the right. The convexity of indifference curves is the reflection of the diminishing marginal rate of substitution. This assumption implies that the commodities can substitute one another at any point on an indifference curve but are not perfect substitutes.

3. **A higher indifference curve is always preferred to a lower one.** The further away from the origin an indifferent curve lies, the higher the level of utility it denotes. Baskets of goods on a higher indifference curve are preferred by the rational consumer because they contain more of the two commodities than the lower ones.

4. **Indifference curves never cross each other (cannot intersect).** The assumptions of consistency and transitivity will rule out the intersection of indifference curves. Figure 3.4 shows the violations of the assumptions of preferences due to the intersection of indifference curves.

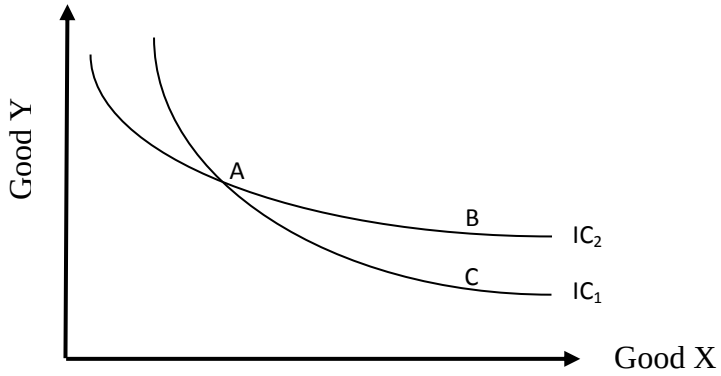


Figure 3.4: Intersection of indifference curves

In the above figure, the consumer prefers bundle B to bundle C. On the other hand, following indifference curve 1 (IC1), the consumer is indifferent between bundle A and C, and along indifference curve 2 (IC2) the consumer is indifferent between bundle A and B. According to the principle of transitivity, this implies that the consumer is indifferent between bundle B and C which is contradictory or inconsistent with the initial statement where the consumer prefers bundle B to C. Therefore, indifference curves never cross each other.

3.3.2.4 Marginal rate of substitution (MRS)

Marginal rate of substitution is a rate at which consumers are willing to substitute one commodity for another in such a way that the consumer remains on the same indifference curve. It shows a consumer's willingness to substitute one good for another while he/she is indifferent between the bundles.

Marginal rate of substitution of X for Y is defined as the number of units of commodity Y that must be given up in exchange for an extra unit of commodity X so that the consumer maintains the same level of satisfaction. Since one of the goods is scarified to obtain more of the other good, the MRS is negative. Hence, usually we take the absolute value of the slope.

$$MRS_{X,Y} = \frac{Number\ of\ units\ of\ Y\ given\ up}{Number\ of\ units\ of\ X\ gained} = -\frac{\Delta Y}{\Delta X}$$

To understand the concept, consider the following indifference curve.

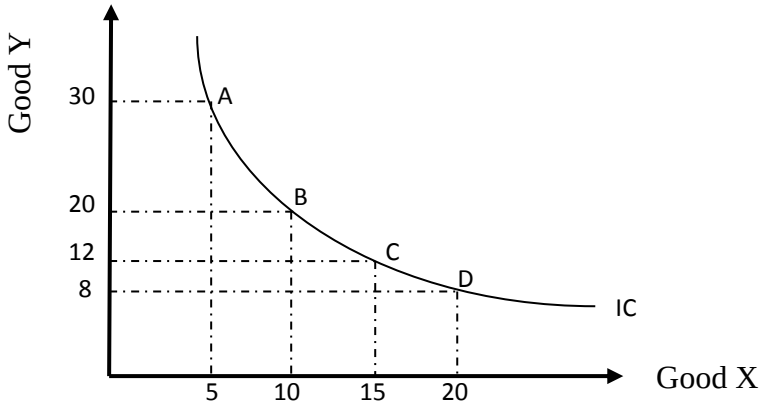


Figure 3.5: Indifference curve for two products X and Y

From the above graph, $MRS_{X,Y}$ associated with the movement from point A to B, point B to C and point C to D is 2.0,1.6, and 0.8 respectively. That is, for the same increase in the consumption of good X, the amount of good Y the consumer is willing to scarify diminishes. This principle of marginal rate of substitution is reflected by the convex shape of the indifference curve and is called diminishing marginal rate of substitution.

It is also possible to derive MRS using the concept of marginal utility. $MRS_{X,Y}$ is related to MU_X and MU_Y as follows.

$$MRS_{X,Y} = \frac{MU_X}{MU_Y}$$

Proof: Suppose the utility function for two commodities X and Y is defined as:

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

Since utility is constant along an indifference curve, the total differential of the utility function will be zero.

$$dU = \frac{\partial U}{\partial X}dX + \frac{\partial U}{\partial Y}dY = 0$$

$$MU_X dX + MU_Y dY = 0$$

$$\frac{MU_X}{MU_Y} = -\frac{dY}{dX} = MRS_{X,Y} \qquad \text{Similarly, } \frac{MU_Y}{MU_X} = -\frac{dX}{dY} = MRS_{Y,X}$$

Example: Suppose a consumer's utility function is given by $U(X,Y) = X^4Y^2$. Find $MRS_{X,Y}$

Solution: $MRS_{X,Y} = \frac{MU_X}{MU_Y}$

$$MU_X = \frac{\partial U}{\partial X} = 4X^3Y^2 \quad \text{and } MU_Y = \frac{\partial U}{\partial Y} = 2X^4Y \quad \text{Hence, } MRS_{X,Y} = \frac{MU_X}{MU_Y} = \frac{4X^3Y^2}{2X^4Y} = \frac{2Y}{X}$$

3.3.2.5 The budget line or the price line

Do you think that the indifference curve discussed in the previous section tells us whether a given combination of goods is affordable to the consumer? If no, what are the major constraints to the consumer in maximizing his/her total utility?

Indifference curves only tell us about consumer preferences for any two goods but they cannot show which combinations of the two goods will be bought. In reality, the consumer is constrained by his/her income and prices of the two commodities. This constraint is often presented with the help of the budget line.

The *budget line* is a set of the commodity bundles that can be purchased if the entire income is spent. It is a graph which shows the various combinations of two goods that a consumer can purchase given his/her limited income and the prices of the two goods.

In order to draw a budget line facing a consumer, we consider the following assumptions.

- There are only two goods bought in quantities, say, X and Y.
- Each consumer is confronted with market determined prices, P_X and P_Y.
- The consumer has a known and fixed money income (M).

Assuming that the consumer spends all his/her income on the two goods (X and Y), we can express the budget constraint as:

$$M = P_X X + P_Y Y$$

By rearranging the above equation, we can derive the following general equation of a budget line.

$$Y = \frac{M}{P_Y} - \frac{P_X}{P_Y} X$$

Graphically,

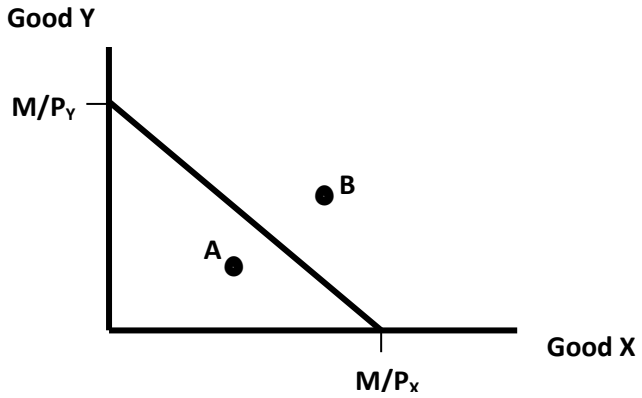


Figure 3.6: The budget line

Note that:

- The slope of the budget line is given is by $-\frac{P_X}{P_Y}$ (the ratio of the prices of the two goods).
- Any combination of the two goods within the budget line (such as point A) or along the budget line is attainable.
- Any combination of the two goods outside the budget line (such as point B) is unattainable (unaffordable).

Example: A consumer has $100 to spend on two goods X and Y with prices $3 and $5 respectively. Derive the equation of the budget line and sketch the graph.

Solution: The equation of the budget line can be derived as follows.

$$P_X X + P_Y Y = M$$

$$3X + 5Y = 100$$

$$5Y = 100 - 3X$$

$$Y = \frac{100}{5} - \frac{3}{5}X$$

$$Y = 20 - \frac{3}{5}X$$



When the consumer spends all of her income on good Y, we get the Y- intercept (0,20). Similarly, when the consumer spends all of her income on good X, we obtain the X- intercept (33.3,0). Using these two points we can sketch the graph of the budget line.

Recall that a budget is drawn for given prices and fixed consumer's income. Hence, the changes in prices or income will affect the budget line.

Change in income: If the income of the consumer changes (keeping the prices of the commodities unchanged), the budget line also shifts (changes). Increase in income causes an upward/outward shift in the budget line that allows the consumer to buy more goods and services and decreases in income causes a downward/inward shift in the budget line that leads the consumer to buy less quantity of the two goods. It is important to note that the slope of the budget line (the ratio of the two prices) does not change when income rises or falls.

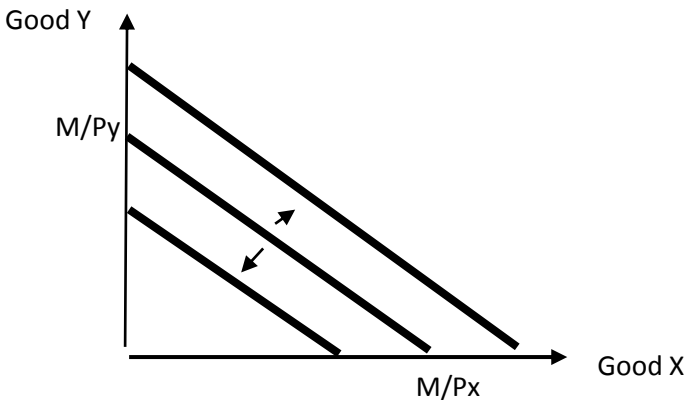


Figure 3.7*: Effects of increase (right) and decrease (left) in income on the budget line*

Change in prices: An equal increase in the prices of the two goods shifts the budget line inward. Since the two goods become expensive, the consumer can purchase the lesser amount of the two goods. An equal decrease in the prices of the two goods, one the other hand, shifts the budget line out ward. Since the two goods become cheaper, the consumer can purchase the more amounts of the two goods.

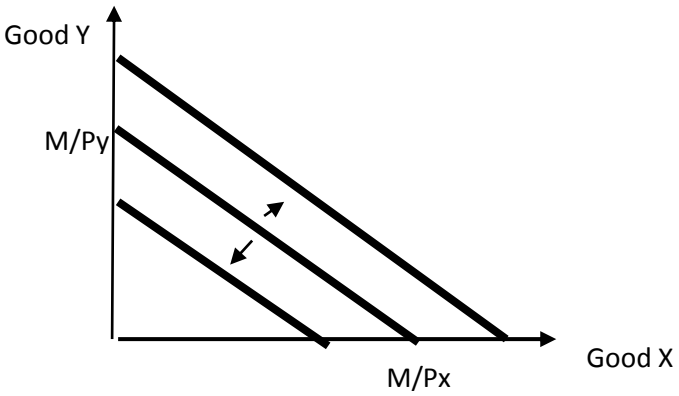


Figure 3.8*: Effect of proportionate increase (inward) and decrease (out ward) in the prices of both goods*

An increase or decrease in the price of one of the two goods, keeping the price of the other good and income constant, changes the slope of the budget line by affecting only the intercept of the commodity that records the change in the price. For instance, if the price of good X decreases while both the price of good Y and consumer's income remain unchanged, the horizontal intercept moves outward and makes the budget line flatter. The reverse is true if the price of good X increases. On the other hand, if the price of good Y decreases while both the price of good X and consumer's income remain unchanged, the vertical intercept moves upward and makes the budget line steeper. The reverse is true for an increase in the price of good Y.

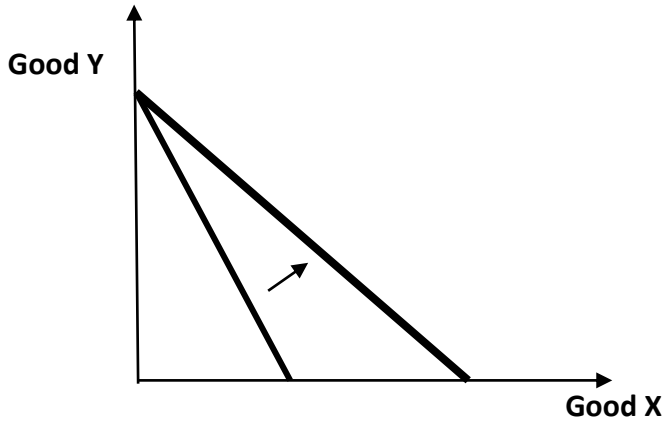


Figure 3.9: Effect of decrease in the price of only good X on the budget line

3.3.2.6 *Equilibrium of the consumer*

The preferences of a consumer (what he/she wishes to purchase) are indicated by the indifference curve. The budget line specifies different combinations of two goods (say X and Y) the consumer can purchase with the limited income. Therefore, a rational consumer tries to attain the highest possible indifference curve, given the budget line. This occurs at the point where the indifference curve is tangent to the budget line so that the slope of the indifference curve (MRS_{XY}) is equal to the slope of the budget line (P_X / P_Y). In figure 3.10, the equilibrium of the consumer is at point 'E' where the budget line is tangent to the highest attainable indifference curve (IC_2).

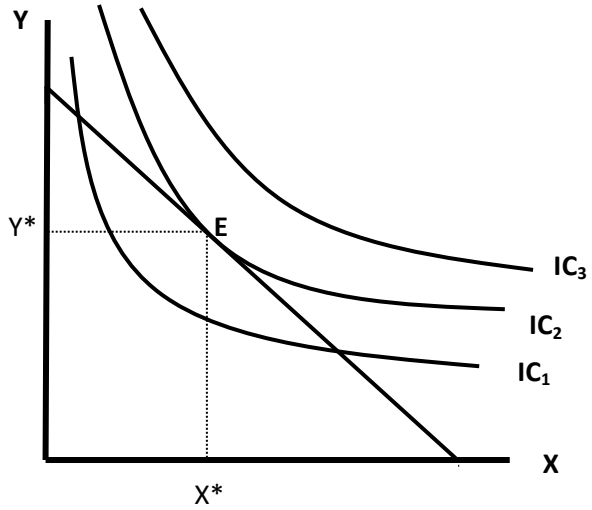


Figure 3.10: Consumer equilibrium under indifference curve approach

Mathematically, consumer optimum (equilibrium) is attained at the point where:
Slope of indifference curve = Slope of the budget line

$$MRS_{XY} = \frac{P_X}{P_Y}$$

$$\Rightarrow \frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

Example: A consumer consuming two commodities X and Y has the utility function $U(X,Y) = XY + 2X$. The prices of the two commodities are 4 birr and 2 birr respectively. The consumer has a total income of 60 birr to be spent on the two goods.

a) Find the utility maximizing quantities of good X and Y.
b) Find the $MRS_{X,Y}$ at equilibrium.

Solution

a) The budget constraint of the consumer is given by:

$P_X.X + P_Y.Y = M$

$4X+2Y= 60$ …… (i)

Moreover, at equilibrium

$$\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

$$\frac{Y+2}{X} = \frac{4}{2}$$

$$\frac{Y+2}{X} = 2$$

$$Y = 2X - 2 \text{ …… (ii)}$$

Substituting equation (ii) into (i), we obtain $Y = 14 \quad and \quad X = 8.$

b) $MRS_{X,Y} = \frac{MU_X}{MU_Y} = \frac{Y+2}{X} = \frac{14+2}{8} = 2$

(At the equilibrium, MRS can also be calculated as the ratio of the prices of the two goods)

Chapter summary

A consumer makes choices by comparing bundle of goods. Given any two consumption bundles, the consumer either decides that one of the consumption bundles is strictly better than the other, or decides that he is indifferent between the two bundles. Economists use the term utility to describe the satisfaction or pleasure derived from consumption of a good or service. In other words, utility is the power of the product to satisfy human wants.

There are two approaches to measure or compare consumer's utility derived from consumption of goods and services. These are cardinal and ordinal approaches. The cardinalist school postulated that utility can be measured objectively. However, the assumption of cardinal utility is doubtful because utility may not be quantified. Unlike the cardinal theory, the ordinal utility theory says that utility cannot be measured in absolute terms but the consumer can rank or order the utility he derives from different goods and goods.

The ordinal/indifference curve approach is based on the consumer's budget line and indifference curves. An indifference curve shows all combinations of two goods which yield the same total utility to a consumer and the budget line represents all combinations of two products that the consumer can purchase, given product prices and his or her money income. The consumer is in equilibrium (utility is maximized) at the point where the budget line is tangent to the highest attainable indifference curve.

Review questions

Part I: Discussion questions

1. Explain briefly the following concepts.
   A) Utility
   B) Indifference curve
   C) Law of diminishing marginal utility
   D) Budget line
   E) Consumer preference
   F) Marginal rate of substitution
2. What is the basic difference between cardinal and ordinal approaches of utility?
3. Elaborate the justifications for the negative slope and convexity of indifference curve.
4. Standard indifference curves cannot intersect each other. Why?
5. Does the change in income affect the slope of the budget line? Explain.

Part III: Workout

1. A person has $ 100 to spend on two goods X and Y whose respective prices are $3 and $5.
   A. Draw the budget line.
   B. What happens to the original budget line if the budget falls by 25%?
   C. What happens to the original budget line if the price of X doubles?
   D. What happens to the original budget line if the price of Y falls to $4?

2. A rational consumer spends all of her income on two goods: Apple and Banana. Suppose the last dollar spent on Apple increased her total utility from 60 utils to 68 utils and the last dollar spent on Banana increased her total utility from 25 utils to 29 utils. If the price of a unit of Apple is 2 Birr, what is the price of a unit of Banana at equilibrium?

3. Given utility function U= $X^{0.5}Y^{0.5}$ where P_X = 12 Birr, Birr, P_Y = 4 Birr and the income of the consumer is, M= 240 Birr.
   A. Find the utility maximizing combinations of X and Y.
   B. Calculate marginal rate of substitution of X for Y ($MRS_{X,Y}$) at equilibrium and interpret your result.

4. Suppose a particular consumer has 8 birr to be spent on two goods, A and B. The unit price of good A is 2 birr and the unit price of B is 1 birr. The marginal utility (MU) she gets from consumption of the goods is given below.

Quantity	MU_A	MU_B
1	36	30
2	24	22
3	20	16
4	18	12
5	16	10
6	10	4

A) Based on the cardinal analysis, what is the combination of the two goods that gives maximum utility to the consumer?

B) What is the total utility at the utility maximization level?

Suggested reading materials

- A. Koutsoyiannis, Modern Microeconomics, 2nd edition, 1979
- D.N.Dwivedi, 1997, *Micro Economic Theory*, 3rd edition., Vikas Publishing
- R. S. Pindyck and D. L. Rubinfeld, Microeconomics, 2nd edition,1992
- Varian, 2010, Intermediate Microeconomics: A Modern Approach, 8th edition
- C.L.Cole, *Micro Economics: A Contemporary Approach*.
- Ferguson & Gould's, 1989, *Microeconomic Theory*, 6th edition.
- E. Mansfield, 1988, Microeconomics: Theory and Applications
- Arnold, 2008, Microeconomics, 8th edition, International student edition

Chapter Four

The Theory of Production and Cost

Introduction

This chapter has two major sections. The first part will introduce you to the basic concepts of production and production function, classification of inputs, essential features of short run production functions and the stages of short run production. The second part mainly deals with the difference between economic cost and accounting cost, the characteristics of short run cost functions, and the relationship between short run production functions and short run cost functions.

Chapter objectives

After successful completion of this chapter, you will be able to:

- define production and production function
- differentiate between fixed and variable inputs
- describe short run total product, average product and marginal product
- compare and contrast the three stages of production in the short run
- explain the difference between accounting cost and economic cost
- describe total cost, average cost and marginal cost functions
- explain the relationship between short run production functions and short run cost functions

4.1 Theory of production in the short run

4.1.1 Definition of production

Raw materials yield less satisfaction to the consumer by themselves. In order to get better utility from raw materials, they must be transformed into outputs. However, transforming raw materials into outputs requires inputs such as land, labour, capital and entrepreneurial ability. Production is the process of transforming inputs into outputs. It can also be defined as an act of creating value or utility. The end products of the production process are outputs which could be tangible (goods) or intangible (services).

4.1.2 Production function

Production function is a technical relationship between inputs and outputs. It shows the maximum output that can be produced with fixed amount of inputs and the existing technology. A production function may take the form of an algebraic equation, table or graph.
A general equation for production function can, for instance, be described as:

$$Q = f(X_1, X_2, X_3, ..., X_n)$$

where, Q is output and X_1, X_2, $X_3, ..., X_n$ are different types of inputs.

Inputs are commonly classified as fixed inputs or variable inputs. **Fixed inputs** are those inputs whose quantity cannot readily be changed when market conditions indicate that an immediate adjustment in output is required. In fact, no input is ever absolutely fixed but may be fixed during an immediate requirement. For example, if the demand for Beer rises suddenly in a week, the brewery factories cannot plant additional machinery overnight and respond to the increased demand. Buildings, land and machineries are examples of fixed inputs because their quantity cannot be manipulated easily in a short period of time. **Variable inputs** are those inputs whose quantity can be altered almost instantaneously in response to desired changes in output. That is, their quantities can easily be diminished when the market demand for the product decreases and vice versa. The best example of variable input is unskilled labour.

Does a short run refer to specific period of time that is applicable to every firm or industry? If this condition is rather unique to the firm, industry or economic variable being studied, what is our basis to classify production as a short run?

In economics, ***short run*** refers to a period of time in which the quantity of at least one input is fixed. In other words, short run is a time period which is not sufficient to change the quantities of all inputs so that at least one input remains fixed. Here it should be noted that short run periods of different firms have different durations. Some firms can change the quantity of all their inputs within a month while it takes more than a year for other types of firms. This sub-section is confined to production with one variable input and one fixed input.

Consider a firm that uses two inputs: capital (fixed input) and labour (variable input). Given the assumptions of short run production, the firm can increase output only by increasing the amount of labour it uses. Hence, its production function can be given by:

$$Q = f(L)$$

where, Q is output and L is the quantity of labour.

The production function shows different levels of output that the firm can produce by efficiently utilizing different units of labour and the fixed capital. In the above short run production function, the quantity of capital is fixed. Thus, output can change only when the amount of labour changes.

4.1.3 Total, average, and marginal product

In production, the contribution of a variable input can be described in terms of total, average and marginal product.

Total product (TP): it is the total amount of output that can be produced by efficiently utilizing specific combinations of the variable input and fixed input. Increasing the variable input (while some other inputs are fixed) can increase the total product only up to a certain point. Initially, as we combine more and more units of the variable input with the fixed input, output continues to increase, but eventually if we employ more and more unit of the variable input beyond the carrying capacity of the fixed input, output tends to decline. In general, the TP function in the short-run follows a certain trend: it initially increases at an increasing rate, then increases at a decreasing rate, reaches a maximum point and eventually falls as the quantity of the variable input rises. This tells us what shape a total product curve assumes.

Marginal Product (MP): it is the change in output attributed to the addition of one unit of the variable input to the production process, other inputs being constant. For instance, the change in total output resulting from employing additional worker (holding other inputs constant) is the marginal product of labour (MP_L). In other words, *MP_L measures the slope of the total product curve at a given point*.

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

In the short run, the marginal product of the variable input first increases, reaches its maximum and then decreases to the extent of being negative. That is, as we continue to combine more and more of the variable input with the fixed input, the marginal product of the variable input increases initially and then declines.

Average Product (AP): Average product of an input is the level of output that each unit of input produces, on the average. It tells us the mean contribution of each variable input to the total product. Mathematically, it is the ratio of total output to the number of the variable input. The average product of labour (AP_L), for instance, is given by:

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

Average product of labour first increases, reaches its maximum value and eventually declines. The AP curve can be measured by the slope of rays originating from the origin to a point on the TP curve (see figure 4.1). For example, the AP_L at L_2 is the ratio of TP_2 to L_2. This is identical to the slope of ray *a*.

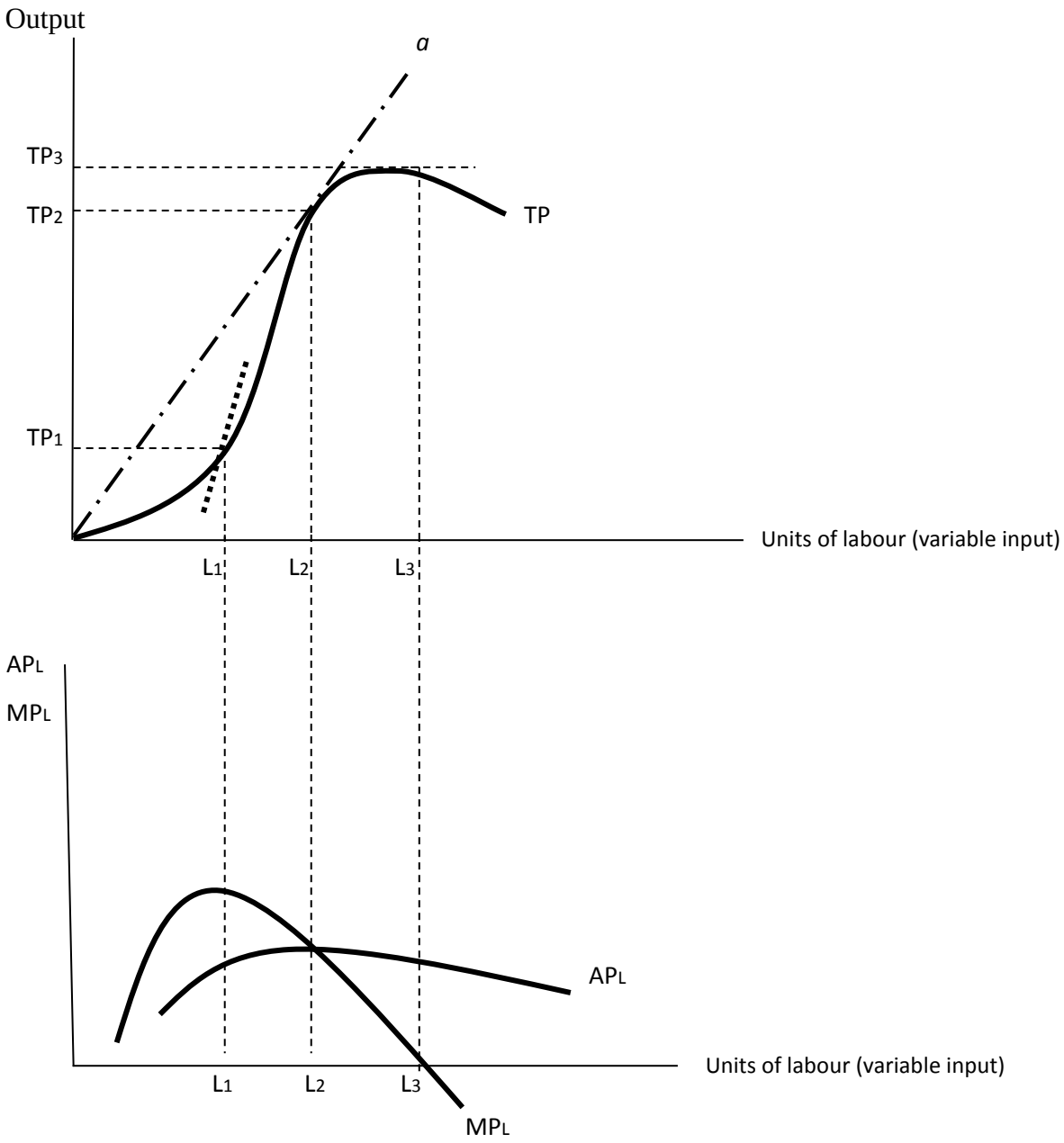


Figure 4.1: Total product, average product and marginal product curves

The relationship between MP_L and AP_L can be stated as follows.

- When AP_L is increasing, $MP_L > AP_L$.
- When AP_L is at its maximum, $MP_L = AP_L$.
- When AP_L is decreasing, $MP_L < AP_L$.

Example: Suppose that the short-run production function of certain cut-flower firm is given by: $Q = 4KL - 0.6K^2 - 0.1L^2$ where Q is quantity of cut-flower produced, L is labour input and K is fixed capital input (K=5).

a) Determine the average product of labour (AP_L) function.

b) At what level of labour does the total output of cut-flower reach the maximum?

c) What will be the maximum achievable amount of cut-flower production?

Solution:

a) $AP_L = \frac{Q}{L} = \frac{4KL - 0.6K^2 - 0.1L^2}{L} = 4K - \frac{0.6K^2}{L} - 0.1L = 20 - \frac{15}{L} - 0.1L = \underline{\underline{\frac{20L - 15 - 0.1L^2}{L}}}$

b) When total product (Q) is maximum, MP will be zero.

$$MP_L = \frac{\partial Q}{\partial L} = \frac{\partial(4KL - 0.6K^2 - 0.1L^2)}{\partial L} = 4K - 0.2L = 0$$

$$\Rightarrow 20 - 0.2L = 0 \;\Rightarrow\; L = \frac{20}{0.2} = \underline{\underline{100}}$$

Hence, total output will be the maximum when 100 workers are employed.

c) Substituting the optimal values of labor (L=100) and capital (K=5) into the original production function (Q):

$$Q_{max} = 4KL - 0.6K^2 - 0.1L^2 = 4*5*100 - 0.6*5^2 - 0.1*100^2 = \underline{\underline{985}}$$

4.1.4 The law of variable proportions

The law of variable proportions states that as successive units of a variable input(say, labour) are added to a fixed input (say, capital or land), beyond some point the extra, or marginal, product that can be attributed to each additional unit of the variable resource will decline. For example, if additional workers are hired to work with a constant amount of capital equipment, output will eventually rise by smaller and smaller amounts as more workers are hired.

This law assumes that technology is fixed and thus the techniques of production do not change. Moreover, all units of labour are assumed to be of equal quality. Each successive worker is presumed to have the same innate ability, education, training, and work experience. Marginal product ultimately diminishes not because successive workers are less skilled or less energetic rather it is because more workers are being used relative to the amount of plant and equipment available. The law starts to operate after the marginal product curve reaches its maximum (this happens when the number of workers exceeds L_1 in figure 4.1). This law is also called the *law of diminishing returns*.

4.1.5 Stages of production

We are not in a position to determine the specific number of the variable input (labour) that the firm should employ because this depends on several other factors than the productivity of labour. However, it is possible to determine the ranges over which the variable input (labour) be employed. To this end, economists have defined three stages of short run production.

Stage I: This stage of production covers the range of variable input levels over which the average product (AP_L) continues to increase. It goes from the origin to the point where the AP_L is maximum, which is the equality of MP_L and AP_L (up to L_2 level of labour employment in figure 4.1). This stage is **not an efficient region** of production though the MP of variable input is positive. The reason is that the variable input (the number of workers) is too small to efficiently run the fixed input so that the **fixed input is under-utilized** (not efficiently utilized).

Stage II: It ranges from the point where AP_L is at its maximum (MP_L=AP_L) to the point where MP_L is zero (from L_2 to L_3 in figure 4.1). Here, as the labour input increases by one unit, output still increases but at a decreasing rate. Due to this, the second stage of production is termed as the stage of ***diminishing marginal returns*****.** The reason for decreasing average and marginal products is due to the scarcity of the fixed factor. That is, once the optimum capital-labour combination is achieved, employment of additional unit of the variable input will cause the output to increase at a slower rate. As a result, the marginal product diminishes. This stage is the efficient region of production. Additional inputs are contributing positively to the total product and MP of successive units of variable input is declining (indicating that the fixed input is being optimally used). Hence, the efficient region of production is where the **marginal product of the variable input is declining but positive.**

Stage III: In this stage, an increase in the variable input is accompanied by decline in the total product. Thus, the total product curve slopes downwards, and the marginal product of labour becomes negative. This stage is also known as the stage of ***negative marginal returns*** to the variable input. The cause of negative marginal returns is the fact that the volume of the variable inputs is quite excessive relative to the fixed input; the fixed input is over-utilized. Obviously, a rational firm **should not operate in stage III** because additional units of variable input are contributing negatively to the total product (MP of the variable input is negative). In figure 4.1, this stage is indicated by the employment of labour beyond L_3.

4.2 Theory of costs in the short run

4.2.1 Definition and types of costs

To produce goods and services, firms need factors of production or simply inputs. To acquire these inputs, they have to buy them from resource suppliers. Cost is, therefore, the monetary value of inputs used in the production of an item.

Economists use the term “profit” differently from the way accountants use it. To the accountant, profit is the firm’s total revenue less its explicit costs (accounting costs). To the economist, economic profit is total revenue less economic costs (explicit and implicit costs).

Accounting cost is the monetary value of all purchased inputs used in production; it ignores the cost of non-purchased (self-owned) inputs. It considers only direct expenses such as wages/salaries, cost of raw materials, depreciation allowances, interest on borrowed funds and utility expenses (electricity, water, telephone, etc.). These costs are said to *be explicit costs*. Explicit costs are out of pocket expenses for the purchased inputs. If a producer calculates her cost by considering only the costs incurred for purchased inputs, then her profit will be an accounting profit.

Accounting profit = Total revenue – Accounting cost = Total revenue – Explicit cost

In the real world economy, entrepreneurs may use some resources which may not have direct monetary expense since the entrepreneur can own these inputs himself or herself. Economic cost of producing a commodity considers the monetary value of all inputs (purchased and non-purchased). Calculating economic costs will be difficult since there are no direct monetary expenses for non-purchased inputs. The monetary value of these inputs is obtained by estimating their opportunity costs in monetary terms. The estimated monetary cost for non-purchased inputs is known as *implicit cost*. For example, if Mr. X quits a job which pays him Birr 10, 000.00 per month in order to run a firm he has established, then the opportunity cost of his labour is taken to be Birr 10,000.00 per month (the salary he has forgone in order to run his own business). Therefore, economic cost is given by the sum of implicit cost and explicit cost.

Economic profit =Total revenue – Economic cost (Explicit cost + Implicit cost)

Economic profit will give the real profit of the firm since all costs are taken into account. Accounting profit of a firm will be greater than economic profit by the amount of implicit cost. If all inputs are purchased from the market, accounting and economic profit will be the same. However, if implicit costs exist, then accounting profit will be larger than economic profit.

4.2.2 Total, average and marginal costs in the short run

A cost function shows the total cost of producing a given level of output. It can be described using equations, tables or curves. A cost function can be represented using an equation as follows.

C = f (Q), where C is the total cost of production and Q is the level of output.

In the short run, total cost (TC) can be broken down in to two – total fixed cost (TFC) and total variable cost (TVC). By fixed costs we mean costs which do not vary with the level of output. They are regarded as fixed because these costs are unavoidable regardless of the level of output. The firm can avoid fixed costs only if he/she stops operation (shuts down the business). The fixed costs may include salaries of administrative staff, expenses for building depreciation

and repairs, expenses for land maintenance and the rent of building used for production. Variable costs, on the other hand, include all costs which directly vary with the level of output. For example, if the firm produces zero output, the variable cost is zero. These costs may include the cost of raw materials, the cost of direct labour and the running expenses of fuel, water, electricity, etc.

In general, the short run total cost is given by the sum of total fixed cost and total variable cost. That is,

$$TC = TFC + TVC$$

Based on the definition of the short run cost functions, let's see what their shapes look like.

Total fixed cost (TFC): Total fixed cost is denoted by a straight line parallel to the output axis. This is because such costs do not vary with the level of output.

Total variable cost (TVC): The total variable cost of a firm has an inverse S-shape. The shape indicates the law of variable proportions in production. At the initial stage of production with a given plant, as more of the variable factor is employed, its productivity increases. Hence, the TVC increases at a decreasing rate. This continues until the optimal combination of the fixed and variable factor is reached. Beyond this point, as increased quantities of the variable factor are combined with the fixed factor, the productivity of the variable factor declines, and the TVC increases at an increasing rate.

Total Cost (TC): The total cost curve is obtained by vertically adding TFC and TVC at each level of output. The shape of the TC curve follows the shape of the TVC curve, i.e. the TC has also an inverse S-shape. It should be noted that when the level of output is zero, TVC is also zero which implies TC = TFC.

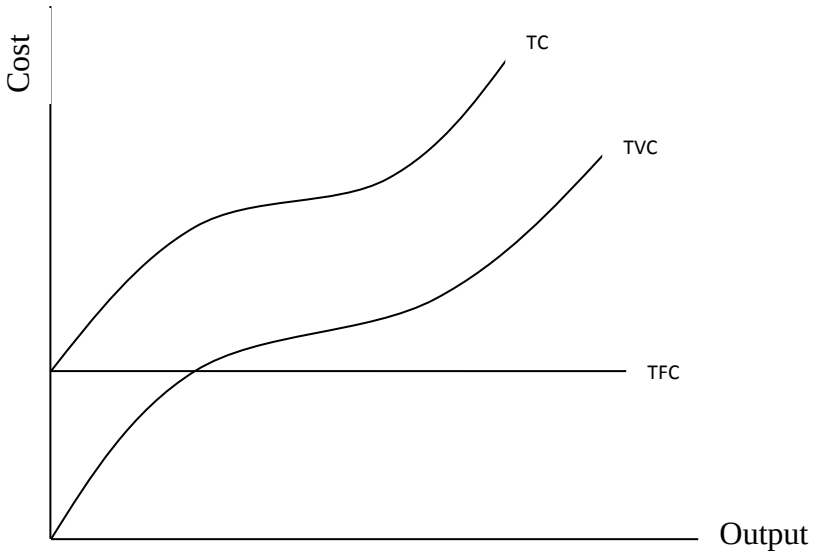


Figure 4.2*: Short run TC, TFC and TVC curves*

Per unit costs

From total costs functions we can derive per-unit costs. These are even more important in the short run analysis of the firm.

a) Average fixed cost (AFC) - Average fixed cost is total fixed cost per unit of output. It is calculated by dividing TFC by the corresponding level of output. The curve declines continuously and approaches both axes asymptotically.

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

b) Average variable cost (AVC) - Average variable cost is total variable cost per unit of output. It is obtained by dividing total variable cost by the level of output.

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

The short run AVC falls initially, reaches its minimum, and then starts to increase. Hence, the AVC curve has U-shape and the reason behind is the law of variable proportions.

c) Average total cost (ATC) or simply Average cost (AC) - Average total cost is the total cost per unit of output. It is calculated by dividing the total cost by the level of output.

$$AC = \frac{TC}{Q}$$

Equivalently, $AC = \frac{TVC + TFC}{Q} = \frac{TVC}{Q} + \frac{TFC}{Q}$ = AVC + AFC

Thus, AC can also be given by the vertical sum of AVC and AFC.

Marginal Cost (MC)

Marginal cost is defined as the additional cost that a firm incurs to produce one extra unit of output. In other words, it is the change in total cost which results from a unit change in output. Graphically, MC is the slope of TC function.

$$MC = \frac{dTC}{dQ}$$

In fact, MC is also a change in TVC with respect to a unit change in the level of output.

$$MC = \frac{dTFC + dTVC}{dQ} = \frac{dTVC}{dQ}, \quad \text{since} \quad \frac{dTFC}{dQ} = 0$$

Given inverse S-shaped TC and TVC curves, MC initially decreases, reaches its minimum and then starts to rise. From this, we can infer that the reason for the MC to exhibit U shape is also the law of variable proportions. In summary, AVC, AC and MC curves are all U-shaped due to the law of variable proportions.

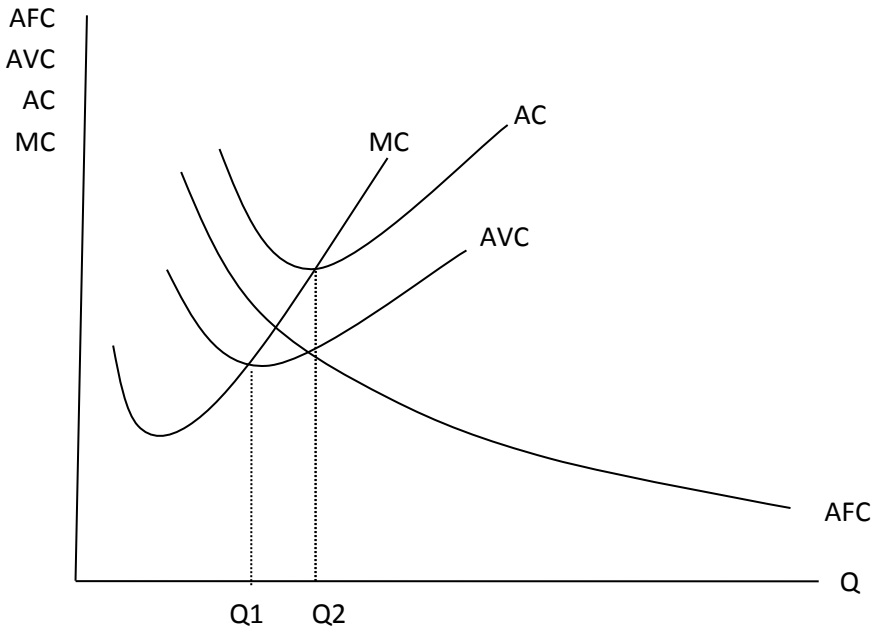


Figure 4.3*: Short run AFC, AVC, AC and MC Curves*

In the above figure, the AVC curve reaches its minimum point at Q_1 level of output and AC reaches its minimum point at Q_2 level of output. The vertical distance between AC and AVC, that is, AFC decreases continuously as output increases. It can also be noted that the MC curve passes through the minimum points of both AVC and AC curves.

Example: Suppose the short run cost function of a firm is given by: $TC=2Q^3-2Q^2+Q+10$.

a) Find the expression of TFC & TVC
b) Derive the expressions of AFC, AVC, AC and MC
c) Find the levels of output that minimize MC and AVC and then find the minimum values of MC and AVC

Solution:

Given $TC=2Q^3-2Q^2+Q+10$

a) $TFC = 10$, $TVC = 2Q^3-2Q^2+Q$

b) $AFC = TFC/Q = 10/Q$

$AVC = TVC/Q = (2Q^3-2Q^2+Q)/Q = 2Q^2-2Q+1$

$AC = TC/Q = (2Q^3-2Q^2+Q+10)/Q = 2Q^2-2Q+1+10/Q$

$MC = dC/dQ = 6Q^2-4Q+1$

c) To find the minimum value of MC,

$dMC/dQ = 12Q - 4 = 0$

$Q = 1/3$

MC is minimized when $Q = 0.33$

The minimum value of MC will be:

$MC = 6Q^2 - 4Q + 1$

$= 6(1/3)^2 - 4(1/3) + 1 = 0.33$

To find the minimum value of AVC

$dAVC/dQ = 4Q - 2 = 0$

$Q = 0.5$

AVC is minimized at Q =0.5

The minimum value of AVC will be:

$AVC = 2Q^2 - 2Q + 1$

$AVC = 2(0.5)^2 - 2(0.5) + 1$

$= 0.5 - 1 + 1$

$= 0.5$

4.2.3 The relationship between short run production and cost curves

Suppose a firm in the short run uses labour as a variable input and capital as a fixed input. Let the price of labour be given by **w**, which is constant. Given these conditions, we can derive the relation between MC and MP_L as well as the relation between AVC and AP_L.

i) Marginal Cost and Marginal Product of Labour

$$MC = \frac{\Delta TVC}{\Delta Q}, \text{ where } TVC = w.L$$

$$MC = \frac{\Delta(w.L)}{\Delta Q} = w.\frac{\Delta L}{\Delta Q}, \text{ but } \frac{\Delta L}{\Delta Q} = \frac{1}{MP_L}$$

Therefore, $MC = \frac{w}{MP_L}$

The above expression shows that MC and MP_L are inversely related. When initially MP_L increases, MC decreases; when MP_L is at its maximum, MC must be at a minimum and when finally MP_L declines, MC increases.

ii) Average Variable Cost and Average Product of Labour

$$AVC = \frac{TVC}{Q}, \text{ where, } TVC = w.L$$

$$AVC = \frac{w.L}{Q} = w.\frac{L}{Q}, \text{ but } \frac{L}{Q} = \frac{1}{AP_L}$$

Therefore, $AVC = \frac{w}{AP_L}$

This expression also shows inverse relation between AVC and AP_L. When AP_L increases, AVC decreases; when AP_L is at a maximum, AVC is at a minimum and when finally AP_L declines, AVC increases.

We can also sketch the relationship between these production and cost curves using graphs.

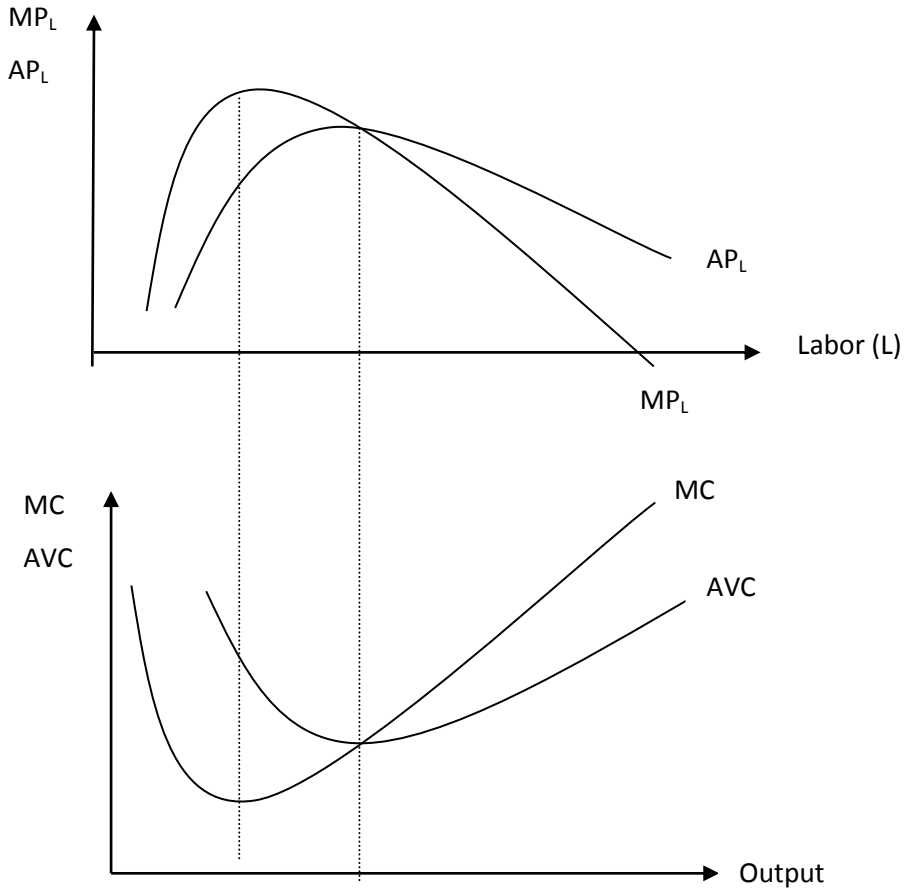


Figure 4.4: relationship between short run production and cost curves

From the above figure, we can conclude that the MC curve is the mirror image of MP_L curve and AVC curve is the mirror image of AP_L curve.

Chapter summary

Production is the act of creating those goods or services that have exchange values. The process of production requires inputs such as land, labor, capital and entrepreneurial ability. Production function is a technical relationship between inputs and outputs. It shows the maximum output that can be produced with fixed amount of inputs and the existing technology. Inputs are commonly classified as fixed inputs or variable inputs. Fixed inputs are those inputs whose quantity cannot readily be changed when market conditions indicate that an immediate change in output is required while variable inputs are those inputs whose quantity can be changed almost instantaneously in response to desired changes in output.

In economics, short run refers to a period of time in which the quantity of at least one input is fixed. In the short run, the efficient stage of production where marginal product of the variable input is positive but declining.

The law of diminishing returns describes what happens to output as a fixed plant is used more intensively. As successive units of a variable resource such as labor are added to a fixed plant, beyond some point, the marginal product associated with each additional unit of a resource declines.

Costs are the monetary values of inputs used for production purpose. Costs of production may involve explicit costs (costs of purchased inputs) and/or implicit costs (estimated costs of inputs self-owned inputs). Accounting cost is the monetary value of all purchased inputs used in production. Economic cost includes the monetary value of both purchased and non-purchased inputs. Thus, economic cost is the sum of implicit cost and explicit cost.

In the short run, one or more of a firm's inputs are fixed. Fixed costs are constant irrespective of the level output. A firm cannot avoid these costs even by producing zero level of output. Variable costs, on the other hand, vary with the level of output directly. In the short run, the AC, AVC and MC curves assume a U- shape due to the law of variable proportions. Short run marginal and average variable cost curves are a mirror reflection of the marginal product and average product of the variable input respectively.

Review questions

Part I: Discussion questions

1. Compare and contrast the following concepts.
   a) Explicit cost and implicit cost
   b) Economic cost and accounting cost
2. What is the main difference between fixed inputs and variable inputs?
3. Explain the law of variable proportions.
4. Which stage of short run production is efficient? Why?
5. Show the relationship between short-run MC and MP_L both mathematically and graphically.
6. Can accounting cost be greater economic cost? Explain.
7. The short run AVC, AC and MC are all U-shaped. Why?

Part II: Workout Questions

1. Suppose the production function is given by $Q(L,K) = L^{\frac{3}{4}} K^{\frac{1}{4}}$. Assuming capital is fixed, find AP_L and MP_L.
2. Consider the following short run production function:

   $$Q = 6L^2 - 0.4L^3$$

   a) Find the value of L that maximizes output
   b) Find the value of L that maximizes marginal product
   c) Find the value of L that maximizes average product
3. Given a short run cost function as $TC = \frac{1}{3}Q^3 - 2Q^2 + 60Q + 100$, find the minimum value of AVC and MC.

Suggested reading materials

- A. Koutsoyiannis, Modern Microeconomics, 2nd edition, 1979
- D.N.Dwivedi, 1997, *Micro Economic Theory*, 3rd edition., Vikas Publishing
- R. S. Pindyck and D. L. Rubinfeld, Microeconomics, 2nd edition,1992
- Varian, 2010, Intermediate Microeconomics: A Modern Approach, 8th edition
- C.L.Cole, *Micro Economics: A Contemporary Approach*.
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- Arnold, 2008, Microeconomics, 8th edition, International student edition

Chapter Five

Market Structure

Introduction

This chapter discusses how a particular firm makes a decision to achieve its profit maximization objective. A firm's decision to achieve this goal is dependent on the type of market in which it operates. To this effect we distinguish between four major types of markets: perfectly competitive market, monopolistically competitive market, oligopolistic market, and pure monopoly market.

Chapter objectives:

At the end of this chapter you will be able to:

- ✓ differentiate market in physical and digital space
- ✓ explain the characteristics and equilibrium condition of perfectly competitive market
- ✓ differentiate between different types of imperfect market structures

5.1. The concept of market in physical and digital space

Comprehensive definition of market according to American Marketing Association (1985) is the process of planning and executing the conception, pricing, promotion, and distribution of goods, services and ideas to create exchanges that satisfy individual and organizational objectives. So market describes place or digital space by which goods, services and ideas are exchanged to satisfy consumer need.

Digital marketing is the marketing of products or services using digital technologies, mainly on the internet but also including mobile phones, display advertising, and any other digital media. Digital marketing channels are systems on the internet that can create, accelerate and transmit product value from producer to the terminal consumer by digital networks. *Physical market* is a set up where buyers can physically meet their sellers and purchase the desired merchandise from them in exchange of money. In physical marketing, marketers will effortlessly reach their target local customers and thus they have more personal approach to show about their brands. The choice of the marketing mainly depends on the nature of the products and services.

5.2. Perfectly competitive market

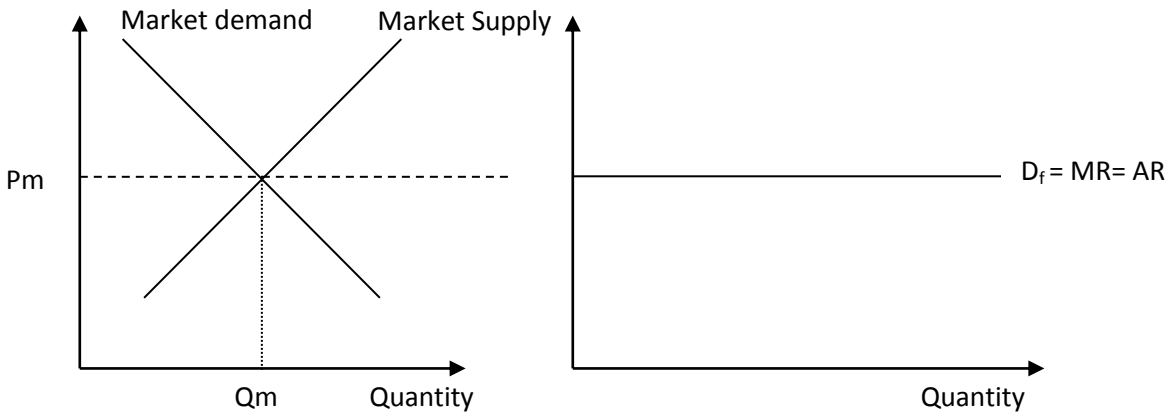
Perfect competition is a market structure characterized by a complete absence of rivalry among the individual firms.

5.2.1 Assumptions of perfectly competitive market

A market is said to be pure competition (perfectly competitive market) if the following assumptions are satisfied.

1. **Large number of sellers and buyers**: under perfect competition the number of sellers is assumed to be too large that the share of each seller in the total supply of a product is very small. Therefore, no single seller can influence the market price by changing the quantity supply. Similarly, the number of buyers is so large that the share of each buyer in the total demand is very small and that no single buyer or a group of buyers can influence the market price by changing their individual or group demand for a product. Therefore, in such a market structure, sellers and buyers are not price makers rather they are price takers, i.e., the price is determined by the interaction of the market supply and demand forces.
2. **Homogeneous product**: homogeneity of the product implies that buyers do not distinguish between products supplied by the various firms of an industry. Product of each firm is regarded as a perfect substitute for the products of other firms. Therefore, no firm can gain any competitive advantage over the other firm.
3. **Perfect mobility of factors of production**: factors of production are free to move from one firm to another throughout the economy. This means that labour can move from one job to another and from one region to another. Capital, raw materials, and other factors are not monopolized.
4. **Free entry and exit:** there is no restriction or market barrier on entry of new firms to the industry, and no restriction on exit of firms from the industry. A firm may enter the industry or quit it on its accord.
5. **Perfect knowledge about market conditions:** all the buyers and sellers have full information regarding the prevailing and future prices and availability of the commodity.
6. **No government interference:-** government does not interfere in any way with the functioning of the market. There are no discriminator taxes or subsidies, no allocation of inputs by the procurement, or any kind of direct or indirect control. That is, the government follows the free enterprise policy. Where there is intervention by the government, it is intended to correct the market imperfection.

From these assumptions, a single producer under perfectly competitive market is a price-taker. That is, at the market price, the firm can supply whatever quantity it would like to sell. Once the price of the product is determined in the market, the producer takes the price (Pm in the figure below) as given. Hence, the demand curve (D_f) that the firm faces in this market situation is a horizontal line drawn at the equilibrium price, Pm.



(a): Market demand and supply (b): Demand curve of a firm

Figure 5.1: Individual and market demand curve

5.2.2 Short run equilibrium of the firm

The main objective of a firm is profit maximization. If the firm has to incur a loss, it aims to minimize the loss. Profit is the difference between total revenue and total cost.

Total Revenue (TR): it is the total amount of money a firm receives from a given quantity of its product sold. It is obtained by multiplying the unit price of the commodity and the quantity of that product sold.

TR=**P** x **Q**, where P = price of the product
Q = quantity of the product sold.

Average revenue (AR):- it is the revenue per unit of item sold. It is calculated by dividing the total revenue by the amount of the product sold.

$$AR = \frac{TR}{Q} = \frac{P.Q}{Q} \Rightarrow AR = P$$

Therefore, the firm's demand curve is also the average revenue curve.

Marginal Revenue: it is the additional amount of money/ revenue the firm receives by selling one more unit of the product. In other words, it is the change in total revenue resulting from the sale of an extra unit of the product. It is calculated as the ratio of the change in total revenue to the change in the sale of the product.

$$MR = \left\{ \Delta TR \,/\, \Delta Q \right\} = \Delta(PxQ) \,/\, \Delta Q$$

$$= P\Delta Q \,/\, \Delta Q \text{ (because P is constant)} \Rightarrow \boxed{\mathbf{MR = P}}$$

Thus, in a perfectly competitive market, a firm's average revenue, marginal revenue and price of the product are equal, i.e. AR = MR = P =D_f

Since the purely competitive firm is a price taker, it will maximize its economic profit only by adjusting its *output*. In the short run, the firm has a fixed plant. Thus, it can adjust its output only through changes in the amount of variable resources. It adjusts its variable resources to achieve the output level that maximizes its profit.

There are two ways to determine the level of output at which a competitive firm will realize maximum profit or minimum loss. One method is to compare total revenue and total cost; the other is to compare marginal revenue and marginal cost.

a) Total Approach (TR-TC approach)

In this approach, a firm maximizes total profits in the short run when the (positive) difference between total revenue (TR) and total costs (TC) is greatest.

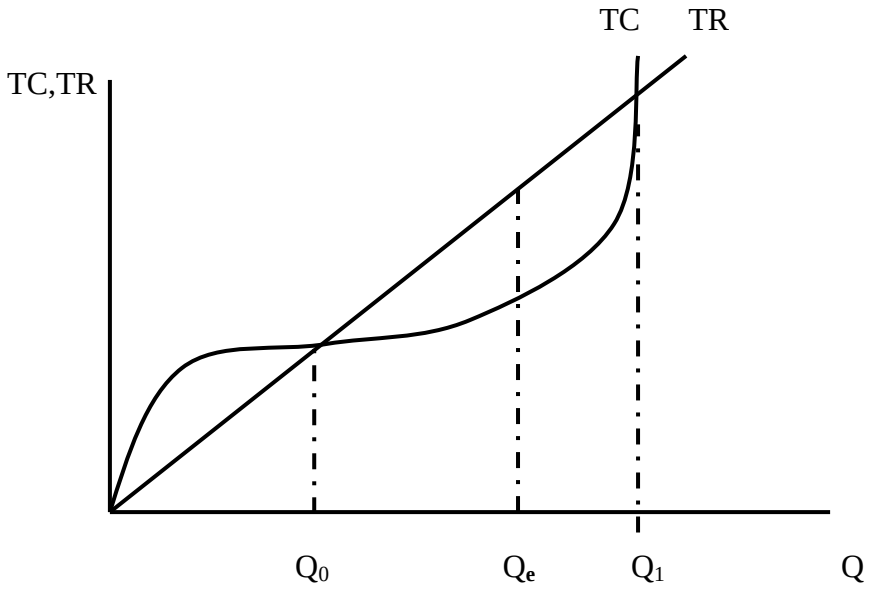


Figure 5.2: Total revenue and total cost approach of profit maximization

Note: The profit maximizing output level is Qe because it is at this output level that the vertical distance between the TR and TC curves (or profit) is maximized.

b) Marginal Approach (MR-MC)

In the short run, the firm will maximize profit or minimize loss by producing the output at which marginal revenue equals marginal cost. More specifically, the perfectly competitive firm maximizes its short-run total profits at the output when the following two conditions are met:

- MR = MC
- The slope of MC is greater than slope of MR; or MC is rising).

  (that is, slope of MC is greater than zero).

Mathematically, $\prod$ =**TR- TC**

$\prod$ is maximized when $\frac{d\pi}{dQ} = 0$

That is, $\frac{d\pi}{dQ} = \frac{dTR}{dQ} - \frac{dTC}{dQ} = 0$

- MR – MC = 0
- **MR = MC** …… **First order condition (FOC)**

$$\frac{d^2\pi}{dQ^2} \prec 0$$

The $\frac{d^2\pi}{dQ^2} = \frac{d^2TR}{dQ^2} - \frac{d^2TC}{dQ^2} \prec 0$ **second order condition** of profit maximization is

That is,

$$\Rightarrow \frac{dMR}{dQ} - \frac{dMC}{dQ} \prec 0$$

$$\Rightarrow \frac{dMR}{dQ} \prec \frac{dMC}{dQ}$$

- $\frac{dMC}{dQ} \succ \frac{dMR}{dQ}$ where $\frac{dMR}{dQ}$ =slope of MR and $\frac{dMC}{dQ}$ =slope of MC

Therefore, **Slope of MC > slope of MR ------- Second order condition (SOC)**

⇨ **Slope of MC > 0** (because the slope of MR is zero)

Graphically, the marginal approach can be shown as follows.

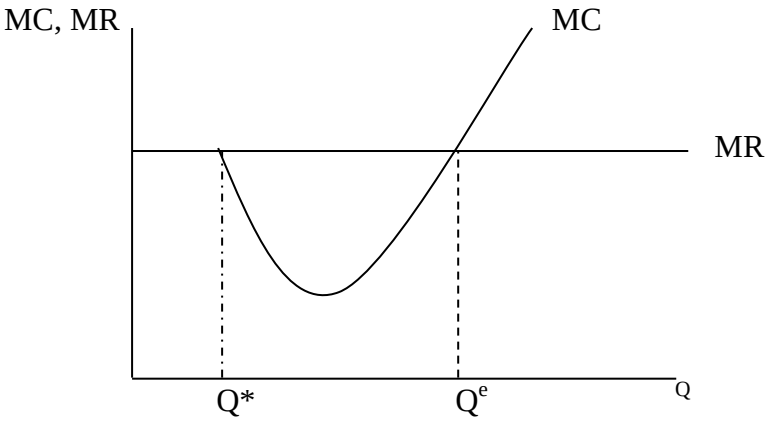


Figure 5.3: ***Marginal approach of profit maximization***

The profit maximizing output is Q^e, where MC=MR and MC curve is increasing. At Q*, MC=MR, but since MC is falling at this output level, it is not equilibrium output.

Whether the firm in the short- run gets positive or zero or negative profit depends on the level of ATC at equilibrium. Thus, depending on the relationship between price and ATC, the firm in the short-run may earn economic profit, normal profit or incur loss and decide to shut-down business.

i) ***Economic/positive profit*** **-** If the AC is below the market price at equilibrium, the firm earns a positive profit equal to the area between the ATC curve and the price line up to the profit maximizing output.

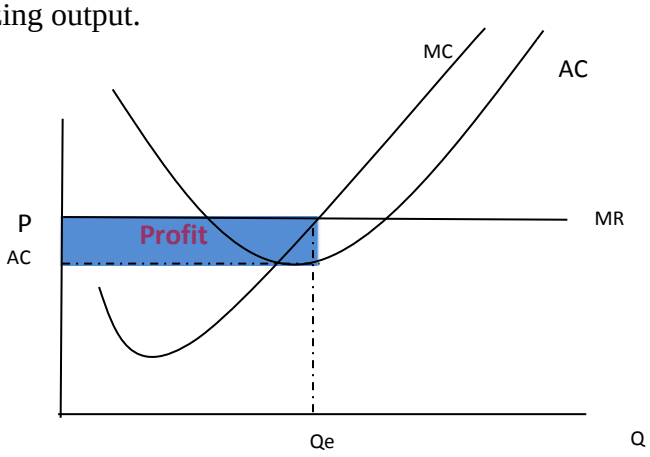


Figure 5.4: Economic profit a firm

ii) ***Loss*** **-** If the AC is above the market price at equilibrium, the firm earns a negative profit (incurs a loss) equal to the area between the AC curve and the price line.

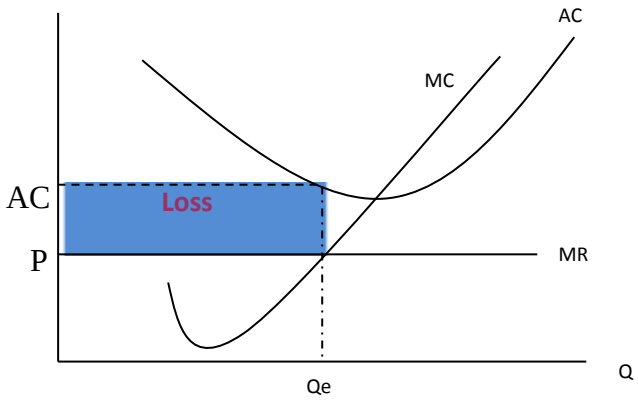


Figure 5.6*: A firm incurring a loss*

iii) ***Normal Profit (zero profit) or break- even point*** **-** If the AC is equal to the market price at equilibrium, the firm gets zero profit or normal profit**.**

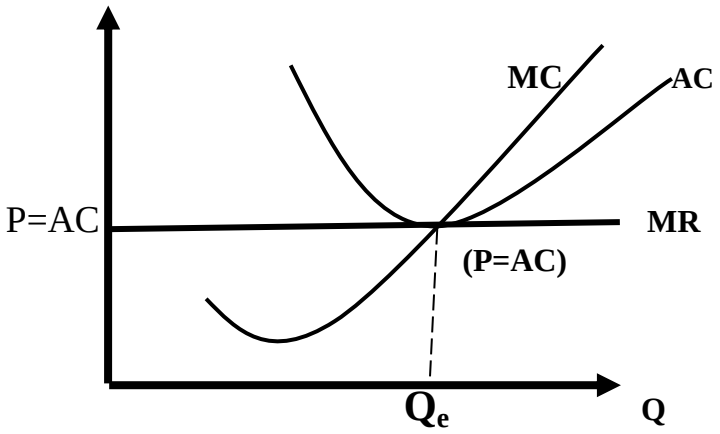


Figure 5.7: A firm earning a normal profit

iv) ***Shutdown point*** - The firm will not stop production simply because AC exceeds price in the short-run. The firm will continue to produce irrespective of the existing loss as far as the price is sufficient to cover the average variable costs. This means, if *P* is larger than AVC but smaller than AC, the firm minimizes total losses. But if *P* is smaller than AVC, the firm minimizes total losses by shutting down. Thus, *P* = AVC is the shutdown point for the firm.

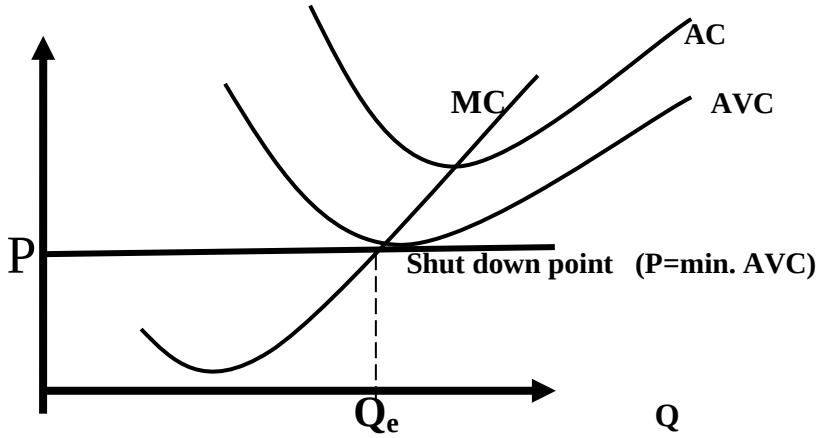


Figure 5.8: *A shut down point*

Example: Suppose that the firm operates in a perfectly competitive market. The market price of its product is $10. The firm estimates its cost of production with the following cost function: $TC=2+10q-4q^2+q^3$

A) What level of output should the firm produce to maximize its profit?

B) Determine the level of profit at equilibrium.

C) What minimum price is required by the firm to stay in the market?

Solution

Given: p=\$10 and $TC= 2+10q - 4q^2+q^3$

A) The profit maximizing output is that level of output which satisfies the following condition

MC=MR &

MC is rising

Thus, we have to find MC& MR first

⧫ MR in a perfectly competitive market is equal to the market price. Hence, MR=10

Alternatively, $MR = \frac{dTR}{dq}$ where TR= P.q = 10q Thus, $MR = \frac{d(10q)}{dq} = 10$

MC= $\frac{dTC}{dq} == 10 - 8q + 3q^2$

⧫ To determine equilibrium output just equate MC& MR

And then solve for q.

$10 – 8q + 3q^2 = 10$

$- 8q + 3q^2 = 0$

$q (-8 + 3q) = 0$

q = 0 or q = 8/3

Now we have obtained two different output levels which satisfy the first order (necessary) condition of profit maximization

⧫ To determine which level of output maximizes profit we have to use the second order test at the two output levels. That is, we have to see which output level satisfies the second order condition of increasing MC.

⧫ To see this first we determine the slope of MC

Slope of MC = $\frac{dMC}{dq}$ = -8 + 6q

✦ At q = 0, slope of MC is -8 + 6 (0) = -8 which implies that marginal cost is decreasing at q = 0. Thus, q = 0 is not equilibrium output because it doesn't satisfy the second order condition.

✦ At q = 8/3, slope of MC is -8 + 6 (8/3) = 8, which is positive, implying that MC is increasing at q = 8/3

Thus, the equilibrium output level is q = 8/3

B) Above, we have said that the firm maximizes its profit by producing 8/3 units. To determine the firm's equilibrium profit we have to calculate the total revenue that the firm obtains at this level of output and the total cost of producing the equilibrium level of output.

TR = Price * Equilibrium Output

= $ 10 * 8/3= $ 80/3

TC at q = 8/3 can be obtained by substituting 8/3 for q in the TC function, i.e.,

$TC = 2+10\ (8/3) - 4\ (8/3)^2 + (8/3)^3 \approx 19.18$

Thus the equilibrium (maximum) profit is

$\prod$ = TR – TC

= 26.67 – 19.18 = $ 7.48

C) To stay in operation the firm needs the price which equals at least the minimum AVC. Thus, to determine the minimum price required to stay in business, we have to determine the minimum AVC.

AVC is minimal when derivative of AVC is equal to zero. That is: $\frac{dAVC}{dQ} = 0$

Given the TC function: $TC = 2+10q - 4q^2 + q^3$, $TVC = 10q - 4q^2 + q^3$

$AVC = \frac{TVC}{q} = \frac{10q - 4q^2 + q^3}{q} = 10 - 4q + q^2$

$\frac{dAVC}{dq} = 0 \rightarrow \frac{d(10 - 4q + q^2)}{dq} = 0$

$= -4 + 2q = 0$

→ q = 2 i.e. AVC is minimum when output is equal to 2 units.

The minimum AVC is obtained by substituting 2 for q in the AVC function i.e., Min AVC = $10 - 4\ (2) + 2^2 = 6$. Thus, to stay in the market the firm should get a minimum price of $ 6.

5.2.3 Short run equilibrium of the industry

Since the perfectly competitive firm always produces where *P* =MR=MC (as long as *P* exceeds AVC), the firm's short-run supply curve is given by the *rising portion of its MC curve above its AVC*, or *shutdown point* (see figure 5.7).

The industry/market supply curve is a horizontal summation of the supply curves of the individual firms. Industry supply curve can be obtained by multiplying the individual supply at various prices by the number of firms, if firms have identical supply curve.

An industry is in equilibrium in the short-run when market is cleared at a given price i.e. when the total supply of the industry equals the total demand for its product, the prices at which market is cleared is equilibrium price. When an industry reaches at its equilibrium, there is no tendency to expand or to contract the output.

5.3. Monopoly market

5.3.1. Definition and characteristics

This is at the opposite end of the spectrum of market structures. Pure monopoly exists when a single firm is the only producer of a product for which there are no close substitutes. The main characteristics of this market structure include:

1. **Single seller**: A pure or absolute monopoly is a one firm industry. A single firm is the only producer of a specific product or the sole supplier of the product; the firm and the industry are synonymous.
2. **No close substitutes**: the monopolist's product is unique in that there are no good or close substitutes. From the buyer's view point, there are no reasonable alternatives.
3. **Price maker**: the individual firm exercises a considerable control over price because it is responsible for, and therefore controls, the total quantity supplied. Confronted with the usual down ward sloping demand curve for its product, the monopolist can change product price by changing the quantity of the product supplied.
4. **Blocked entry**: A pure monopolist has no immediate competitors because there are barriers, which keep potential competitors from entering in to the industry. These barriers may be economic, legal, technological etc. Under conditions of pure monopoly, entry is totally blocked.

5.3.2. Sources of monopoly

The emergence and survival of monopoly is attributed to the factors which prevent the entry of other firms in to the industry. The barriers to entry are therefore the sources of monopoly power. The major sources of barriers to entry are:

i) **Legal restriction:** Some monopolies are created by law in public interest. Such monopoly may be created in both public and private sectors. Most of the state monopolies in the public utility sector, including postal service, telegraph, telephone services, radio and TV services, generation and distribution of electricity, rail ways, airlines etc… are public monopolies.

ii) **Control over key raw materials**: Some firms acquire monopoly power from their traditional control over certain scarce and key raw materials that are essential for the production of certain other goods. For example, Aluminum Company of America had monopolized the aluminum industry because it had acquired control over almost all sources of bauxite supply; such monopolies are often called raw material monopolies.

iii) **Efficiency:** a primary and technical reason for growth of monopolies is economies of scale. The most efficient plant (probably large size firm,) which produces at minimum cost, can eliminate the competitors by curbing down its price for a short period and can acquire monopoly power. Monopolies created through efficiency are known as natural monopolies.

iv) **Patent rights**: Patent rights are granted by the government to a firm to produce commodity of specified quality and character or to use specified rights to produce the specified commodity or to use the specified technique of production. Such monopolies are called to patent monopolies.

5.4. Monopolistically competitive market

This market model can be defined as *the market organization in which there are relatively many firms selling differentiated products.* It is the blend of competition and monopoly. The competitive element arises from the existence of large number of firms and no barrier to entry or exit. The monopoly element results from differentiated products, i.e. similar but not identical products.

A seller of a differentiated product has limited monopoly power over customers who prefer his product to others. His monopoly is limited because the difference between his product and others are small enough that they are close substitutes for one another.

This market is characterized by:

(i) **Differentiated product**: the product produced and supplied by many sellers in the market is similar but not identical in the eyes of the buyers. There is a variety of the same product. The difference could be in style, brand name, in quality, or others. Hence, the differentiation of the product could be real (eg. quality) or fancied (e.g. difference in packing).

(ii) **Many sellers and buyers**: there are many sellers and buyers of the product, but their number is not as large as that of the perfectly competitive market.

(iii) **Easy entry and exit**: like the PCM, there is no barrier on new firms that are willing and able to produce and supply the product in the market. On the other hand, if any firm believes that it is not worth to stay in the business, it may exit.

(iv) **Existence of non-price competition**: Economic rivals take the form of non-price competition in terms of product quality, advertisement, brand name, service to customers, etc. A firm spends money in advertisement to reach the consumers about the relatively unique character of its product and thereby get new buyers and develop brand loyalty. Many retail trade activities such as clothing, shoes, soap, etc are in this type of market structure.

5.5. Oligopoly market

This is a market structure characterized by:

- **Few dominant firms**: there are few firms although the exact number of firms is undefined. Each firm produces a significant portion of the total output.
- **Interdependence:** since few firms hold a significant share in the total output of the industry, each firm is affected by the price and output decisions of rival firms. Therefore, the distinguishing characteristic of oligopoly is the *interdependence* among firms in the industry.
- **Entry barrier**: there are considerable obstacles that hinder a new firm from producing and supplying the product. The barriers may include economies of scale, legal, control of strategic inputs, etc.
- **Products may be homogenous or differentiated.** If the product is homogeneous, we have a *pure oligopoly*. If the product is differentiated, it will be a *differentiated oligopoly.*
- **Lack of uniformity in the size of firms:** Firms differ considerably in size. Some may be small, others very large. Such a situation is asymmetrical.
- **Non-price competition:** firms try to avoid price competition due to the fear of price wars and hence depend on non-price methods like advertising, after sales services, warranties, etc. This ensures that firms can influence demand and build brand recognition.

A special type of oligopoly in which there are only two firms in the market is known as *duopoly.*

Chapter summary

Characteristics	Market models			
	Pure Competition	**Monopolistic Competition**	**Oligopoly**	**Pure Monopoly**
Number of firms	Large	Many	Few	One or Single
Type of product	Homogeneous	Differentiated	Homogeneous or differentiated	Unique, no close substitutes
Control over price	None	Some, but within rather narrow limits	Limited by mutual interdependence and collusion	Significant
Condition of entry	Very easy	Relatively easy	Considerable barriers/obstacles	Blocked
Examples	Agricultural products	Clothes, Shoes	Steel, Automobiles	Local utilities

Review questions

1. Discuss the main assumptions of perfectly competitive market
2. Describe the feature of monopolistic competition that resembles perfect competitive and the monopolistic market structure.
3. What is the difference between real and fancied differentiation. Explain using practical examples.
4. What are the similarities and differences between oligopoly and monopolistically competitive market structure?
5. A firm operates in a perfectly competitive market. The market price of its product is 4 birr and the total cost function is given by TC= $\frac{1}{3}Q^3 - 5Q^2 + 20Q + 50$, where TC is the total cost and Q is the level of output.
    a) What level of output should the firm produce to maximize its profit?
    b) Determine the level of profit at equilibrium.
    c) What minimum price is required by the firm to stay in the market?

Suggested reading materials

- A. Koutsoyiannis, Modern Microeconomics, 2nd edition, 1979
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Chapter Six

Fundamental Concepts of Macroeconomics

Introduction

Conventionally, economics is divided into microeconomics and macroeconomics. Microeconomics studies about the individual decision making behaviour of different economic units such as households, firms, and government at a disaggregated level. Whereas, macroeconomics, studies about overall or aggregate behaviour of the economy, such as economic growth, employment, inflation, distribution of income, macroeconomic policies and international trade.

This chapter discusses major macroeconomic issues such as measurement of a country's economic performance, macroeconomic problems (fluctuations in economic system mainly reflected by inflation and unemployment), how budgetary deficit and trade deficit occur and macroeconomic policies applied to cure the macroeconomic problems.

Chapter objectives

After completing this chapter, you will be able to:

- define GNP and GDP and able to measure national income by using the expenditure or income or product approach;
- differentiate between nominal GDP and real GDP and decide which is better to measure economic performance;
- explain the concept of business cycle;
- briefly discuss the types of unemployment;
- understand about inflation, causes of inflation and its impact on the economy and
- explain budgetary deficit and its ways of financing;

6.1. Goals of macroeconomics

Macroeconomics studies the working of an economy in aggregation or as a whole. And it aimed at how;

- To achieve high economic growth
- To reduce unemployment
- To attain stable prices
- To reduce budget deficit and balance of payment (BoP) deficit
- To ensure fair distribution of income

In other words, the goals of macroeconomics can be given as ways towards full employment, price stability, economic growth and fair distribution of income among citizens of a country.

6.2. The National Income Accounting

National Income Accounting (NIA) is an accounting record of the level of economic activities of an economy. It is a measure of an aggregate output, income and expenditure in an economy.

Why do we need to study NIA?

- It enables us to measure the level of total output in a given period of time, and to explain the causes for such level of performance.
- It enables us to observe the long run trend of the economy.
- It provides information to formulate policies and design plans.

6.2.1. Approaches to measure national income (GDP/GNP)

Before discussing different approaches of national income, it is important to understand about the measure of the economic performance of a given country at large. Generally it is named as GDP or GNP.

Gross Domestic Product (GDP): it is the total value of currently produced final goods and services that are produced within a country's boundary during a given period of time, usually one year. From this definition, we can infer that:

- It measures the current production only.
- It takes in to account final goods and services only (only the end products of various production processes) or we do not include the intermediate products in our GDP calculations. Intermediate goods are goods that are completely used up in the production of other products in the same period that they themselves are produced.
- It measures the values of final goods and services produced within the boundary/territory of a country irrespective of who owns that output.
- In measuring GDP, we take the market values of goods and services **(** $GDP = \sum P_i Q_i$ **)**

  where:
  - P_i = series of prices of outputs produced in different sectors of an economy in certain period
  - Q_i = the quantity of various final goods and services produced in an economy

Gross National Product (GNP): is the total value of final goods and services currently produced by domestically owned factors of production in a given period of time, usually one year, irrespective of their geographical locations.

GDP and GNP are related as follows:

GNP=GDP + NFI

NFI denotes Net Factor Income received from abroad which is equal to factor income received from abroad by a country's citizens less factor income paid for foreigners to abroad. Thus, NFI could be negative, positive or zero depending on the amount of factor income received by the two parties.

- **If NFI >0, then GNP > GDP**
- **If NFI<0, then GNP < GDP**
- **If NFI =0, then GNP =GDP**

Basically, there are three approaches to measure GDP/GNP. These are:

I. Product/value added approach,
II. Expenditure approach and
III. Income approach

Product Approach: In this approach, GDP is calculated by adding the market value of goods and services currently produced by each sector of the economy. In this case, GDP includes only the values of final goods and services in order to avoid double counting.

Double counting will arise when the output of some firms are used as intermediate inputs of other firms. For example, we would not include the full price of an automobile in GDP and then also include as part of GDP the value of the tires that were sold to the automobile producer. The components of the car that are sold to the manufacturers are called intermediate goods, and their value is not included in GDP.

There are two possible ways of avoiding double counting.

- ❖ Taking only the value of final goods and services
- ❖ Taking the sum of the valued added by all firms at each stage of production

We can illustrate the two scenarios using some hypothetical examples as follows.

I. Taking only the value of final goods and services.

Example:

Sectors	**Value of Output (in million birr)**
Agriculture and allied activities	**9309**
- Agriculture	7000
- Forestry	1000
- Fishing	1309
Industry	**147413**
- Mining & quarrying	9842
- Large & medium scale manufacturing	91852
- Electricity & water	13717
- Construction	32002
Service	**357 872**
- Banking insurance and real estate	121704
- Public administration & defense	36605
- Health	20000
- Education	32509
- Domestic & other services	147054
4. Net factor income from abroad	87348

GDP = 9,309+147,413+357,872 = 514,594

GNP = GDP + NFI = 514,594 +87,348 = 601,942

II. Taking the sum of the valued added by all firms at each stage of production

Example:

Stages of production	Values of output (in birr)	Cost of intermediate inputs	Value added
Farmer	500	0	500
Oil factory	2000	500	1500
Retailers	2500	2000	500

Note: If all values in the economy were added, GDP would be 5000= (2500+2500). The problem of double counting is 2500, because of considering intermediate input in the calculation.

Expenditure Approach: here GDP is measured by adding all expenditures on final goods and services produced in the country by all sectors of the economy. Thus, GDP can be estimated by summing up personal consumption of households (C), gross private domestic investment (I), government purchases of goods and services (G) and net exports (NE).

Personal consumption expenditure includes expenditures by households on durable consumer goods (automobiles, refrigerators, video recorders, etc), non-durable consumer goods (clothes, shoes, pens, etc) and services.

Gross private domestic investment is defined as the sum of all spending of firms on plants, equipment, and inventories, and the spending of households on new houses. Investment is broken down into three categories: residential investment (the spending of households on the construction of new houses), business fixed investment (the spending of firms on buildings and equipment for business use), and inventory investment (the change in inventories of firms).

Note that gross private domestic investment differs from net private domestic investment in that the former includes both replacement and added investment whereas the latter refers only to added investment. Replacement means the production of all investment goods, which replace machinery, equipment and buildings used up in the production process. In short, net private domestic investment = gross private domestic investment minus depreciation.

Government purchases of goods and services include all government spending on finished products and direct purchases of resources less government transfer payments because transfer payments do not reflect current production although they are part of government expenditure.

Net exports refer to total value of exports less total value of imports. Note that net export is different from the terms of trade in that the latter refers to the ratio of the value of exports to the value of imports.

Example: GDP at current market price measured using expenditure approach for a hypothetical economy.

Types of expenditure	**Amount (in million Birr)**
1. Personal consumption expenditure	**4500**
Durable consumer goods	1500
Non-durable consumer goods	2000
Services	1000
2. Gross private domestic investment	**600**
Business fixed investment	250
Construction Expenditure	300
Increases in inventories	50
3. Government expenditure on goods and services	**250**
Federal government	100
State government	150
4. Net export	**-50**
Exports	150
Imports	200
GDP at current market price	**5300**

Income approach: in this approach**,** GDP is calculated by adding all the incomes accruing to all factors of production used in producing the national output. It is crucial, however, to note that some forms of personal incomes are not incorporated in the national income. For instance, transfer payments (payments which are made to the recipients who have not contributed to the production of current goods and services in exchange for these payments) are excluded from national income, as these are mere redistribution of income from taxpayers to the recipients of transfer payments. Transfer payments may take the form of old age pension, unemployment benefit, subsidies, etc.

According to the income approach, GDP is the sum incomes to owners of factors of production plus some other claims on the value of output (depreciation and indirect business tax) less subsidies and transfer payments.

GDP = Compensation of employees (wages & salaries)

+ Rental income

+ Interest income

+ Profits (proprietors' profit plus corporate profit)

+ Indirect business taxes

+ Depreciation

- Subsidies

- Transfer payments

Example:

Items	**Value (in million Birr)**
1) Compensation of Employees	**45623.71**
2) Rental Income	**1249.32**
3) Proprietor's Income	10561.21
4) Corporate Profits	16960.33
Subtotal (corporate and proprietor's)	**27521.54**
5) Net interest	**5189.73**
6) Depreciation	**503.84**
7) Indirect Business Taxes	**476.51**
8) Subsidy	(**11368.95)**
Gross Domestic Product	***69195.70***
9) Income from abroad	2036.20
10) Payments to abroad	(11231.90)
NFI	**(9195.70)**
Gross National Income	***60000.00***

Limitation of GDP measurement:

The calculation of national income is not an easy task. We face a number of problems in the estimation of national income, especially in under-developed countries like Ethiopia.

- *Definition of a nation*: while calculating national income, nation does not mean only the political or geographical boundaries of a country for calculating the value of final goods and services produced in the country. It includes income earned by the nationals abroad.
- *Stages of economic activities*: it is also difficult to determine the stages of economic activity at which the national income is determined i.e. whether the income should be calculated at the stage of production or distribution or consumption. It has, therefore, been agreed that the stage of economic activity may be decided by the objective for which the national income is being calculated. If the objective is to measure economic progress, then the production stage can be considered. To measure the welfare of the people, then the consumption stage should be taken into consideration.
- *Transfer payments*: this also creates a great difficulty in calculating the national income. It has generally been agreed that the best way is to consider only the disposal income of the individuals of groups.
- *Underground economy:* no imputation is made for the value of goods and services sold in the illegal market. The underground economy is the part of the economy that people hide from the government either because they wish to evade taxation or because the activity is illegal. The parallel exchange rate market is one example.
- *Inadequate data:* in all most all the countries, difficulty has been faced in the calculation of national income due to lack of adequate data. Sometimes, the data are not reliable.
- *Non-monetized sector:* this difficulty is special to developing countries where a substantial portion of the total produce is not brought to the market for sale. It is either retained for self-consumption or exchanged for other goods and services.
- *Valuation of depreciation:* the value of depreciation is deducted from the gross national product to get net national product. But the valuation of such depreciation is full of difficulties.
- *Changes in price levels:* since the national income is in terms of money whose value itself keeps on changing, it is difficult to make a stable calculation which is assessed in terms of prices of the base year.
- *No focus on quality:* it is difficult to account correctly for improvements in the quality of goods. This has been the case for computers, whose quality has improved dramatically while their price has fallen sharply. It also applies to other goods such as cars whose quality changes over time.

6.2.2. Other income accounts

Apart from GDP and GNP, there are also other social accounts which have equal importance in macroeconomic analysis. These are:

- Net National Product (NNP)
- National Income (NI)
- Personal Income (PI)
- Personal Disposable Income (PDI)

Net National product (NNP) : GNP as a measure of the economy's annual output may have defect because it fails to take into account capital consumption allowance, which is necessary to replace the capital goods used up in that year's production. Hence, net national product is a more accurate measure of economy's annual output than gross national product and it is given as:

Net National product (NNP) = Gross National product (GNP) – Capital consumption allowance (D)

National income (NI): National income is the income earned by economic resource (input) suppliers for their contributions of land, labour, capital and entrepreneurial ability, which are involved in the given year's production activity. However, from the components of NNP, indirect business tax, which is collected by the government, does not reflect the productive contributions of economic resources because government contributes nothing directly to the production in return to the indirect business tax. Hence, to get the national income, we must subtract indirect business tax from net national product.

National Income (NI) = Net National Product (NNP) – Indirect Business Tax (IBT)

Personal Income (PI): refers to income earned by persons or households. Persons in the economy may not earn all the income earned as national income.

PI = NI – [social security contribution + corporate income tax + retained corporate profit] + [Public transfer payments (e.g. Subsidy) + net interest on government bond]

Personal Disposable Income: it is personal income less personal tax payments.

DI = PI – Personal taxes

DI = C + S where, C = personal consumption expenditure, S = Personal savings

6.3. Nominal versus Real GDP

Nominal GDP is the value of all final goods and services produced in a given year when valued at the **prices of that year**. That is, nominal GDP = $\sum PiQi$ where, P is the general price level and Q is the quantity of final goods and services produced. Therefore, any change that can happen in the country's GDP is due to changes in price, quantity or both. For example, if prices are doubled over one year, then GDP will also double even though exactly the same goods and services are produced as the year before. Hence, GDP that is not adjusted for inflation is called Nominal GDP.

Real GDP is the value of final goods and services produced in a given year when valued at the prices of a reference ***base year*.** By comparing the value of production in the two years at the same prices, we reveal the change in output. Hence, to be able to make reasonable comparisons of GDP overtime we must adjust for inflation.

Example: Consider an economy producing two goods, X and Y.

Year	Product	Quantity	Unit price ($)
2017 (base year)	X	20	5
	Y	8	50
2018	X	25	20
	Y	10	100

Given the above information, we can calculate the real and nominal GDP in both years as follows:

In 2017:	**In 2018:**
Nominal GDP = (20 x 5) + (8 x 50) = $500 Real GDP = (20 x 5) + (8 x 50) = $500 Note that both the real and nominal GDP values are exactly the same in the base year.	The outputs of 2018 valued at the prices of 2017(the base year). Nominal GDP= (25 x 20) + (10 x 100) = $1500 Real GDP = (25 x 5) + (10 x 50) = $625

6.4. The GDP Deflator and the Consumer Price Index(CPI)

The GDP Deflator: The calculation of real GDP gives us a useful measure of inflation known as the GDP deflator. The GDP deflator is the ratio of nominal GDP in a given year to real GDP of that year. It reflects what's happening to the overall level of prices in the economy.

$$\textbf{GDP deflator} = \frac{\textbf{Nominal GDP}}{\textbf{Real GDP}} * 100$$

We can calculate the GDP deflator based on the example above.

GDP *deflator* (2017) $= \frac{\text{GDP}n}{\text{GDPr}}$ x 100 $= \frac{500}{500}$ x 100 = 100

As both the real and nominal GDP values are exactly the same, the GDP deflator in the base year is always 100.

GDP *deflator* (2018) $= \frac{\text{GDP}n}{\text{GDPr}}$ x 100 $= \frac{1{,}500}{625}$ x 100= 240, which shows the price in 2018 was 140% higher than the price in base year.

The Consumer Price Index: The Consumer Price Index (CPI) is an indicator that measures the average change in prices paid by consumers for a representative basket of goods and services. It compares the current and base year cost of a basket of goods of fixed composition. If we denote the base year quantities of the various goods by q'_0 and their base year prices by p'_0, the cost of the basket in the base year is $\sum p'_0 * q'_0$, where the summation is over all the goods in the basket. The cost of a basket of the same quantities but at today's prices is $\sum p'_t, q'_0$, where p_t is today's price. The CPI is the ratio of today's cost to the base year cost.

$$CPI = \frac{\Sigma P_t^{'} * q_o^{'}}{\Sigma p_o^{'} * q_o^{'}}$$

The CPI versus the GDP Deflator

The GDP deflator and the CPI give somewhat different information about what's happening to the overall level of prices in the economy. There are three key differences between the two measures.

1) GDP deflator measures the prices of all goods and services produced, whereas the CPI measures the prices of only the goods and services bought by consumers. Thus, an increase in the price of goods bought by firms or the government will show up in the GDP deflator but not in the CPI.
2) GDP deflator includes only those goods produced domestically. Imported goods are not part of GDP and do not show up in the GDP deflator.
3) The CPI assigns fixed weights to the prices of different goods, whereas the GDP deflator assigns changing weights. In other words, the CPI is computed using a fixed basket of goods, whereas the GDP deflator allows the basket of goods to change over time as the composition of GDP changes.

6.5. The Business Cycle

Business cycle refers to the recurrent ups and downs in the level of economic activity. Countries usually experience ups and downs in the level of total output and employment over time. For some period of time the total output level may increase and other times it may decline. With the fluctuation in the overall economic activity, the level of unemployment also moves up and down.

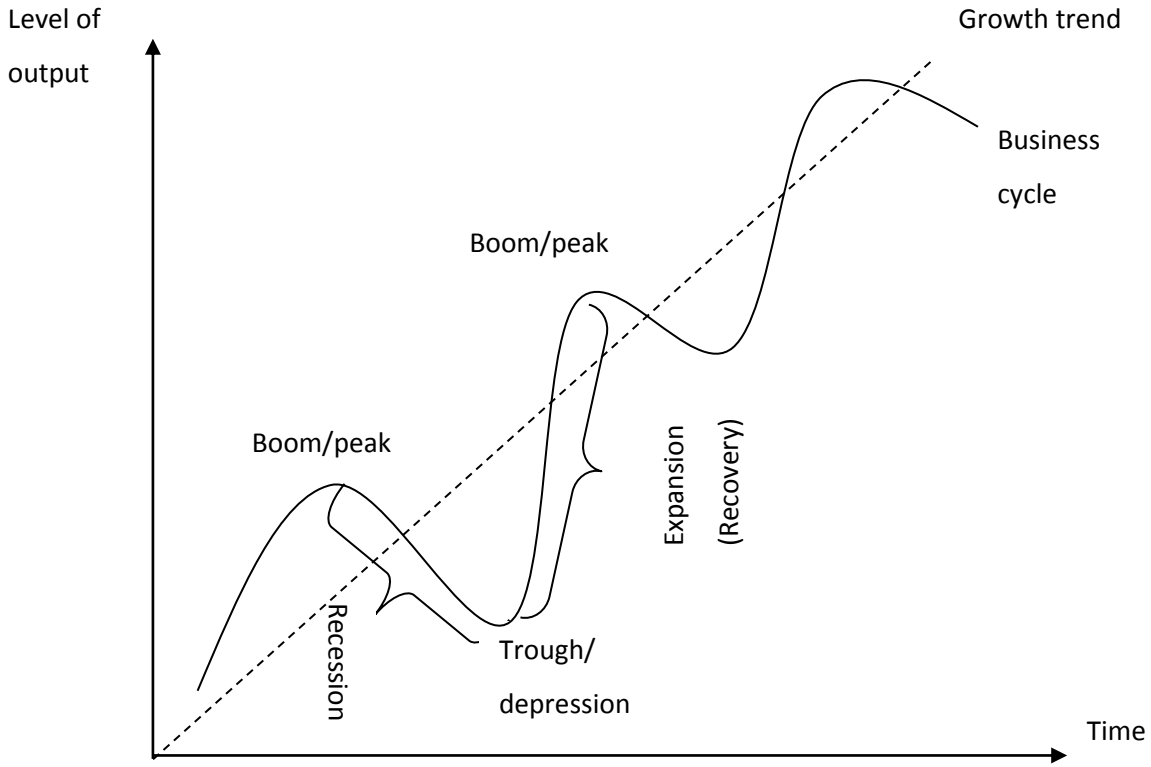


Figure 6.9: The business cycle

A business cycle is a fluctuation in overall economic activity, which is characterized by the simultaneous expansion or contraction of output in most sectors. We can identify four phases in the business cycle.

Boom/peak: it is a phase in which the economy is producing the highest level of output in the business cycle. It is the point which marks the end of economic expansion and the beginning of recession. In this phase, the economy's output is growing faster than its long-term (potential) trend and is therefore unsustainable. Due to very high degree of utilization of resources, unemployment level is low; business is good; and it is a period of prosperity.

Recession/contraction: during a recession phase, the level of economic performance generally declines. Total output declines, national income falls, and business generally decline. As a result, unemployment problem rises. When the recession becomes particularly severe, we say the economy reaches depression or trough. This period can cause hardship on business and citizens.

Trough/Depression: - this phase is the lowest point in a business cycle. It marks the end of a recession and the beginning of economic recovery/expansion. During this period, there is an excessive amount of unemployment and idle productive capacity.

Recovery/Expansion: - during this phase, the economy starts to grow or recover, i.e. there is an option of economic activity between a trough and a peak. In this phase, more and more resources are employed in the production process; output increases, unemployment level diminishes and national income rises. When this expansion of the economy reaches its maximum, the economy once again comes to another boom or peak.

Note that:

- One business cycle includes the point from one peak to the next peak or from one trough to the next.
- A business cycle is a short-term fluctuation in economic activities.
- The trend path of GDP is the path GDP would take if factors of production were fully employed.
- Business cycles may vary in duration and intensity.

6.6. Macroeconomic Problems

6.6.1. Unemployment

Can we say that every person who does not have a job is unemployed?

Problem of unemployment is one of the major issues dealt in macroeconomics. Unemployment refers to group of people who are in a specified age (labour force), who are without a job but are actively searching for a job. In the Ethiopia context, the specified age is between 14 and 60 which are normally named as productive population. To better understand what unemployment is, it is important to begin with classifying the whole population of a country into two major groups: those in the labour force and those outside the labour force.

Labor force includes group of people within a specified age (for instance, people whose ages are greater than 14 are considered as job seekers though formal employment requires a minimum of 18 years of age bracket) who are actually employed and those who are without a job but are actively searching for a job, according to the Ethiopian labour law. Therefore, the labour force does not include: Children <14 and retired people age >60, and also people in mental and correctional institutions, and very sick and disabled people etc.

A person in the labour force is said to be unemployed if he/she is without a job but is actively searching for a job.

Labour force = Employed + Unemployed

Types of unemployment

1. **Frictional unemployment:** refers to a brief period of unemployment experienced due to.
    - Seasonality of work E.g. Construction workers
    - Voluntary switching of jobs in search of better jobs
    - Entrance to the labor force E.g. A student immediately after graduation
    - Re-entering to the labor force
2. **Structural unemployment:** results from mismatch between the skills or locations of job seekers and the requirements or locations of the vacancies. E.g. An agricultural graduate looking for a job at "Piassa". The causes could be change in demand pattern or technological change.
3. **Cyclical unemployment:** results due to absence of vacancies. This usually happens due to deficiency in demand for commodities/ the low performance of the economy to create jobs. E.g. During recession

Note: **Frictional** and **structural unemployment** are more or less unavoidable; hence, they are known as ***natural level of unemployment***.

Measurement of rates of unemployment

Total unemployment = Frictional + Structural + Cyclical unemployment
Natural level of unemployment = Frictional unemployment + Structural unemployment = Total unemployment - Cyclical unemployment
Natural rate of unemployment = Natural unemployment /labor force
Unemployment rate = total unemployment / labor force

When the unemployment rate is equal to the natural rate of unemployment, we say the economy is at **full employment**. Therefore, full employment **does not mean zero unemployment**.

6.6.2. Inflation

It is the sustainable increase in the general or average price levels commodities. Price index serves to measure inflation. Two points about this definition need emphasis. First, the increase price must be a sustained one, and it is not simply once time increase in prices. Second, it must be the general level of prices, which is rising; increase in individual prices, which can be offset by fall in prices of other goods is not considered as inflation.

$$\textbf{Rate of inflation} = \frac{P_t - P_{t-1}}{P_{t-1}} * 100$$

where, P_t is price index (eg. CPI) at time t and P_{t-1} is price index at time t-1.

Causes of inflation

The causes of inflation are generally classified into two major groups: *demand pull and cost push inflation.*

A. **Demand pull inflation**: according to demand pull theory of inflation, inflation results from a rapid increase in demand for goods and services than supply of goods and services. This is a situation where "*too much money chases too few goods*."
B. **Cost push or supply side inflation**: it arises due to continuous decline in aggregate supply. This may be due to bad weather, increase in wage, or the prices of other inputs.

Economic effects of inflation

1. Generally inflation reduces real money balance or purchasing power of money. This will in turn reduce the welfare of individuals.
2. Banks charge their customers nominal interest rate for their loans. Nominal interest rate however is determined based on inflation rate as it is represented by Fisher's equation.

   $I = r + \Pi$ where, I is nominal interest rate, r is real interest rate and Π is inflation rate.

   Increase in inflation rate will raise the nominal interest rate and the opportunity cost of holding money. If people are to hold lower money balances on average, they must make more frequent trips to the bank to withdraw money. This is metaphorically called the *shoe-leather cost* of inflation.
3. Inflation reduces investment by increasing nominal interest rate and creating uncertainty about macroeconomic policies.
4. Inflation redistributes wealth among individuals. Most loan agreements specify a nominal interest rate, which is based on the rate of inflation expected at the time of the agreement. If inflation turns out to be higher than expected, the debtor wins and the creditor loses because the debtor repays the loan with less valuable dollars. If inflation turns out to be

lower than expected, the creditor wins and the debtor loses because the repayment is worth more than the two parties anticipated.

5. Unanticipated inflation hurts individuals with fixed income and pension.
6. High inflation is always associated with variability of prices which induces firms to change their price list more frequently and requires printing and distributing new catalogue. This is known as *menu cost* of inflation.

6.6.3. Trade deficit and budget deficit

Budget deficit

The overriding objectives of the government's fiscal policy are building prudent public financial management, financing the required expenditure with available resource and refrain from possibility of unsustainable fiscal deficit.

The government receives revenue from taxes and uses it to pay for government purchases. Any excess of tax revenue over government spending is called public saving, which can be either positive (a budget surplus) or negative (a budget deficit).

When a government spends more than it collects in taxes, it faces a budget deficit, which it finances by borrowing from internal and external borrowing. The accumulation of past borrowing is the government debt. Debate about the appropriate amount of government debt in the United States is as old as the country itself. Alexander Hamilton believed that "a national debt, if it is not excessive, will be to us a national blessing," while James Madison argued that "a public debt is a public curse".

When we see Ethiopian case, to augment available domestic financing options, the government opted to finance its fiscal deficit from external sources on concessional terms. In particular, the Government of Ethiopia finances its budget by accessing external loans on concessional terms. As a rule of thumb, non-concessional loans cannot be used to finance the budgetary activities. On the other hand, external non-concessional loans are used to finance projects that are run by State Owned Enterprises. In recent years, the government accessed loans from international market on non-concessional terms to finance feasible and profitable projects managed by State Owned Enterprises (SOEs). The country's total public debt contains central government, government guaranteed and public enterprises.

Trade deficit

The national income accounts identity shows that net capital outflow always equals the trade balance. Mathematically,

$$S - I \quad = \quad NX.$$

Net Capital Outflow = Trade Balance

Net cash out flow is Saving(S) – Investment (I)

Balance of Trade = Merchandize Exports – Merchandize Imports

- If this balance between $S - I$ *and* NX *is* positive, *we have a* ***trade surplus***, so we say that there is a surplus in the current account. In this case, we are net lenders in world financial markets, and we are exporting more goods than we are importing.
- If the balance between $S - I$ *and* NX is negative, we have a ***trade deficit*** then we say that there is a deficit in the current account. In this case, we are net borrowers in world financial markets, and we are importing more goods than we are exporting.
- If $S - I$ *and* NX *are exactly zero,* we are said to have **balanced trade** because the value of imports equals the value of exports.

6.7. Macroeconomic policy instruments

The ultimate policy objective of any country in general is to have sustainable economic growth and development. Policy measures are geared at achieving moderate inflation rate, keeping unemployment rate low, balancing foreign trade, stabilizing exchange and interest rates, etc and in general attaining stable and well-functioning macroeconomic environment.

6.7.1. Monetary policy

Monetary policy refers to the adoption of suitable policy regarding the control of money supply and the management of credit which is important measure for adjusting aggregate demand to control inflation. It is concerned with the money supply, lending rates and interest rates and is often administered by a central bank.

Monetary policy is a highly flexible stabilization policy tool. For instance, during economic recession where output falls with a fall in aggregate demand, monetary policy aims at increasing demand and hence production as well as employment will follow the same pattern of demand. In contrast, at the time of economic boom where demand exceeds production and treat to create inflation, the monetary policy instruments are utilized that could offset the condition and achieve price stability by counter cyclical action upon money supply.

Government monetary policy regulation is under responsibilities of Central Banks. Central Bank controls the money supply to control nominal interest rates. Investment and saving decisions are based on the real interest rate. When government lowers interest rate, firms borrow more and invest more. Higher interest rates mean less investment.

6.7.2. Fiscal policy

Fiscal policy involves the use of government spending, taxation and borrowing to influence both the pattern of economic activity and also the level and growth of aggregate demand, output and employment. It is important to realize that changes in fiscal policy affect both aggregate demand (AD) and aggregate supply (AS). Most governments use fiscal policy to promote stable and sustainable growth while pursuing its income redistribution effect to reduce poverty. Fiscal policy therefore plays an important role in influencing the behaviour of the economy as monetary policy does. The choice of the government fiscal policy can have both short and long term influences. The most important tools of implementing the government fiscal policy are taxes, expenditure and public debt.

Traditionally fiscal policy has been seen as an instrument of demand management. This means that changes in government spending, direct and indirect taxation and the budget balance can be used to help smooth out some of the volatility of real national output particularly when the economy has experienced an external shock.

Fiscal policy decisions have a widespread effect on the everyday decisions and behaviour of individual households and businesses. Thus, it is mainly used to achieve internal balance, by adjusting aggregate demand to available supply. It also promotes external balance by ensuring sustainable current account balance and by reducing risk of external crisis. In general, it helps promote economic growth through more and better education and health care.

Major functions of fiscal policy

Allocation: The first major function of fiscal policy is to determine exactly how funds will be allocated. This is closely related to the issues of taxation and spending, because the allocation of funds depends upon the collection of taxes and the government using that revenue for specific purposes. The national budget determines how funds are allocated. This means that a specific amount of funds is set aside for purposes specifically laid out by the government. The budget allocation is done on the basis of aggregated development objectives such as recurrent vs capital expenditures or sectoral allocation (economic and social developments).

Distribution: The distribution functions of the fiscal policy are implemented mainly through progressive taxation and targeted budget subsidy. Virtually allocation determines how much will be set aside and for what purpose, the distribution function of fiscal policy is to determine more specifically how those funds will be distributed throughout each segment of the economy. For instance, the government might apportion a share of its budget toward social welfare programs, such as food security and asset building for the most vulnerable and disadvantaged in society. It might also allocate for low-cost housing construction and mass transportation.

Stabilization: Stabilization is another important function of fiscal policy in that the purpose of budgeting is to provide stable economic growth. Government expenditure needs particularly in developing countries such as Ethiopia are unlimited. But its source of financing is limited. Thus without some restraints on spending or limiting the level of expenditure with available financial resources the economic growth of the nation could become unstable, creating imbalances in external sector as well as resulting in high prices.

Development: The fourth and most important function of fiscal policy is that of promoting development. Development seems to indicate economic growth, and that is, in fact, its overall purpose. However, fiscal policy is far more complicated than determining how much the government will tax citizens in a given year and then determining how that money will be spent. True economic growth occurs when various projects are financed and carried out using budgetary finance. This stems from the belief that the private sector cannot grow the economy by itself. Instead, government input and influence are needed. The government is responsible for providing public goods, reduce externalities and correct market distortions in order to pave the way for private sector.

The underlying principles of the tax policies in Ethiopia are as follows:

- To introduce taxes that enhance economic growth, broaden the tax base and increase government revenue;
- To introduce taxes that are helpful to implement social policies that discourage consumption of substances that are hazardous to health and social problems;
- To introduce tax system that accelerate industrial growth and achieve transformation of the country and to improve foreign exchange earnings, as well as create conducive environment for domestic products to become competitive in the international commodity markets;
- To ensure modern and efficient tax system that supports the economic development;
- To make the tax system fair and equitable;
- To minimize the damage that may be caused by avoidance and evasion of tax; and
- To promote a tax system that enhances saving and investment.

Chapter summary

Macroeconomics is branch of economics which studies about overall or aggregate behaviour of the economy such as economic growth, employment, inflation, distribution of income, macroeconomic policies and international trade.

Basically, economic performance of a given country is measured by GDP/GNP. The method of measuring the aggregate output and income based on the principle of the circular flow economic activity is named as National Income Accounting. There are three approaches to measure GDP/GNP; namely, product/value added approach, expenditure approach and income approach.

The other basic issue in macroeconomics is business cycle and it refers to the recurrent ups and downs in the level of economic activity. Countries usually experience ups and downs in the level of total output and employment over time. In connection to this, unemployment and inflation are among the major macroeconomic problems. Unemployment refers to group of people who are in a specified age (labor force), who are without a job but are actively searching for a job. Inflation is a situation of continuous increase in the general price level. It is a sustained increase in the general price level. Based on the sources of inflation, we can identify demand two types of inflation: cost push and demand pull inflation.

The ultimate policy objective of any country in general is to have sustainable economic growth and development. Monetary policy refers to the adoption of suitable policy regarding the control of money supply and the management of credit which is important measure for adjusting aggregate demand to control inflation. It is concerned with the money supply, lending rates and interest rates and is often administered by a central bank. Fiscal policy involves the use of government spending, taxation and borrowing to influence both the pattern of economic activity and also the level and growth of aggregate demand, output and employment

Review questions

1. What is the difference between GDP and GNP? Which one is a better measure of the economic performance of a country?
2. What is unemployment? How can we measure it?
3. What is inflation? What are its causes? What is its impact on the economy?
4. Discuss the three major differences between CPI and GDP deflator.
5. Consider the following information for a particular economy.

   Total population = 60 million Number of employed = 30 million
   Total labor force = 40 million Natural rate of unemployment = 12%

   a) Find the total unemployment rate
   b) Calculate the cyclical unemployment rate

6. Consider an economy that produces and consumes **Bread** and **Automobile**. Data for two different years 2005 and 2010 is given in the following table.

Year	**2005**	**2010**
Price of Automobiles	$ 5000	$ 6000
Price of a loaf of bread	$10	$20
Number of automobiles produced	100	120
Number of loaves of bread produced	500,000	400,000

   Using the year 2005 as a base year,

   a) Calculate the nominal and real GDP of 2010.
   b) Find the value of GDP Deflator for the year 2010 and interpret.
   c) Calculate the inflation rate in 2010.

Suggested reading materials

- Mankiw, G. (2000) Macroeconomics, 5th ed., Worth Publishing
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