

INTRODUCTION TO MICROECONOMICS

HBC 2107

Copyright

Copyright © 2013 by DeKUT

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the publisher, addressed "Attention: Director CODEL," at the address below.

Dedan Kimathi University of Technology
Centre for Open Distance and E-learning
657, 10100 Nyeri-Kenya
Nyeri-Mweiga Rd.
<http://dkut.ac.ke/elearning/>



School of Business
Department of Economics

P.O. BOX 657
Code 10100
Nyeri
Kenya

Fax: +254 - 0708803849
E-mail: elearning@dkut.ac.ke
Website: www.dkut.ac.ke

Acknowledgements

The School of Business Department of Economics wishes to thank those below for their contribution to this USER MANUAL:

WARUGONGO



Contents

About this [DOCUMENT TYPE]	1
How this [DOCUMENT TYPE] is structured	1
Course overview	3
Welcome to [Add course title here] [Course sub-title]	3
[Add course title here] [Course sub-title]—is this course for you?	3
Course outcomes	3
Timeframe	4
Study skills	4
Need help?	5
Assignments	6
Assessments	6
Getting around this [DOCUMENT TYPE]	7
Margin icons	7
Topic 1	9
INTRODUCTION TO ECONOMICS	9
Introduction	9
Economics as a science	10
Economics as an Art	10
Microeconomics	11
Macroeconomics	11
Approaches to Economics	11
BASIC ECONOMIC PROBLEMS	12
Basic Terms and Concepts Used in Economics	12
Unit summary	15
Task	16
Assessment	16
Unit 2	17
DEMAND OF GOOD AND SERVICES ANALYSIS	17
Introduction	17
The law of Demand	19
Movements along a Demand Curve	20
Exceptions to the Laws of Demand (Abnormal Demand)	23
SUPPLY OF GOODS AND SERVICES ANALYSIS	23
DETERMINANTS OR SUPPLY	26
SHIFTS IN A SUPPLY CURVE (CHANGES IN SUPPLY)	28

Unit summary	28
Assignment	29
Assessment.....	29
Unit 3	30
MARKET EQUILIBRIUM	30
Introduction	30
Unstable Equilibrium	32
WORKED EXAMPLES	33
DEMAND AND SUPPLY INTER-RELATIONSHIPS	33
Effect of a decrease in demand supply remaining constant	34
(iii) Effect of an increase in supply demand remaining constant (effect of a subsidy)	34
(iv) Effect of a decrease in supply, demand remaining constant.....	35
v) Effect of a simultaneous increase in demand and a decrease in supply.....	36
vi) Effect of a simultaneous decrease in demand and an increase in supply.....	36
PRICE MECHANISM	37
PRICE CONTROLS.....	39
Unit summary	41
Assessment.....	42
Unit 4	43
ELASTICITY	43
Introduction	43
1.Point elasticity	44
DIFFERENT KINDS OF ELASTICITIES	47
2. INCOME ELASTICITY OF DEMAND (EY)	53
3.CROSS ELASTICITY OF DEMAND (EC).....	54
FACTORS INFLUENCING ELASTICITY	55
IMPORTANCE OF ELASTICITY IN ECONOMIC DECISION MAKING	55
ELASTICITY OF SUPPLY	56
FACTORS INFLUENCING ELASTICITY OF SUPPLY	56
Unit summary	57
Assignment	58
Assessment.....	58
Unit 5	59
THE THEORY OF CONSUMER BEHAVIOUR.....	59
Introduction	59
Cardinal utility.....	60
Marginal utility.....	62
ASSUMPTIONS (AXIOM) MADE UNDER CARDINAL APPROACH	64
DERIVATION OF THE DEMAND CURVE FOR THE CONSUMER.....	67
ORDINAL UTILITY (INDIFFERENCE CURVE ANALYSIS).....	68
Properties of Indifference Curves.....	74
THE BUDGET CONSTARINT (LINE) OF THE CONSUMER.....	76
CONSUMER EQUILIBRIUM	80

DERIVATION OF DEMAND CURVE USING THE INDIFFERENCE CURVE APPROACH.....	82
INCOME AND SUBSTITUTION EFFECT OF A PRICE CHANGE	86
SUBSTITUTION EFFECT	87
INCOME EFFECT	88
THE CONSUMER SURPLUS	91
IMPORTANCE OF INDIFFERENCE CURVE ANALYSIS.....	91
Unit summary	92
Assignment	92
Assessment.....	93

Unit 6**94**

THEORY OF PRODUCTION	94
Introduction	94
Factors of production.....	94
1. Land.....	95
2. Labour	95
3. Capital	96
4. Entrepreneurship	96
TYPES OF PRODUCTION CURVES	97
RELATIONSHIP BETWEEN TP & MP.....	100
IMPORTANT RELATIONSHIP BETWEEN MPP_L & APP_L	100
THE THREE STAGES OF PRODUCTION	102
SHAPES OF ISOQUANTS	105
CHARACTERISTICS OF ISOQUANTS.....	107
THE LAW OF RETURN TO SCALE	108
EQUILIBRIUM OF THE FIRM	109
EQUILIBRIUM OF THE FIRM	113
THE THEORY OF COSTS	113
AVERAGE TOTAL COST CURVE.....	115
THE OPTIMUM SIZE OF A FIRM	117
THE RELATIONSHIP BETWEEN THE AVERAGE COST CURVES.....	118
LONG RUN COST	118
THE OPTIMAL POINT OF A FIRM.....	119
DECISION RULE.....	122
Unit summary	123
Assignment	123
Assessment.....	123

Unit 7**124**

MARKET STRUCTURES	124
Introduction	124
PROFIT MAXIMISATION	125
SHORT-RUN EQUILIBRIUM OF FIRM UNDER PERFECT COMPETITION.....	127
LONGRUN EQUILIBRIUM OF THE FIRM	129
MONOPOLY	130
TYPES OF PRICE DISCRIMINATION	131
CONDITIONS FOR DISCRIMINATION	132

DEMAND AND REVENUE CURVES FOR MONOPOLIST	134
GRAPHICAL PRESENTATION	136
SHORT RUN EQUILIBRIUM UNDER THE MONOPOLY	136
OLIGOPOLY	137
EQUILIBRIUM IN OLIGOPOLISTIC FIRM.....	139
Monopolistic competition.....	139
SHORT-RUN AND LONG-RUN EQUILIBRIUM UNDER MONOPOLISTIC COMPETITION.....	141
Unit summary	142
Assignment	142
Assessment.....	142

DEKUT

About this USER MANUAL

INTRODUCTION TO MICROECONOMICS HBC 2107 has been produced by School of Business. All USER MANUALs produced by School of Business are structured in the same way, as outlined below.

How this USER MANUAL is structured

The course overview

The course overview gives you a general introduction to the course. Information contained in the course overview will help you determine:

- If the course is suitable for you.
- What you will already need to know.
- What you can expect from the course.
- How much time you will need to invest to complete the course.

The overview also provides guidance on:

- Study skills.
- Where to get help.
- Course assignments and assessments.
- Activity icons.
- Units.

We strongly recommend that you read the overview *carefully* before starting your study.

The course content

The course is broken down into units. Each unit comprises:

- An introduction to the unit content.
- Unit outcomes.
- New terminology.
- Core content of the unit with a variety of learning activities.

- A unit summary.
- Assignments and/or assessments, as applicable.

Resources

For those interested in learning more on this subject, we provide you with a list of additional resources at the end of this USER MANUAL; these may be books, articles or web sites.

Your comments

After completing INTRODUCTION TO MICROECONOMICS we would appreciate it if you would take a few moments to give us your feedback on any aspect of this course. Your feedback might include comments on:

- Course content and structure.
- Course reading materials and resources.
- Course assignments.
- Course assessments.
- Course duration.
- Course support (assigned tutors, technical help, etc.)

Your constructive feedback will help us to improve and enhance this course.

Course overview

Welcome to INTRODUCTION TO MICROECONOMICS HBC 2107

[Add a general description of the course here]

INTRODUCTION TO MICROECONOMICS HBC 2107—is this course for you?

This course is intended for people who [Add a set of course aims here].

[Add any prerequisites or skills required here].

Course outcomes



Outcomes

Upon completion of INTRODUCTION TO MICROECONOMICS HBC 2107 you will be able to:

- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].

Timeframe



How long?

[What is the expected duration of this course?]

[How much formal study time is required?]

[How much self-study time is expected/recommended?]

Study skills



As an adult learner your approach to learning will be different to that from your school days: you will choose what you want to study, you will have professional and/or personal motivation for doing so and you will most likely be fitting your study activities around other professional or domestic responsibilities.

Essentially you will be taking control of your learning environment. As a consequence, you will need to consider performance issues related to time management, goal setting, stress management, etc. Perhaps you will also need to reacquaint yourself in areas such as essay planning, coping with exams and using the web as a learning resource.

Your most significant considerations will be *time* and *space* i.e. the time you dedicate to your learning and the environment in which you engage in that learning.

We recommend that you take time now—before starting your self-study—to familiarize yourself with these issues. There are a number of excellent resources on the web. A few suggested links are:

- <http://www.how-to-study.com/>

The “How to study” web site is dedicated to study skills resources. You will find links to study preparation (a list of nine essentials for a good study place), taking notes, strategies for reading text books, using reference sources, test anxiety.

- <http://www.ucc.vt.edu/stdysk/stdyhlp.html>

This is the web site of the Virginia Tech, Division of Student Affairs. You will find links to time scheduling (including a “where does time go?” link), a study skill checklist, basic concentration techniques, control of the study environment, note taking, how to read essays for analysis, memory skills (“remembering”).

- <http://www.howtostudy.org/resources.php>

Another “How to study” web site with useful links to time management, efficient reading, questioning/listening/observing skills, getting the most out of doing (“hands-on” learning), memory building, tips for staying motivated, developing a learning plan.

The above links are our suggestions to start you on your way. At the time of writing these web links were active. If you want to look for more go to www.google.com and type “self-study basics”, “self-study tips”, “self-study skills” or similar.

Need help?



Help

Is there a course web site address?

What is the course instructor's name? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a teaching assistant for routine enquiries? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a librarian/research assistant available? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a learners' resource centre? Where is it located? What are the opening hours, telephone number, who is the resource centre manager, what is the manager's e-mail address)?

Who do learners contact for technical issues (computer problems, website access, etc.)

Assignments



Assignments

[How many assignments are there for this course?]

[How are the assignments are to be submitted?]

[To whom should the assignments be submitted?]

[What is the schedule for submitting assignments? End of each unit?
Specific dates?]

[What is the order of the assignments? Must they be completed in the
order in which they are set?]

Assessments



Assessments

How many assessments will there be in this course?

Are they self-assessments or teacher-marked assessments?

When will the assessments take place?

How long will the assessments be?

How long will learners be allowed to complete the assessment(s)?

How long will it take a teacher to mark the assessment(s)?

Getting around this USER MANUAL

Margin icons

While working through this USER MANUAL you will notice the frequent use of margin icons. These icons serve to “signpost” a particular piece of text, a new task or change in activity; they have been included to help you to find your way around this USER MANUAL.

A complete icon set is shown below. We suggest that you familiarize yourself with the icons and their meaning before starting your study.

			
Outcomes	Reflection	Reading	Study skills
			
Discussion	Help	Group activity	Note it!
			
Summary	Time	Terminology	Tip
			
Activity	Assignment	Assessment	Case study

Topic 1

INTRODUCTION TO ECONOMICS

Introduction

Economics is the social science studying the production, distribution and consumption of goods and services. It is a complex social science that spans from mathematics to psychology. At its most basic, however, economics considers how a society provides for its needs. Its most basic need is survival; which requires food, clothing and shelter. Once those are covered, it can then look at more sophisticated commodities such as services, personal transport, entertainment, the list goes on.

Economics is *defined as a science which studies human behaviour in a relation to how he utilizes scarce resources in order to maximizes utility as he satisfy his unlimited wants.*

Observations

- Economics is the study of scarcity and choice. Meaning to satisfy the unlimited human wants individuals must make a choice
- Making a choice involves an opportunity cost.
- Economics is both a science and an art.

Upon completion of this unit you will be able to:



Outcomes

- *Define* economics.
- *Differentiate* microeconomics with macroeconomics.
- *Explain* key terms as used in economics.
- *Discuss* advantages and disadvantages of specialization.
- *[verb]* [complete the sentence].
- *[verb]* [complete the sentence].
-



Terminology

*Adding extra rows to the
Table graphic
Removing
rows from the table graphic*

Scarcity:	[Term description]
Choice:	[Term description]
Opportunity cost:	[Term description]
Goods:	[Term description]
Microeconomics:	[Term description]
Macroeconomics:	[Term description]
Specialization:	[Term description]
Production Possibility Frontier:	[Term description]

Economics as a science

A science refers to a body of knowledge which describes the relationship between a set of given courses and their effects. Economic is a science because it's a body of laws which describe the relationship between some their courses and it effects. It's a science due to its approach in definitions of concepts, formulation of hypothesis, use of the hypothesis to make predictions and testing the hypothesis.

Economics as an Art

An art is a discipline that tells us how to achieve an end. Economics is an art because the final justification for studying economies has in the possibility of our ability to use it for solving economic problems. Economics is therefore

used in solving economic problems. It explains how individuals make decisions in life.

Branches of Economics

Economics generally has two branches namely

- **Microeconomics**
- **Macroeconomics**

Microeconomics

It's the study of the economic behaviour of individual economic units e.g. consumers firms, government agencies etc. It is study of public, business choices. (for example consumer decide how much of various goods to purchase, workers decide what job to take & business people decide how many workers to hire and how much output to produce). It is frequently called "Price theory".

Macroeconomics

Study of the aggregate economic variables i.e. it's the study of economic behaviours of industries or whole economy system. We study economic variables like, consumption, savings, economic growth, Interests rates, unemployment and inflation among others

Approaches to Economics

Refers to how economists go about the study of the subject economics. There are 2 main approaches to economic

- a) Positive economics
- b) Normative economics

Positive Economics

Is concerned with the investigation of the ways in which the different economic agents in society seek to achieve their goals. Deals with statements that can be tested using data eg positive economists may analyze how a firm behaves in

trying to make as much profit as possible. It's thus concerned with "what is" "what was" or "what will be". And these are statements whose validity can be tested against available evidence.

Normative Economics

Is concerned with making suggestions about the ways in which the societal goals may be more efficiently realized. This advocates for "what ought to be". E.g. the present high level of unemployment in Kenya today ought to be reduced. It's thus concerned with preposition based on varied judgments i.e. statement that are an expression of opinion.

BASIC ECONOMIC PROBLEMS

The economic problem is most simply explained by the question "how do we satisfy unlimited wants with limited resources?" The premise of the economic problem model is that human wants are constant and infinite due to constantly changing demands (often closely related to changing (demographics) of the population. However, resources in the world to satisfy human wants are always limited to the amount of natural or [human resources] available. The economic problem, and methods to curb it, revolves around the idea of choice in prioritizing which wants can be fulfilled, and how do we know what to produce for economy. This can be explained using 3 basic economic statements, namely;

- i) What to produce?
- ii) How to produce?
- iii) For whom to produce?

Basic Terms and Concepts Used in Economics

i) Scarcity

Means limited in supply. Hence economic resources are scarce.

ii) Choice

Since economic resources are scarce and human wants unlimited, individuals must make a choice from a scale of preference i.e. by ranking wants according to their urgency and intensity.

iii) **Opportunity cost**

Alternative foregone in order to enjoy a good/service

iv) **Want**

A want is a human desire or a wish to have a commodity.

Characteristics of human wants

- unlimited
- certain wants can be fully satisfied
- alternatives i.e. competitive in nature
- vary in urgency and intensity
- felt again and again i.e. recurrent
- complimentary i.e. certain wants must be satisfied together

v) **Good**

This is anything that satisfies a human want and has an exchange value.

vi) **Wealth**

Refers to goods which possess the following characteristics

- a) Utility
- b) Scarcity
- c) Monetary value
- d) Capability of being transferred

Wealth includes business wealth, personal wealth and social wealth.

vii) **Utility**

Is the ability of a commodity to satisfy a human want i.e. it's the satisfaction derived from consuming a unit of a commodity (good or service)

viii) **Demand**

Is the desire and ability of a consumer to have a commodity at a given price over a given period of time?

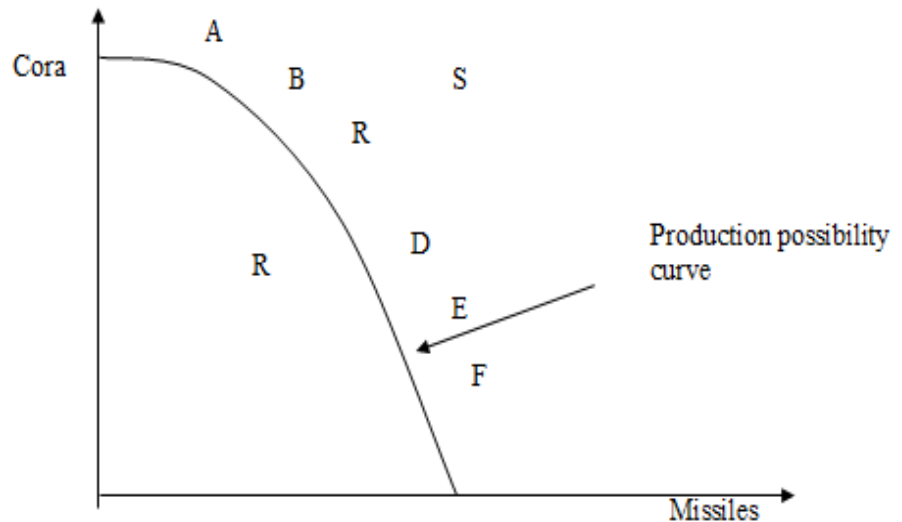
ix) **Market**

The market is the place where buyers and sellers go to buy and sell. The name comes of course from those gatherings of people in towns, but today markets don't need to be physical. Not only can you have electronic marketplaces such as e-commerce,

markets are also seen as the congregation of all people buying and selling things everywhere.

x) **Production Possibility Curve/Production Possibility Frontier**

This is a locus of point which joins together different combinations of two goods that can be produced by a country when all its resources are fully and efficiently utilized given the available technology.



Points (A-F) along the curve can be attained with the countries resources and technology assuming full employment and no wastage of resource. Points inside the curve e.g. R, represent either unemployment or inefficient use of resources. Points outside the curve e.g. S, can't be attained with the current level of resources and technology.

SPECIALIZATION

Involves concentrating on what one is best at, leaving others to supply skills, services and experiences differing from one's own.

Specialization creates a surplus produce which necessitates exchange (trade)

Advantages

- i) Production of high output
- ii) Production of high quality goods and services
- iii) It saves times
- iv) Promote innovation and invention
- v) Promotes quality management and efficiency
- vi) Leads to high mechanization
- vii) High profits are earned in an organization
- viii) Individuals have a personal liking to their jobs
- ix) Leads to economies of scale

Disadvantages

- i) may lead to overproduction causing wastage and lowering of prices
- ii) greater risk of unemployment
- iii) Employee get bored due to work monotony
- iv) Leads to poor socialization of employees in a given industry
- v) Employees lack responsibility of the final product produced.
- vi) Leads to diseconomies of scale

Unit summary



Summary

In this unit you learned the definition of economics, branches and approaches to the study of economics. We have also looked at the basic terms used generally in economics. The unit has also covered the usefulness of specialization to an economy.

[Continue your body text here]

Task



Assignment

Discuss the connection between scarcity, choice and opportunity cost

[Continue your body text here]

Assessment



Assessment

1. Discuss the differences between microeconomics and macroeconomics
2. By use of a diagram, explain Production Possibility Frontier
3. Discuss the advantages of specializations
4. List down five characteristics of human wants
5. Define the following terms
 - i. Opportunity Cost,
 - ii. Markets,
 - iii. Utility
 - iv. Specialization

[Continue your body text here]

Unit 2

DEMAND OF GOOD AND SERVICES ANALYSIS

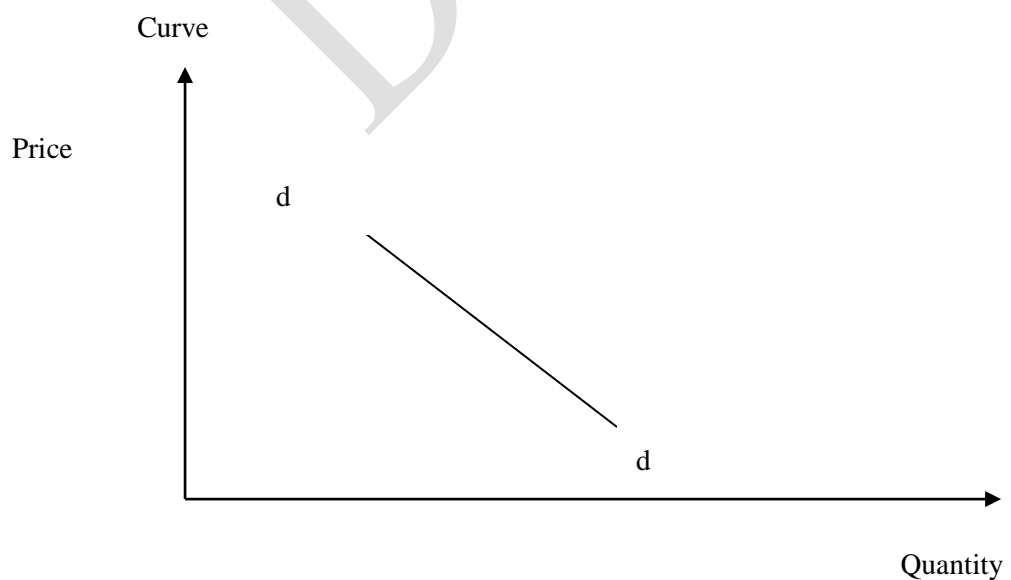
Introduction

Demand is the willingness and ability of a consumer to buy a commodity at a given price over a given period of time.

Demand schedule

This is a table that shows the relationship between prices and the corresponding quantities demanded.

Price (Ksh)	Quantity demanded (units)
30	1
25	4
20	7
15	10
10	13
5	15



Where dd = demand curve

From the demand schedule and the demand curve above it can be observed that:

- a) More is demanded at low prices
- b) Less is demanded at high prices
- c) There exist an inverse relation between prices and quantity demanded
- d) The demand curve slopes downwards from top left to bottom right.
(downward sloping)



Outcomes

Upon completion of this unit you will be able to:

- *Explain demand and supply for goods and services.*
- *Discuss factors influencing demand.*
- *Discuss factors influencing supply.*
- *Discuss abnormal demand and supply.*
- *Differentiate movement along and shift of demand and supply curves .*
- *Describe price mechanism.*



Terminology

Demand:	Total amount of goods and services that are demanded in a market at a specified time and price
Supply:	Total amount of goods and services that are supplied in a market at a specified time and price
Price mechanism	The use of market forces of demand and supply to determine prices and quantity demanded in a market
Price control:	Use of legislation by government to regulate prices of a commodity
Price ceiling:	Maximum price that a commodity can be sold at retail price
Price floor:	Minimum price that can be charged for a commodity
[Term]:	[Term description]
[Term]:	[Term description]

The law of Demand

It states that “The lower the price, the higher the quantity demanded and the higher the price, the lower the quantity demanded *ceteris paribus*.”

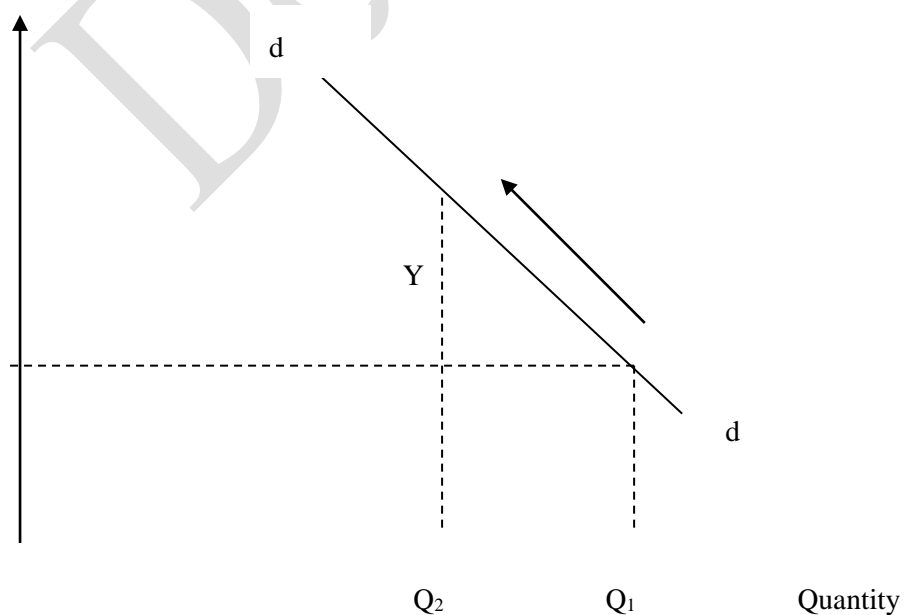
Factors influencing demand /determinant of demand

- i) **Price of a good:** the higher the price, the lower the quantities demanded and vice versa.
- ii) **Income of consumer:** it can influence demand level in three different ways depending on the type of good in question;
 - *Normal good*, the higher the income, the higher the quantity demanded and the lower the income the lower the quantity demanded.
 - *Inferior goods*: with increasing income, less of inferior goods are demanded until they are done away with.
 - *Necessities* e.g. salt or sugar at low incomes, these goods are almost done away with. However as income increases, the consumption of these goods becomes constant.
- iii) **Future expectation of price changes:** if consumers expect that the price of a commodity will increase in future, more of the commodity will be demanded now. However if they expect that the price will fall in future, then less of the commodity will be demanded now
- iv) **Prices of other related goods**
 - *Substitute goods* e.g. tea and coffee. The demand of a commodity goes up if the price of its substitute increases e.g. more of tea is demanded when the price of coffee increases.
 - *Complimentary goods* e.g. car and petrol. If the price of a commodity goes down, the demand of its complement increases e.g. if the price of cars goes down the demand for petrol increases.
- v) **Population composition:** the higher the population the higher the quantity demanded and the lower the population the lower the demand.
 - *Gender*. The demand for feminine goods is higher in a population largely composed of females than one that's largely composed of males.
 - *Age*. The demand for baby clothes is higher in a population largely composed of babies than in a population largely composed of old people.

- vi) **Customs, religion and traditions.** Demand is low for those goods that are against people's customs and traditions and high for those goods that are for people's customs and traditions.
- vii) **Fashion of the day.** Demand is high for those goods that are in fashion and for those goods that are out of fashion. The demand for fashionable goods goes against the law and demand.
- viii) **Season and weather.** Change in season influenced the demand for a commodity e.g. the demand for warm clothes is high during cold season and low during warm season.
- ix) **Tastes and preferences.** Demand is high for those goods that are for people's tastes and preferences and low for those against people's tastes and preferences.
- x) **Government policy:** the government influences the demand for a commodity e.g. the government may encourage consumption of a commodity by reducing taxes and giving subsidies. On the other hand the government may discourage consumption of a commodity by increasing taxes and withdrawing subsidies.

Movements along a Demand Curve

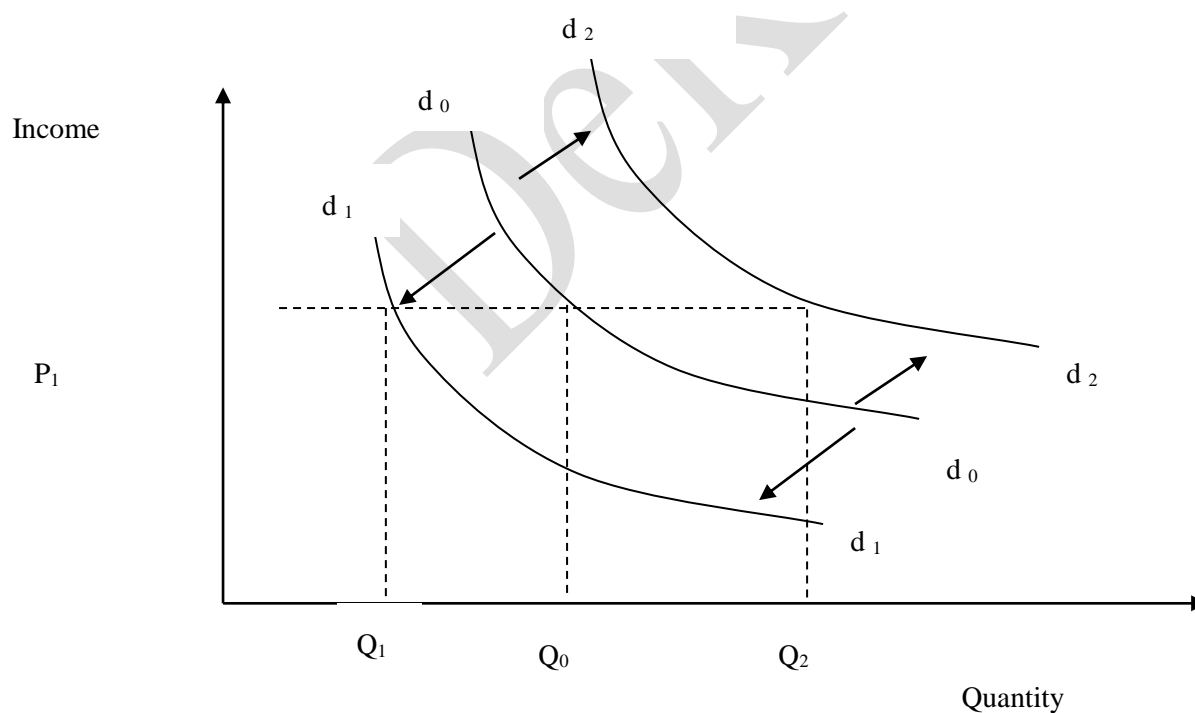
Movements along a Demand Curve



At a low price P_1 , quantity demanded is high Q_1 . An increase in price from P_1 to P_2 leads to decrease in quantity demanded from Q_1 to Q_2 . This causes a movement along the demand curve from point x to point y. On the other hand at a high price P_2 , quantity demanded is low, Q_2 . a decrease from P_2 to P_1 leads to an increase in quantity demanded from Q_2 to Q_1 . This causes a movement along the demand curve from point Y to point X

Movement along a demand curve is brought about by changes in price *ceteris paribus*.

Shifts in Demand curve (changes in demand)



An increase in income, leads to an increase in quantity demanded from Q_0 to Q_2 . This causes a shift in the demand curve to the right (i.e. upward shift in

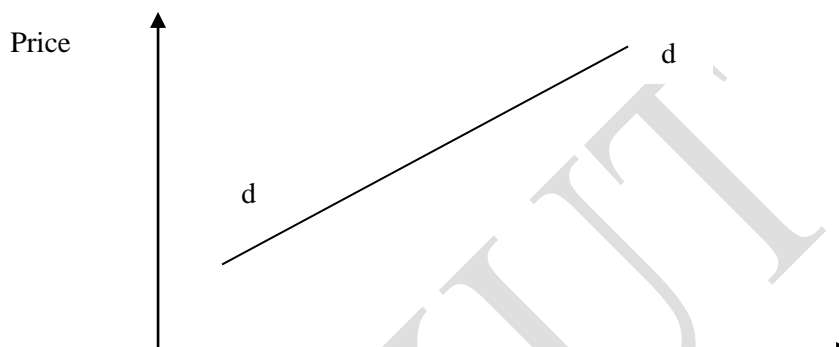
demand curve) from d_0d_0 to d_2d_2 . On the other hand, a decrease in income leads to a decrease in quantity demanded from Q_0 to Q_1 this causes a shift in the demand curve to the left (i.e. downward shift) from d_0d_0 to d_1d_1 . Shifts in demand curve are brought about by changes in other factors influencing demand other than changes in price.

Likely Causes of Shifts in the Demand Curve for Good

CAUSE	EFFECT
i) increase in income	Increase in demand for good x The demand curve shifts to the right
ii) Decrease in income	Decrease in demand for good x The demand curve shifts to the left
iii) increase in price of the substitute	Increase in demand for good x Demand curve shifts to the right
iv) decrease in price of a substitute	Decrease in demand for good x Demand curve shifts to the left
v) Increase in price of a complimentary good	Decrease in demand for good x Demand curve shifts to the left
vi) Decrease in price of a complimentary good	Increase in demand for good x Demand curve shifts to the right
vii) Change in tastes in favour of x	Increase in demand for x Demand curve shifts to the right
Viii) Change in tastes against x	Decrease in demand for x Demand curve shifts to the left
Expectation of a raise in future price of x	Increase in demand of x Demand curve shift to the right
Expectation of a fall in future price of x	Decrease in demand of x Demand curve shift to the left

Exceptions to the Laws of Demand (Abnormal Demand)

Abnormal demand goes against the law of demand i.e. more goods are demanded at low prices.



Exceptions to the law of demand applies in the following circumstances

- a. **Giffen goods**. An increase in price of the goods Qty ad to a decrease in their demand
- b. **Veblelem goods/goods of ostentation/luxurious goods**. Demand is high at high prices and low prices.
- c. **Inferior goods**
- d. **Future expectation** of an increase in prices
- e. **Fashions**
- f. **Necessities**, e.g. medicines

SUPPLY OF GOODS AND SERVICES ANALYSIS

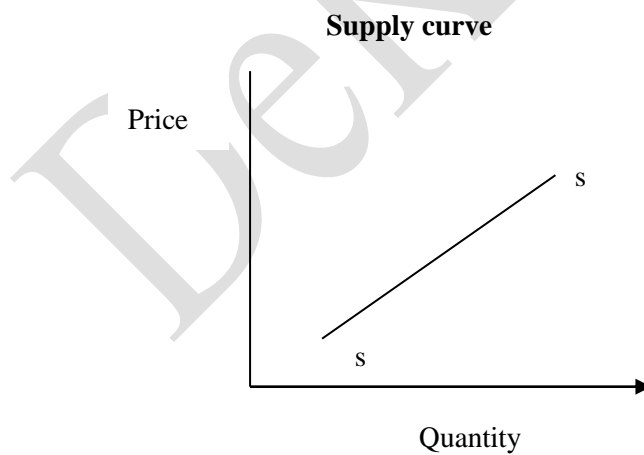
Supply Definition

This is the amount of a commodity that sellers/supplies are willing and able to sell/supply at a given price over a given period of time.

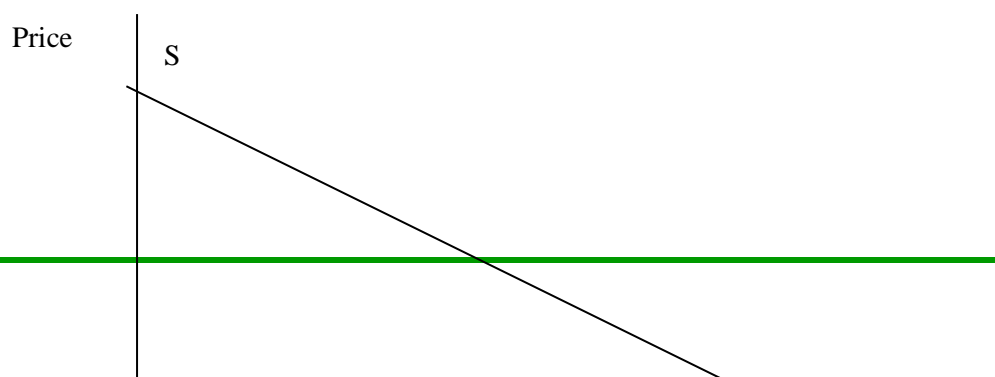
Supply schedule

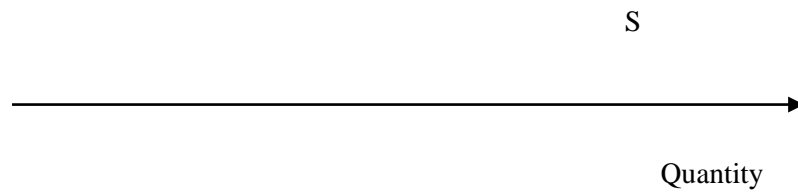
This is a table that shows the relationship between prices and the corresponding quantities supplied.

Price (Ksh)	Quantity supplied (units)
10	5
12	10
14	15
16	20
18	25



Goes against the law of supply i.e. less is supplied at high prices and more is supplied at low prices

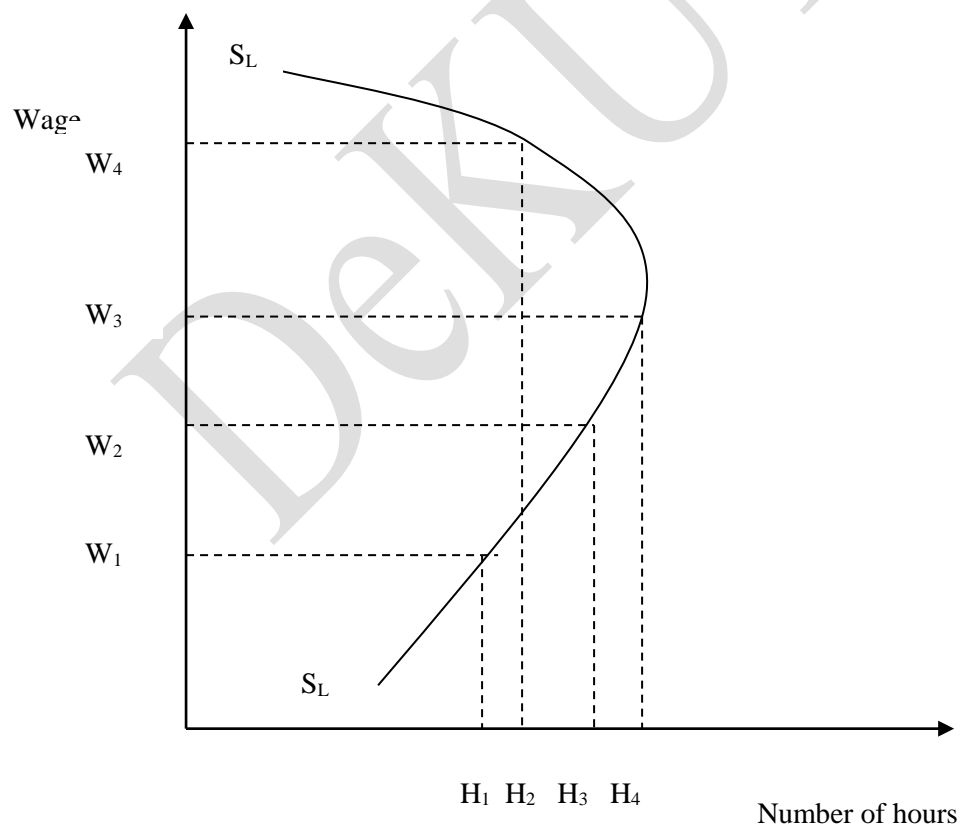




Where S = Abnormal supply curve

Abnormal supply occurs in the following circumstances

a) Backward bending supply curve of labour (regression supply)



At a low wage W_1 , the number of hours offered for work is low. An increase in wage to W_2 , leads to an increase in the number of hours offered for work, W_2 .

A further increase in wage W_3 , leads to a higher no. of hours offered for work H_3 , leads to a higher no. of hours offered for H_3 , however an increase in wage to W_4 leads to fewer hours offered for work H_4

Reasons for this are:

- i) The worker now feels rich enough and substitutes work for leisure.
- ii) There are certain workers who work with targets. Whenever they achieve their targets e.g. accumulating enough money to start a business, they are no longer encouraged to work.
- iii) The higher the income, the higher the income tax it attracts. High taxation discourages workers from working and hence fewer hours being offered for work.

b) Supply of perishable goods

These are goods that don't last for long e.g. vegetables. Producers may supply these goods at low prices to avoid them going into waste.

c) Future expectation of price change

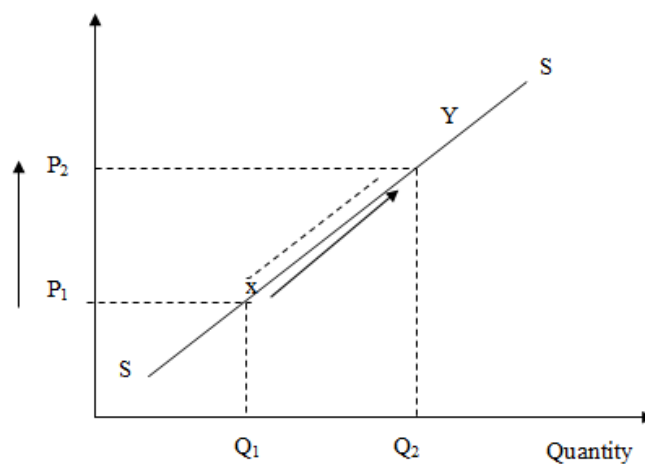
If producers expect that the prices of a commodity will fall in future, then they will supply more now at low prices.

a) Where money supply is controlled by the government.

DETERMINANTS OR SUPPLY

- i) **Price of the commodity:** The higher the price of a particular commodity the higher the supply and vice versa in normal circumstances.
- ii) **Costs of production:** The higher the costs of production the lower the quantities supplied and the lower, the costs, the higher the quantities supplied.

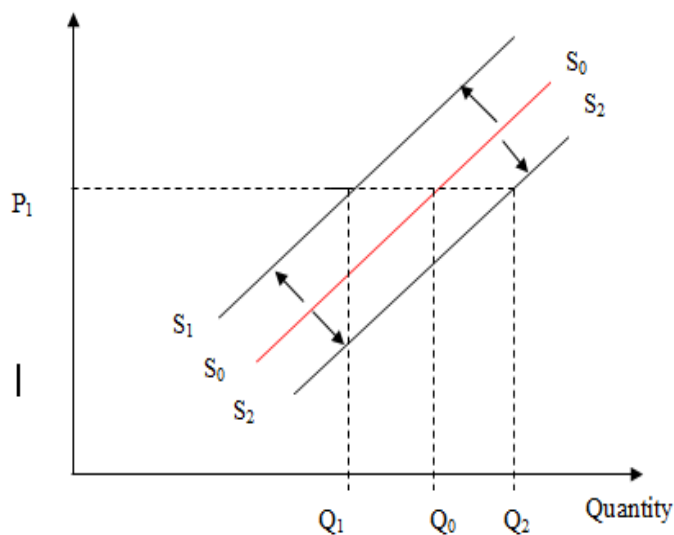
- iii) **The length of production period:** If production takes a short period then supply is high thus elastic but if it takes a Long period supply is low
- iv) **Level of Technology:** The higher the technology the higher the supply and vice versa.
- v) **Environment factors:** like climate and weather, if the environmental factors are favourable, quantity supplied are higher. If they are unfavourable, supply is low.
- vi) **Government policy:** The government influences the supply of commodities e.g. the government may encourage production by reducing **taxes** and giving **subsidies**. On the other hand, the government may discourage production by increasing taxes and withdrawing subsidies.
- vii) **Future expectation of price changes:** If producers expect that the price of the commodity will fall in future, then they will supply more now and less in future. But if they expect that the price will increase in future, they will supply less now and more in future.



Movement along supply curve is influenced by changes in **prices ONLY**. Changes in prices from p_1 to p_2 causes changes in quantity supplied from Q_1 to Q_2 .

SHIFTS IN A SUPPLY CURVE (CHANGES IN SUPPLY)

Shifts in supply curve are brought about by **changes in other factors** affecting/influencing supply **other than changes in price**.



If climate becomes favourable, quantity supplied increases from Q_0 to Q_2 . This causes a shift in the supply curve to the right (i.e. downward shift in supply curve) from S_0S_0 to S_2S_2 . If climate becomes unfavourable, quantity supplied decreases from Q_0 to Q_1 , this causes a shift in the supply curve to the left (i.e. upward shift in the supply curve) from S_0S_0 to S_1S_1 .

Unit summary



Summary

In this unit you learned the definition of demand and supply, the schedules, and the laws of demand and supply. We have also covered the abnormal demand and supply and factors influencing each.

[Continue your body text here]

Assignment



Assignment

Discuss factors that influence the supply of agricultural food commodities in Kenya

[Continue your body text here]

Assessment



Assessment

List down factors that influence demand for goods and services

Discuss the differences between movement and shift of supply curve

With aids of diagram(s) elaborate on the abnormal demand and supply of a commodity

[Continue your body text here]

Unit 3

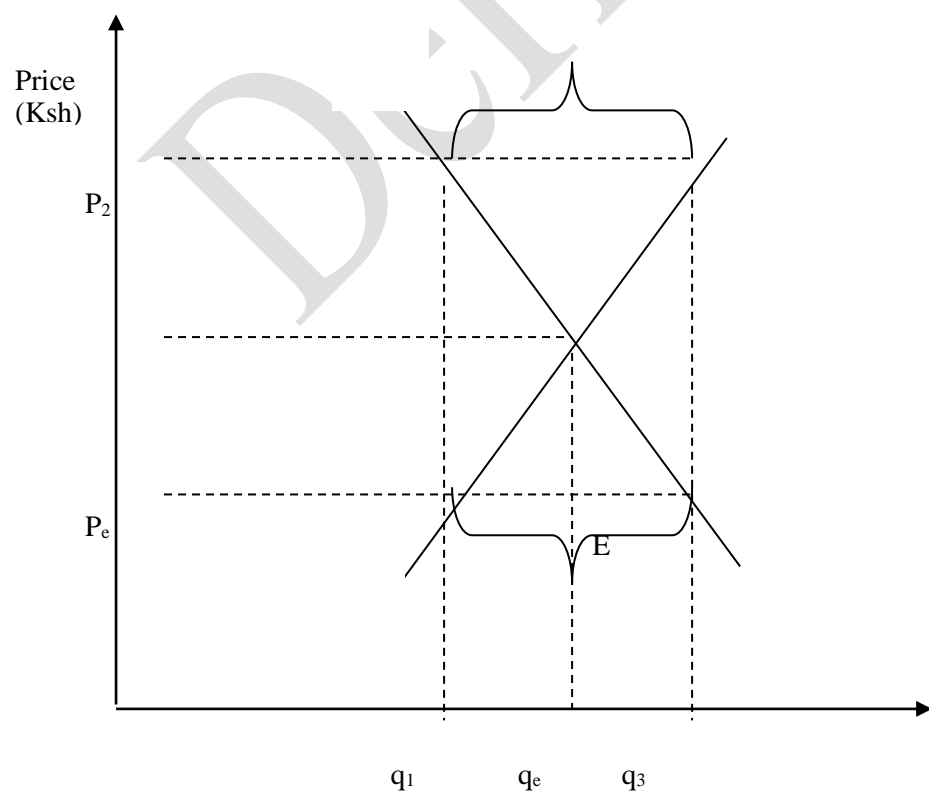
MARKET EQUILIBRIUM

Introduction

Market price is that price that's prevailing in the market and is determined through the market forces of demand and supply.

Demand and supply schedules

Price (Ksh)	Quantity (demands) (units)	Quantity supplied (units)
2	100	40
4	90	50
6	80	60
8	70	70
10	60	80



Where q_e = market /equilibrium quantity

P_e = equilibrium price

At a low price P_1 , quantity demanded is high, q_3 , while quantity supplied is low q_1 . This creates an excess demand in the market. The excess demand pushes up the price from P_1 towards equilibrium price P_e . As the price increases quantity supplied increases from q_1 . While quantity demanded decreases from q_3 , move towards equilibrium quantity Q_e .

At a high price, P_2 , quantity demanded is low, q_1 , while quantity supplied is high, q_2 . this creases an excess supply in the market. The excess supply pushes down the price from P_2 towards equilibrium price P_e . As the price decreases, quantity demanded increases from q_1 while quantity supplied decreases from q_2 , both towards equilibrium quantity q_e .

NB

- There are a lot of adjustments which go on and in the market until the equilibrium price and quantity are established
- Market is said to be at equilibrium (i.e. stable) when quantity demanded = quantity supplied and there's an establishment of equilibrium price and quantity
- Market is said to be at disequilibrium (i.e. unstable) when any divergence from the equilibrium position sets up forces which tend to push the prices further away from the equilibrium price.

Upon completion of this unit you will be able to:



Outcomes

Discuss market equilibrium.

Estimate equilibrium prices and quantity from some functions.

Explain why market fails.

Discuss why government intervenes in fixing prices of commodities.

Elaborate the price control mechanism and its effects.



Market equilibrium: [Term description]

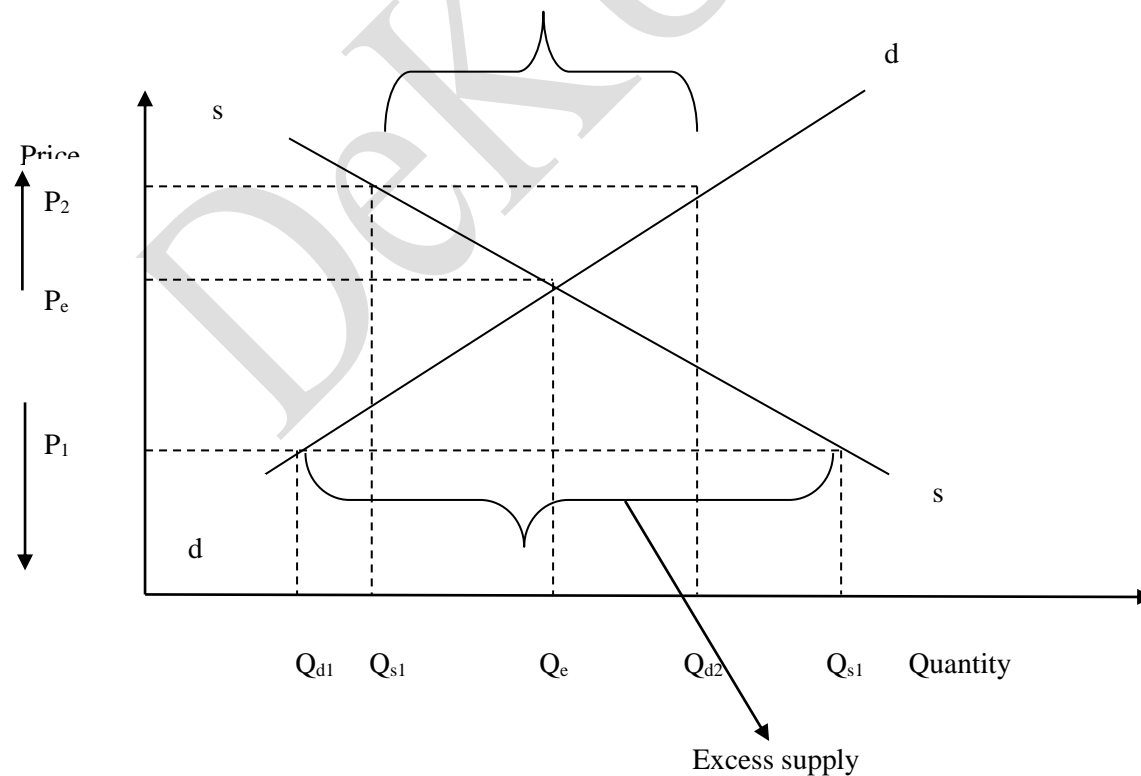
Market prices: [Term description]

Terminology

Market quantity:	[Term description]
Price controll:	[Term description]
Prices ceiling:	[Term description]
Prices floor:	[Term description]
Disequilibrium:	[Term description]
[Term]:	[Term description]

Unstable Equilibrium

Market is unstable at both prices P_1 and P_2 . At price P_1 there's an excess supply and this pushes the price downwards away from the equilibrium price P_e . On the other hand at prices P_e , there's an excess demand and this tends to push the price up away from the equilibrium price, P_e .



Where dd = abnormal demand curve

Ss – Abnormal supply curve

WORKED EXAMPLES

Question 1 (a)

Given that: $Q_d = 20 - 4p$

$$Q_s = -10 + 6p$$

Determine the equilibrium price and quantity

SOLN

$$Q_d = Q_s$$

$$Q_d = 20 - (4 \times 3)$$

$$20 - 4p = -10 + 6p \quad = 20 - 12$$

$$30 = 10p \quad Q_e = 8$$

$$3 = P_e$$

Question 1 (b)

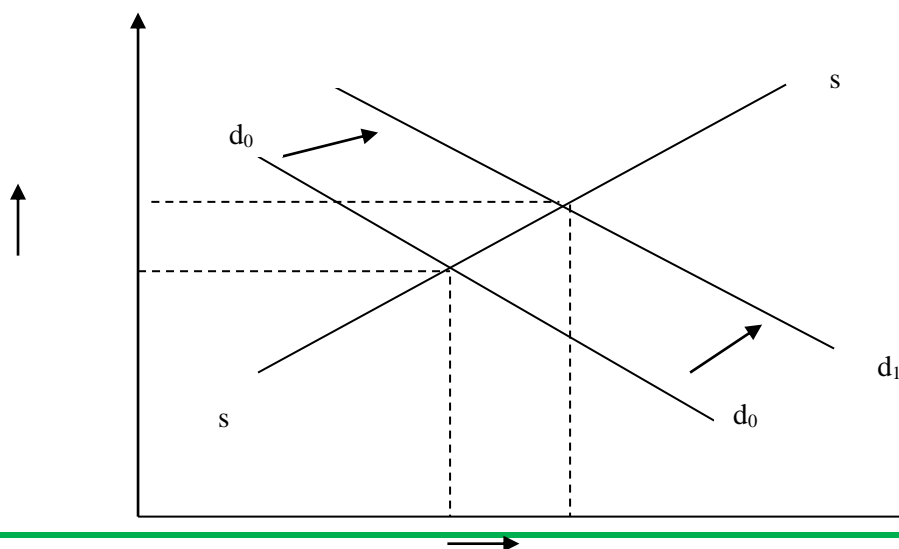
$$Q_d = 10 - \frac{3}{4}p$$

$$Q_s = -15 + 6p$$

Establish equilibrium price and quantity

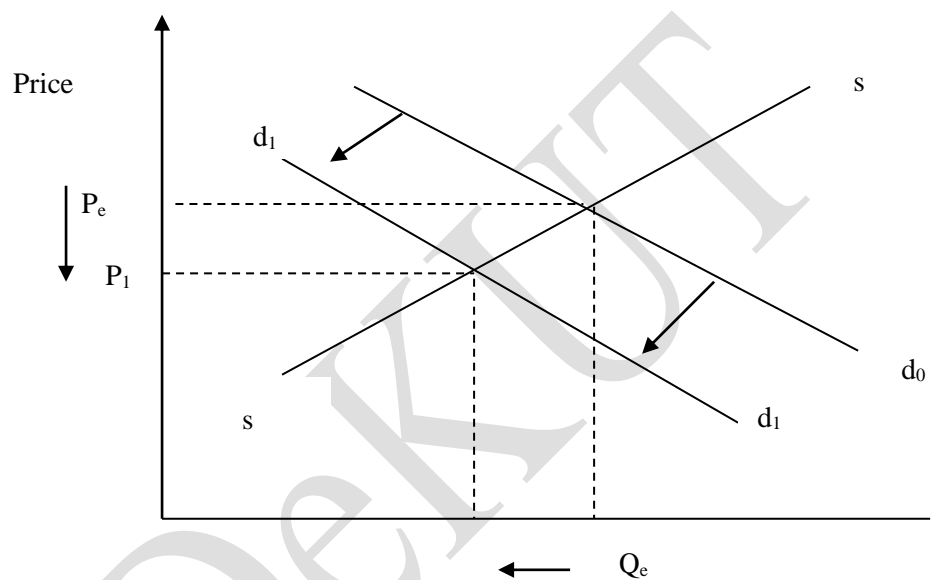
DEMAND AND SUPPLY INTER-RELATIONSHIPS

Effect of an increase in demand, supply remaining constant



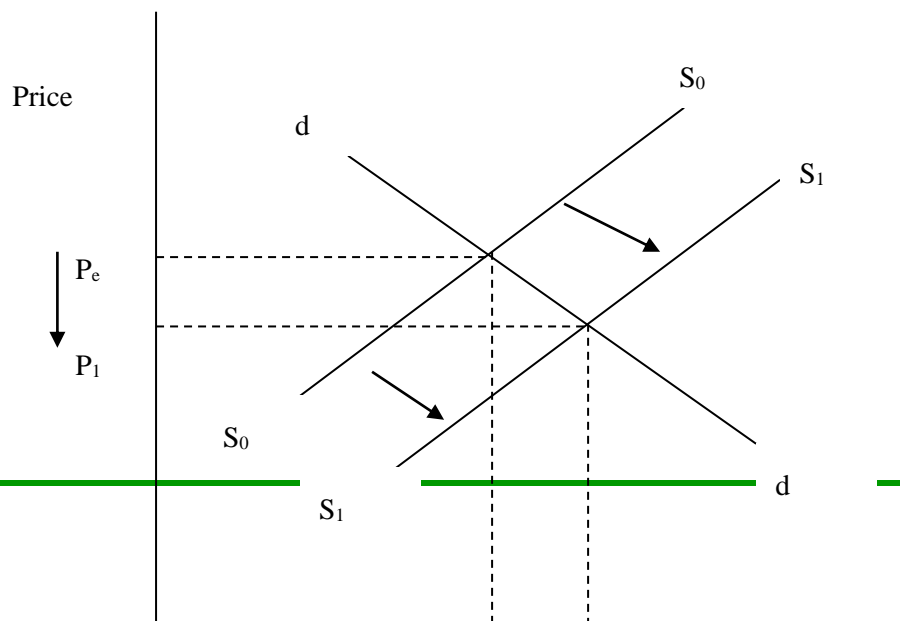
The demand curve shifts to the right from d_0 to d_1 . Quantity demanded increased from Q_e to Q_1 . This causes an increase in price from P_e to P_1 .

Effect of a decrease in demand supply remaining constant



The demand curve shifts to the left (downward shift of the demand curve) from d_0 to d_1 . Quantity demanded decreases from Q_e to Q_1 . This causes a decrease in price from P_e to P_1 .

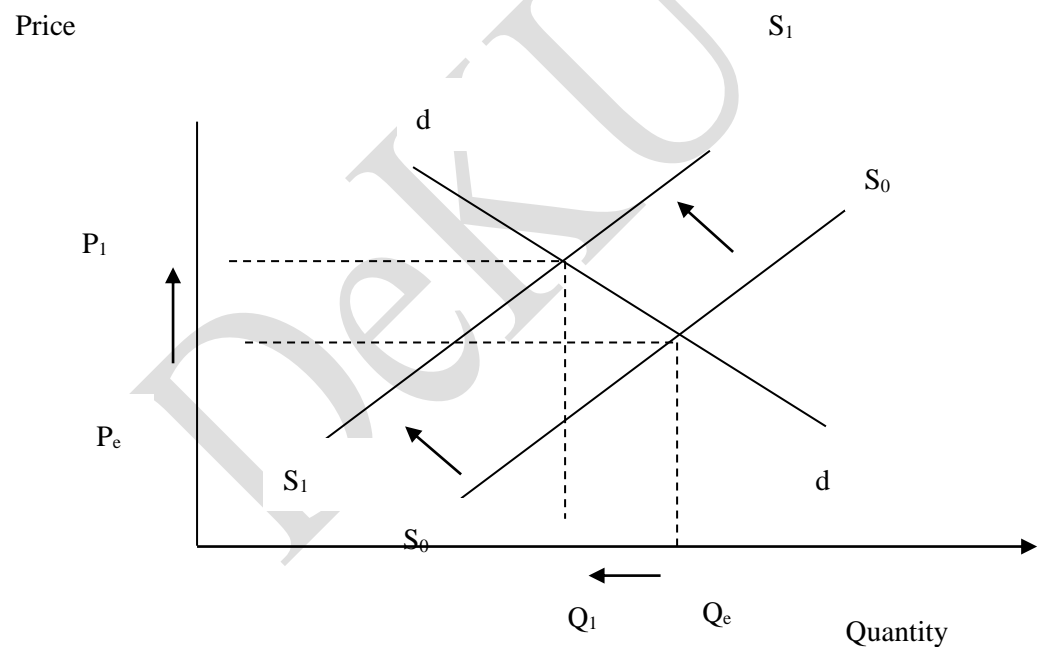
(iii) Effect of an increase in supply demand remaining constant (effect of a subsidy)



The supply curve shifts to the right from S_0S_0 to S_1S_1 . Quantity supplied increases from Q_e to Q_1 . This causes a decrease in price from P_e to P_1

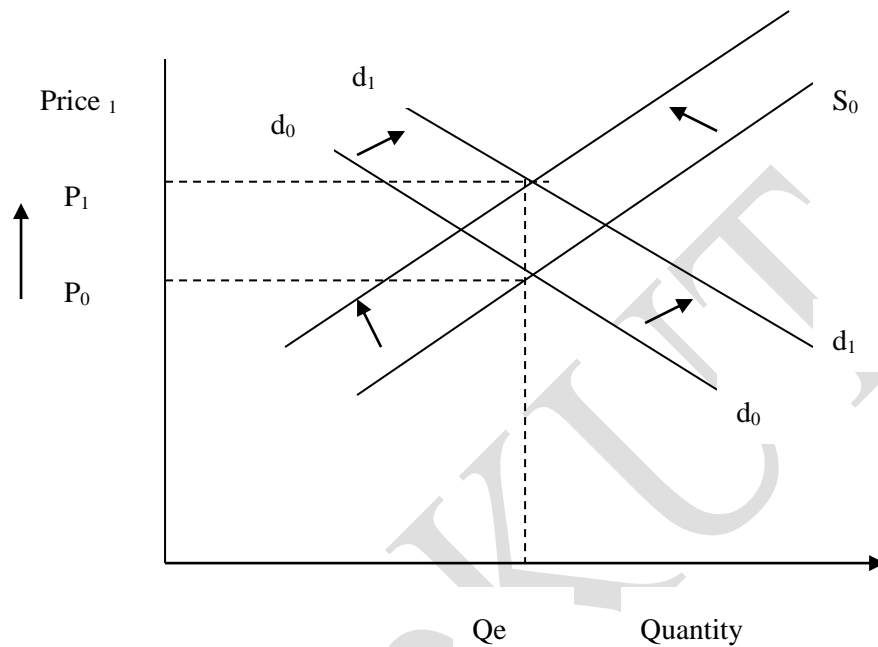
(iv) Effect of a decrease in supply, demand remaining constant

(i) Effect of a decrease in supply, demand remaining constant



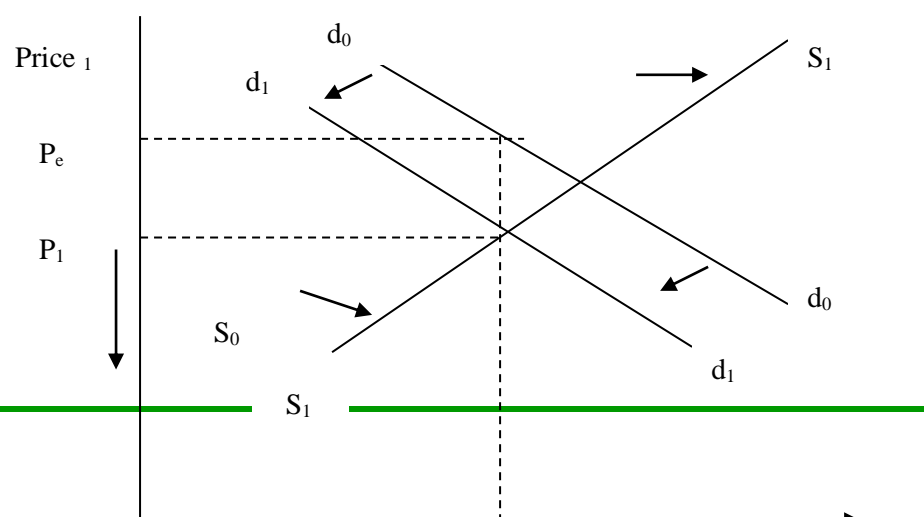
The supply curve shifts to the left from S_0S_0 to S_1S_1 . Quantity supplied decreases from Q_e to Q_1 . This causes an increase in price from P_e to P_1

v) Effect of a simultaneous increase in demand and a decrease in supply.



The demand curve shifts to the right (from d_0d_0 to d_1d_1) while the supply curve shifts to the left (from S_0S_0 to S_1S_1). This causes the price of the commodity to increase from P_e to P_1 .

vi) Effect of a simultaneous decrease in demand and an increase in supply



Q_e

Quantity

The demand curve shifts to the left (from d_0d_0 to d_1d_1), while the supply curve shifts to the right (from S_0S_0 to S_1S_1). This causes the price of the commodity to decrease from P_e to P_1

PRICE MECHANISM

The price mechanism is a system of determination of prices and resource allocation. It operates in a free market situation where forces of demand and supply dictate prices. It is the process by which changes in prices guide and shape changes in the value and types of the goods and services that are produced. The price mechanism will determine: “what is produced, how much is produced and for whom a good or service is produced for.

Importance of Price Mechanisms

- **Transmission of preferences** - consumers are able to alert producers to changes in wants and needs, so that the market provides the right amount of the right goods.
- **The Allocative Function:** The price mechanism will also ensure that goods will be allocated efficiently. If prices are set above equilibrium, suppliers will find themselves with a surplus of stock. Prices will fall to clear the market and allocate resources efficiently. Under this system there's no government interference and there's a lot of consumer sovereignty.
- **The Signaling Function:** Prices must convey sufficient information to all traders in the market for their economic activities and plans to

be coordinated. It demonstrate where resources are required, via a change in demand

- **The Rationing Function:** When consumers and firms respond to the information and incentives provided by prices, scarce resources are rationed between competing uses. When there is a shortage of a good, the price increases, leaving only those with the willingness/ability to pay to purchase the product.
- **Incentive Function:** Increase in price should provide an incentive for producers to increase production of the good
- **Consumer Sovereignty:** The price mechanism (system) operates under a free market economy. Under this system there's no government interference and there's a lot of consumer sovereignty.

Reasons government interference with the price mechanism

- i) To control against the production of socially undesirable goods and services e.g. drugs, illicit goods etc
- ii) To control against depletion/exhaustion of certain natural resources due to over-exploitation
- iii) To control against externalities e.g. pollution
- iv) To ensure an equitable distribution of income and wealth
- v) To ensure provision of essential goods and services
- vi) To control against market imperfections like monopolies
- vii) To control against inflation through price controls
- viii) To attain full employment of resources

Methods of interfering with price mechanism

- i) Taxation. This is to discourage entrepreneurs from charging high prices.
- ii) Banning. The production of certain products
- iii) By giving subsidies i.e. meeting part of the production costs so as to encourage production
- iv) Through minimum wage legislation. This is to protect workers against exploitation by employers
- v) Rent control. This is aimed at protecting tenants against exploitation by the landlords.

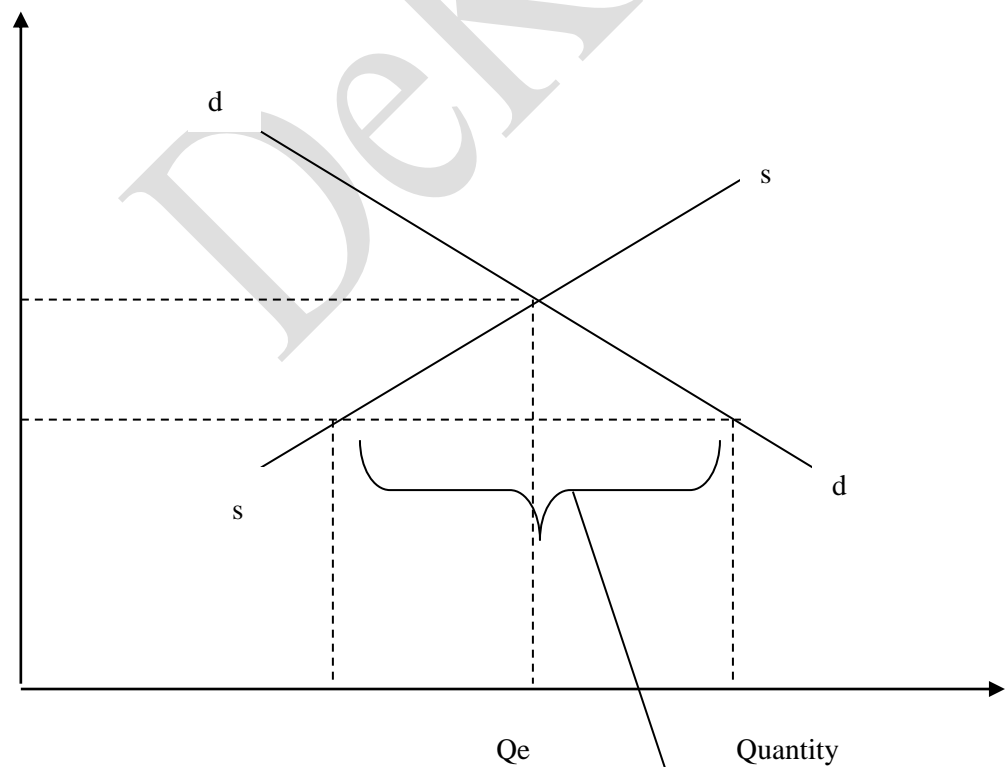
- vi) Price controls i.e. by setting maximum and minimum prices of commodities

PRICE CONTROLS

This refers to the government action of artificially imposing through legislation the price of a commodity to be charged. Such imposed prices are referred to as flat prices. A flat price can either be a maximum or a minimum price.

Maximum Price (price ceiling)

Refers to that action taken by the government to set a price above which a commodity can't be sold. A maximum price is usually set below the equilibrium price since the government feels that the price set by the forces of demand and supply is too high.



Where P_1 = maximum price

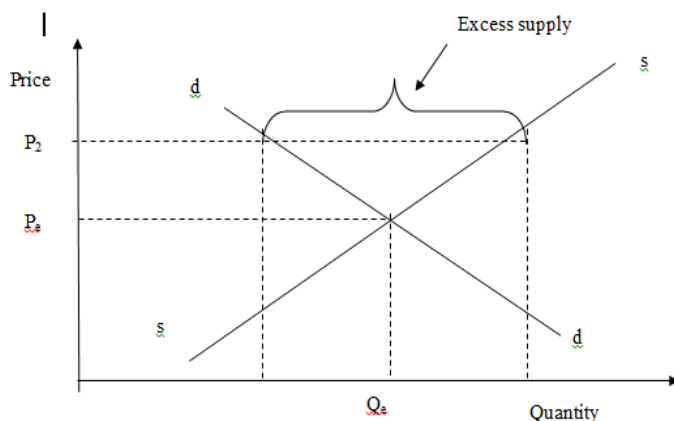
Excess demand

Effects of fixing a maximum price

- i) Creates an excess demand in the market
- ii) Causes shortages of a commodity since producers are not encouraged to produce.
- iii) Leads to rationing of commodities due to shortages
- iv) Leads to long queues of consumers buying the commodity
- v) Causes unemployment since some workers are laid off
- vi) Government revenue decreases since a low output is produced
- vii) Encourages smuggling and black-marketing
- viii) Research and development is encouraged since producers will try to move away from the price control industry.
- ix) Leads to cost-efficiency i.e. minimization of costs, so as to increase on profits as prices are already controlled.

x) Minimum Price (Price Floor)

- xi) Refers to that price set by the government below which a commodity can't be sold.
- xii) It's usually set above the equilibrium price since the government feel that the price set by the forces of demand and supply is too low.



Where P_2 = Minimum Price

Effects of fixing a minimum price

- i) Encourage production since producers sell at high prices
- ii) Causes excess supply in the market leading to wastage
- iii) Consumers are exploited since they are charged high prices
- iv) Producers are assured of a stable income
- v) In case of minimum wages, workers have an improved standard of living
- vi) Government revenue increases through taxes
- vii) Causes unemployment due to minimum wage legislation
- viii) Leads to creation of employment

NB

A maximum price is usually set to protect consumers while a minimum price is usually set to protect producers

Unit summary



Summary

In this unit you learned how equilibrium in market occurs. We have seen how market price and quantities are determined using market forces. We have also seen the situations under which government intervenes in pricing of goods and the effects of price controls

[Continue your body text here]

Assessment



Assessment

Question1

Given the following functions, calculate the equilibrium price and quantity

$$Q_{dt} = 70 - 4P_t + 6P_c$$

$$Q_{st} = -13 + 20P_t$$

$$Q_{dc} = 80 - 2P_t + 4P_c$$

$$Q_{sc} = -6 + 40P_c$$

Question 2

Given the following functions,

$$Q_a = -5 - 3p$$

$$Q_b = -22 + 10p$$

- i. Which of the above equations represent demand and supply curves? Give reasons
- ii. Determine the equilibrium market price and quantity.

Question3

Explain how government intervene in price fixing of goods

Question4

State the usefulness of price mechanism in an economy

Question5

What are the effects of fixing price floor

Unit 4

ELASTICITY

Introduction

This is the responsiveness of quantity demanded to changes in the determinants of demand.

The two are different ways of computing elasticity of demand.



Outcomes

Upon completion of this unit you will be able to:

- *Define* Elasticity.
- *Calculate* different kinds of elasticity of goods.
- *Explain* applications of elasticity.
- *[verb]* [complete the sentence].
- *[verb]* [complete the sentence].
- *[verb]* [complete the sentence].



Terminology

Elasticity:	[Term description]
Cross elasticity	[Term description]
Income elasticity:	[Term description]
Arc elasticity:	[Term description]
Point elasticity:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]

1.Point elasticity

Point elasticity is the proportionate change in quantity demanded resulting from a proportionate change in price at a **particular point**. Along the demand curve.

When calculating point elasticity, it is assumed that the slope of the demand function is known.

From the formula for elasticity,

$$\lambda_{pp} = \frac{\partial Q}{\partial p} \cdot \frac{p}{Q}$$

As noted earlier $\frac{\partial Q}{\partial p}$ is the reciprocal of the slope of the demand function.

Given a demand function $Q = b_0 - b_1 p$.

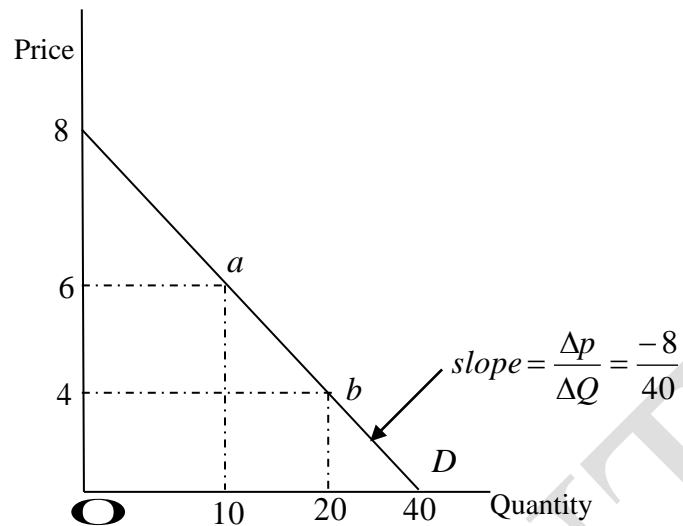
$\frac{\partial Q}{\partial p}$ is found by getting first derivative of Q with respect to p

Thus point of elasticity $\lambda_{pp} = -b_1 \cdot \frac{p}{Q}$

Example

Demand schedule

Price	Quantity
0	40
1	35
2	30
3	25
4	20
5	15
6	10
7	5



Find point elasticity of demand when

1. $p = 6$
2. when $p = 4$

$$E_{pp} = \frac{\partial Q}{\partial p} \cdot \frac{p}{Q} = -\frac{40}{8} \times \frac{6}{10} = -3$$

$$E_{pp} = -\frac{40}{8} \cdot \frac{4}{20} = -1$$

Notice price elasticity has been calculated for different points along the demand.

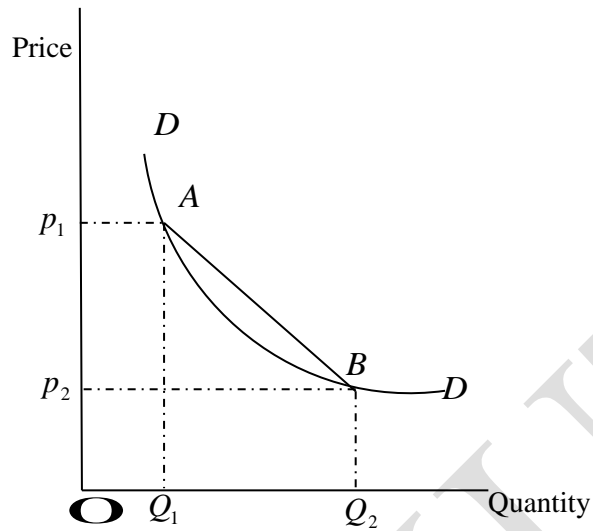
For convex slope $\frac{\partial p}{\partial Q}$ would vary at different points along the curve.

To get the slope of the curve we differentiate the equation (get $\frac{\partial p}{\partial Q}$)

$$\text{Point elasticity } e_{pp} = \frac{\partial Q}{\partial p} \cdot \frac{p}{Q}$$

Arc Elasticity

Arc elasticity is a measure of the average elasticity; i.e. the elasticity at the mid point of the chord that connects 2 points (A and B) along the demand curve defined by the initial and the new price levels.



Using example in above demand schedule.

Assume initial price $p_1 = 5$, which then increases to $p_2 = 6$

$$\begin{array}{cc} p_1 & Q_1 \\ 5 & 15 \end{array}$$

$$\begin{array}{cc} p_2 & Q_2 \\ 6 & 10 \end{array}$$

$$\Delta Q = Q_2 - Q_1 = 10 - 15 = -5$$

$$\Delta p = p_2 - p_1 = 6 - 5 = 1$$

$$p_1 + p_2 = 11$$

$$Q_1 + Q_2 = 25$$

$$\therefore E_p = \frac{-5}{1} \times \left(\frac{11}{25} \right) = -2\frac{1}{5}$$

DIFFERENT KINDS OF ELASTICITIES

1. PRICE ELASTICITY OF DEMAND (ED)

Price elasticity of demand (PED or E_d) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a one percent change in price (holding constant all the other determinants of demand, such as income). It was devised by Alfred Marshall.

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

$$E_P = \frac{\Delta Q}{Q} \div \frac{\Delta P}{P}$$

$$\text{So that } E_P = \frac{\partial Q}{\partial P} \cdot \frac{P}{Q}$$

Where

ΔQ is change in quantity demanded.

Q is original quantity demanded.

ΔP is change in price

P is original price

$$\text{So that } E_P = \frac{\partial Q}{\partial Y} \cdot \frac{Y}{Q}$$

Where

ΔQ is change in quantity demanded.

Q is original quantity demanded.

ΔY is change in income

Y is original income.

We can apply this in

- a) Example 1: Suppose the price of a commodity increases from Sh. 10 to Ksh 30 quantity demanded decreases from 100 units to 60 units. Calculate the Ed

Answer

$$(60-100)/100 \div (30-10)/10 = (40/100) \div (20/10) = -0.2 \text{ (normal good)}$$

NB: When you calculate ED and you get a negative answer, it means you have a normal good.

- b) Example 2: Price of a commodity increases from Ksh 80 to Ksh 100 quantity demanded increases from 20 units to 30 units calculate ED.

SOLN

$$(30-20)/20 \div (100-80)/80 = 10/20 \div 20/80 = 2 \text{ (abnormal good)}$$

- If the price elasticity of demand is greater than zero and less than 1, it is said to be inelastic ($0 < E < 1$).
- If the price elasticity of demand is greater than 1, it is said to be elastic ($1 < E$)
- If the elasticity of demand is equal to 1, it is said to be unitary ($E=1$)
- If the elasticity of demand is equal to zero, it is said to be perfectly inelastic ($E=0$).
- If the elasticity of demand is infinite /undefined, it is said to be perfectly elastic ($e=\infty$).

$E_d > 1$ Elastic; $E_d = 1$ Unitary; $E_d = 0$ Perfectly inelastic; $E_d = \infty$ Perfectly elastic

Numerical example

$$Q_d Y = 5000 - 0.5p_Y - 2.3p_W + 0.2p_X + 0.000001p_Z + 0.0037I$$

Compute different price elasticity and state the relationships between the commodities Y, W, X and Z.

Solution

Take first derivative of commodity Y with respect to all other products.

$$\frac{\partial Q_Y}{\partial p_W} = -0.3$$

$$\frac{\partial Q_Y}{\partial p_Z} = 0.000001$$

$$\frac{\partial Q_Y}{\partial p_X} = 0.2$$

We know with certainty that the ratios $\frac{p_W}{Q_Y}$, $\frac{p_X}{Q_Y}$ and $\frac{p_Z}{Q_Y}$ are all positive.

$$E_{Y,W} = \frac{\partial Q_Y}{\partial p_W} \cdot \frac{p_W}{Q_Y} = -0.3 \frac{p_W}{Q_Y}$$

From this example it is clear that good y and w are complementary goods since $E_{y,w}$ is negative.

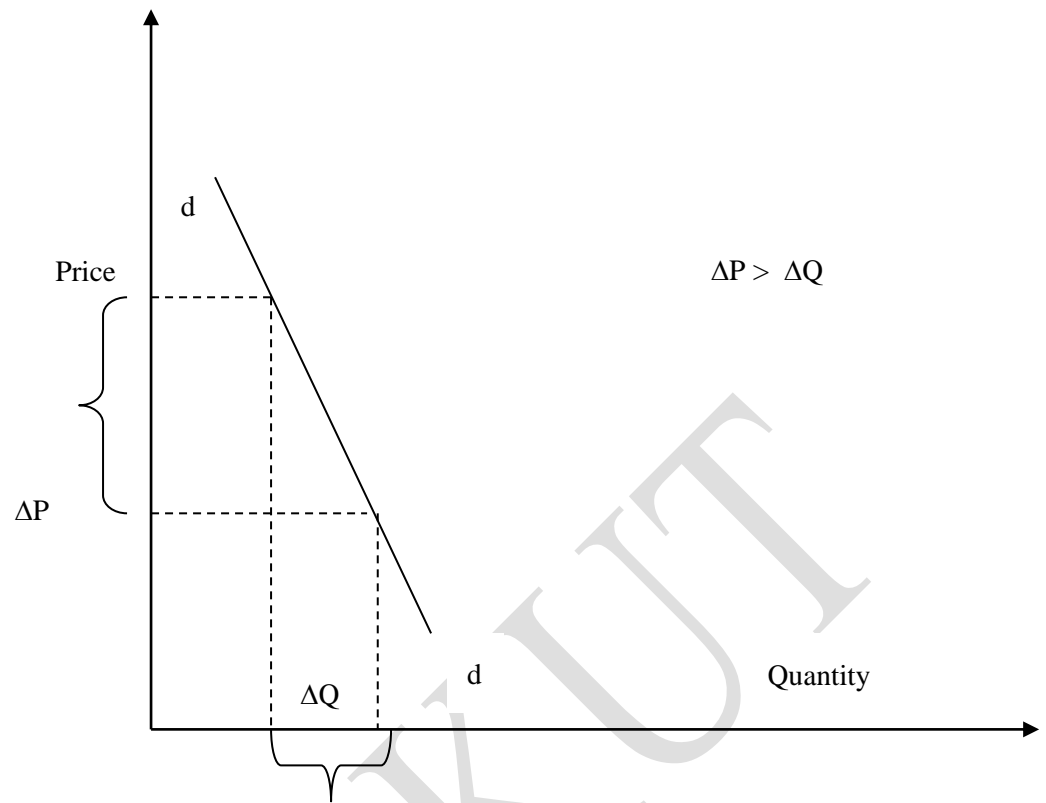
$$E_{Y,X} = \frac{\partial Q_Y}{\partial p_X} \cdot \frac{p_X}{Q_Y} = 0.2 \frac{p_X}{Q_Y}$$

$E_{y,x}$, is positive implying that x and y are substitutes.

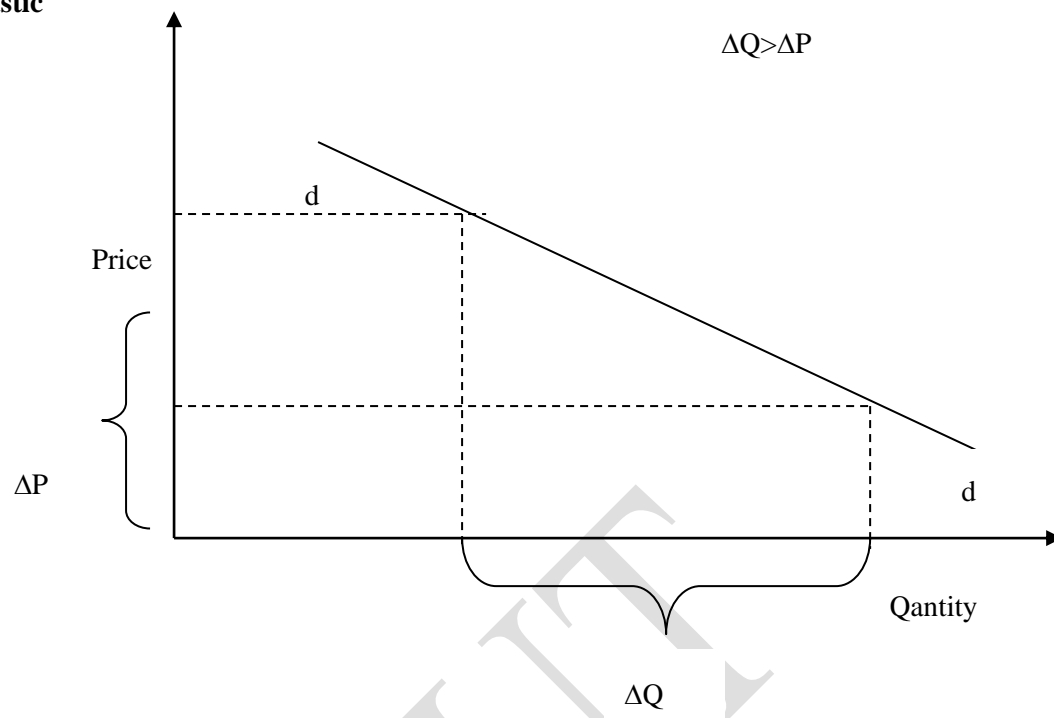
Good z and y are independent and are not related to each other.

Graphical representation of price elasticity

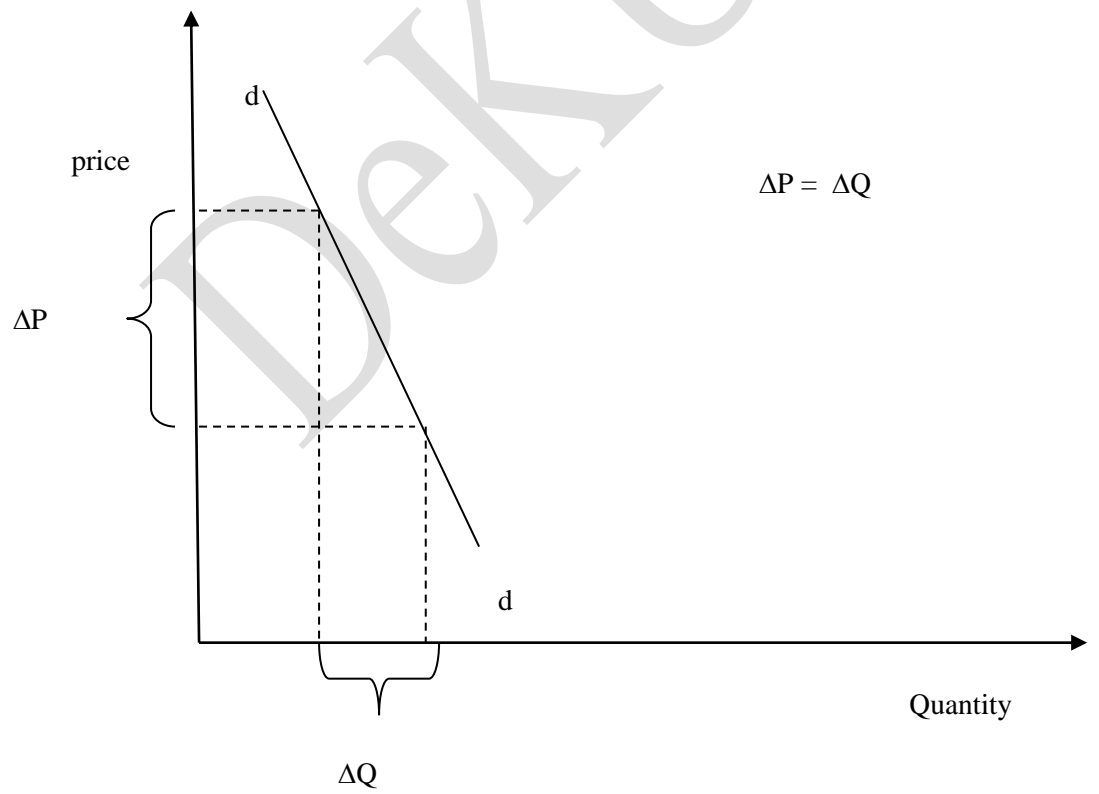
- Inelastic



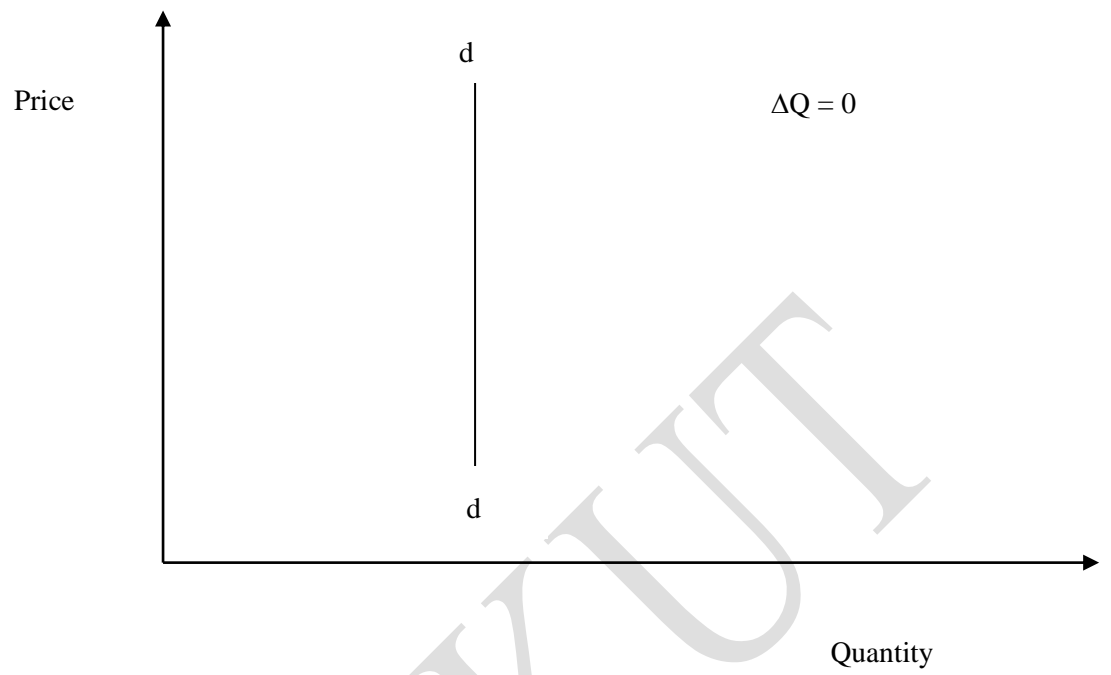
Elastic



Unitary



Perfectly elastic



Perfectly elastic



2. INCOME ELASTICITY OF DEMAND (E_Y)

This is responsiveness of quantity demanded to changes in income

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

$$E_Y = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta Y}{Y}} = \frac{\Delta Q}{Q} \div \frac{\Delta Y}{Y}$$

$$\text{So that } E_Y = \frac{\partial Q}{\partial Y} \cdot \frac{Y}{Q}$$

Where

ΔQ is change in quantity demanded.

Q is original quantity demanded.

ΔY is change in income

Y is original income.

Arc income elasticity of demand can be calculated as:

$$E_Y = \frac{\partial Q}{\partial Y} \cdot \frac{(Y_1 + Y_2)}{(Q_1 + Q_2)}$$

- Income elasticity of demand for most commodities is positive, indicating higher purchases at higher income. Income elasticity for a few commodities is known as inferior goods.
- Degree of income elasticity varies in accordance with the nature of commodities consumers consume in general. Where the commodity is a basic necessity, the demand is not very responsive to change in income. Basic necessities like food are usually bought in fairly constant amount and on regular basis. In this case $E_Y < 1$
- However, in the case of luxuries, the demand is very responsive to change in income. Sales of such goods increase rapidly with increase in income. In this case $E_Y > 1$

Worked Example 1

Income increases by 10% quantity demanded increases by 20%. Calculate income elasticity of demand.

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

$$= 20/10 = 2$$

NB

Whenever you calculate E_y and you get a positive answer; it's a normal good. If the answer is negative, it's an abnormal good.

Example 2

Income increases from Ksh 500 to Ksh 1000. Quantity demanded increases from 100 units to 200 units. Calculate E_y

SOLN

$$(1000-500)/500 \div (200-100)/100 = 500/500 \div 100/100 = 1$$

3.CROSS ELASTICITY OF DEMAND (E_c)

Refers to responsiveness of quantity demanded of commodity A to changes in price of a related commodity B.

$$E_c = \frac{\% \text{ change in quantity demanded of commodity A}}{\% \text{ change in price of commodity B}}$$

$$= \frac{\Delta Q_A}{Q_A} \div \frac{\Delta P_B}{P_B}$$

Example 3

Price of coffee increases from Ksh 16 to Ksh. 20. Quantity demanded of tea increases from 100 units to 120 units. Calculate E_c

$$(120-100)/100 \div (20-16)/16 = 20/100 \div 4/16 = 0.8 \text{ (Substitute good)}$$

NB: Whenever E_c = positive answer then the commodities are substitute goods, and when E_c = negative answer the goods are complimentary goods

Example 4

Price of petrol increases from Ksh 40 to Ksh 50 per liter. Quantity demand of cars decreases from 2000 units to 1000 units. Calculate E_c

$$E_c = \frac{\frac{\Delta Q_A}{A}}{\frac{\Delta P_B}{PB}}$$

$$= (1000-2000)/2000 \div (50-40)/40 = 1000/2000 * 40/10 = -2 \text{ (Complementary goods)}$$

FACTORS INFLUENCING ELASTICITY

1. **Price changes.** Changes in price influence demand
2. **Time in the short run.** A change in price has little influence on demand. This is because it may be sometime before all consumers become aware of the change in price or it may be thought that, in the case of a fall in price, this may be merely the first stage in a more prolonged fall in price. With durable goods, a decrease in price may be slow to take effect since consumers may be reluctant to replace such goods if they are still in good condition.
3. **Possibility of substitution.** The closer the substitute for a commodity, the more likely is the demand for it to be elastic.
4. **Degree of necessity.** The greater the degree for necessity, the more likely is the demand for a commodity to be inelastic.
5. **Size of the consumer's income.** The poorer a person is the more elastic is likely to be his demand for most things.
6. **Habit.** Consumer's purchases are to some extent determined by habit; with the effect that for small changes in price, their demand is fairly inelastic.

IMPORTANCE OF ELASTICITY IN ECONOMIC DECISION MAKING

1. **Government tax policy:** To be certain of raising the desired tax revenue, the government taxes more those commodities whose demand is inelastic and less those whose demand is elastic.
2. **Entrepreneurs' decision making:** For those commodities with elastic demand, an entrepreneur would make more prices by lowering prices. However, he can increase price for those commodities with inelastic demand since consumer will always buy them.
3. **Profit maximization by a monopolist:** Since monopolist is a price maker, he can maximize profits by charging high prices those

commodities with inelastic demand and low prices for those commodities with elastic demand.

4. **International trade:** Price elasticity of demand may be used to encourage exports and discourage import through devaluation. Devaluation- cheapens a country's currency relative to other currencies. This is done by the government.
5. **Consumption:** Elasticity of demand may be used to encourage or discourage the consumption of a commodity e.g. the government may encourage consumption by reducing taxes and discourage consumption by increasing taxes.
6. **Production:** Elasticity of demand may be used to encourage or discourage the production of a given commodity.
7. **Consumer:** The consumer may use the concept of elasticity of demand to gauge when it's more economical for them to obtain a commodity. E.g. for fashionable goods whose demand is inelastic, the consumer may opt to obtain the good when it's still not in fashion as prices will be lower. Thus he/she is able to make a more economical decision.

ELASTICITY OF SUPPLY

This is the responsiveness of quantities supplied to changes in the determinants of supply.

Price elasticity of supply (E_s)

This is the responsiveness of quantities supplied to changes in price.

$$E_s = \frac{\% \text{ change in quantity supplied}}{\% \text{ change in price}}$$

$$= \frac{\Delta QS}{QS} \div \frac{\Delta P}{P}$$

Elasticity of supply may be

- a) Elastic
- b) Inelastic
- c) Unitary
- d) Perfectly elastic
- e) Perfectly inelastic

FACTORS INFLUENCING ELASTICITY OF SUPPLY

- i) The length of the production period. When firms are able to convert raw materials into finished goods for sale in a production period of just a few

- hours or days supply will usually be more elastic than when a longer period of production is involved.
- ii) The existence of spare capacity. If a firm possesses spare capacity and if labour and raw materials are readily available, then it's usually possible to increase production quickly in the short run.
 - iii) The ease of accumulating stocks. If unsold stock can be sold at low costs, firms will be able to meet any sudden increases in demand. Supply will tend to be elastic when firms can quickly increase production by drawing on their stocks (e.g. of raw materials or finished goods).
 - iv) Ease of factor substitution. Supply will tend to be relatively elastic if firms can use different combinations of the factor of production to produce a particular level of output. However, supply will be less elastic (inelastic) when technical consideration requires that the factors of production are employed in a fixed ratio.
 - v) The number of firms in the market (Degree of competition). Generally, the greater the number of firms (the higher the degree of competition) the more elastic is the supply.
 - vi) Time (a) Short-run period in the short run supply is completely inelastic
 - Medium – term period supply tends to be elastic
 - Long-run period supply is more elastic because in the long-run, the firm can vary all its factors of production.
 - vii) Price. When prices are high supply tends to be elastic. On the other hand, supply tends to be inelastic at low prices.

Unit summary



Summary

In this unit you learned the point and arc elasticity. You have also covered the own price, income and cross elasticity and their calculations. Finally you have looked at the usefulness of elasticity in real life situation

[Continue your body text here]

Assignment



Assignment

Discuss using an example for each the arc and point elasticity

[Continue your body text here]

Assessment



Assessment

ASSIGNMENT

Given

$$Q_D Y = 5000 - 0.5p_Y - 2.3p_W + 0.2p_X + 0.000001p_Z + 0.0037I$$

And that

$$p_Y = 30,000 \quad Q_Y = 15,000 \quad \text{income}(I) = 60,000$$

Compute

1. price elasticity of demand
2. Income elasticity of demand
3. Interpret your results
4. From income elasticity of demand, what type of product would y be (luxury or necessity good)?

[Continue your body text here]

Unit 5

THE THEORY OF CONSUMER BEHAVIOUR

Introduction

The theory of consumer behaviour assures that:-

- (i) Customers are rational and their objectives are to maximize satisfaction or utility derived from various baskets of goods, given their income and market prices of the various goods.
- (ii) Consumers have full knowledge of all the available commodities in the market, their prices and their income.

In order to attain his utility maximization objective, the consumer must be able to compare the utility (satisfaction) of the various baskets of goods which he can buy with his income.

There are two basic approaches to the study of the consumer behaviour, namely **cardinalist approach**, and the **ordinalist approach**.

Utility is the ability of a commodity to satisfy a human want.

There are 3 main approaches to utility

- a) Cardinal utility
- b) Ordinal utility
- c) Revealed preference theory

Upon completion of this unit you will be able to:



Outcomes

- *Explain* the three theories of consumer behaviour
- *Elaborate* the shortcomings of cardinal theory.
- *Discuss* the ordinal theory of consumer behaviour.
- *Discuss* the application of indifference curve analysis.
- *[verb]* [complete the sentence].



Cardinal: [Term description]

Ordinal: [Term description]

Terminology

Revealed Preference:	[Term description]
Indifference curve :	[Term description]
Axioms:	[Term description]
Utility :	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]

Cardinal utility

Cardinal approach could also be referred to as utility approach. The **cardinalist** argue that utility can be measured. Some economists have suggested that where perfect knowledge of market condition and income level exist, utility can be measured in monetary units, by the amount of money the consumer is willing to pay (sacrifice) for another unit of a commodity. Others suggested the measurement of utility in subjective units called **utils**. (Subjective – depending on personal judgment/ imagination)

Concept of utility

Utility can be defined as satisfaction a consumer gets from consuming various goods and services. Utility here is assumed to be quantifiable (measurable)

It is very important to distinguish between total utility and marginal utility.

Total utility:- refers to the entire amount of satisfaction a consumer receives from consuming various goods. Given that consumers consume different types of goods, say $x_1 \dots x_n$, total utility is.

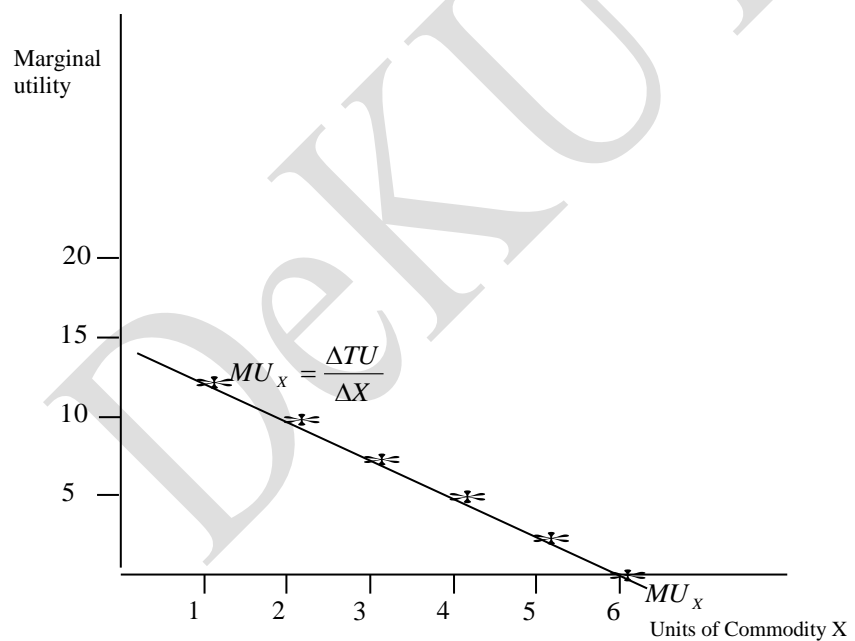
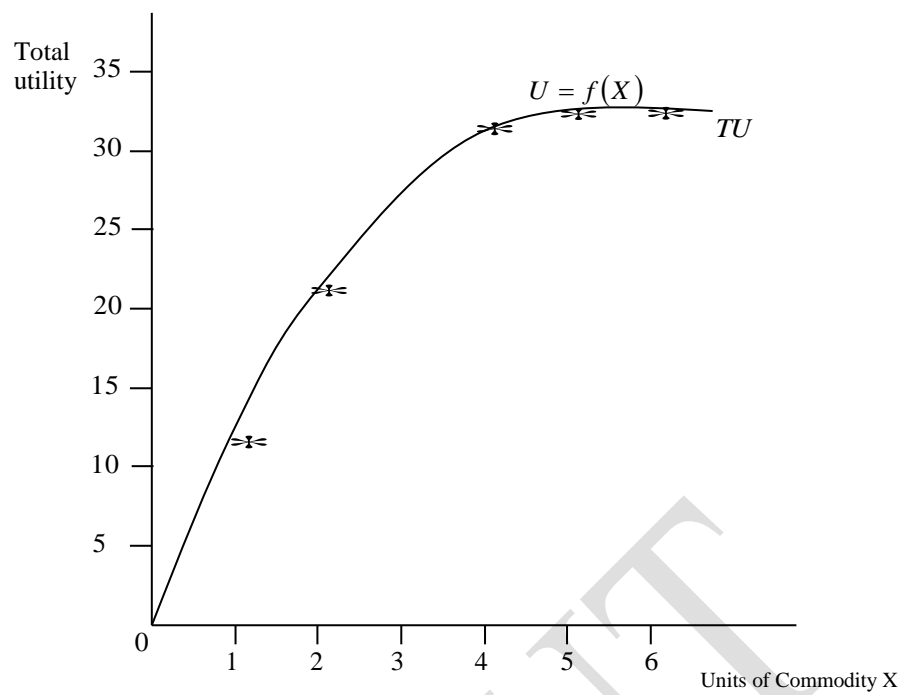
$$U = f(x_1, x_2, x_3, \dots, x_n)$$

The more of an item a consumer consumes per unit of time, the greater will be the total utility up to a certain point. When this point is reached, the commodity will no longer give the consumer any utility. Such a point is known as saturation point.

Quantity	Utility	Marginal utility
----------	---------	------------------

0	0	-
1	4	4
2	7	3
3	9	2
4	10	1
5	10	0
6	10	0
7	10	0

DEKUT



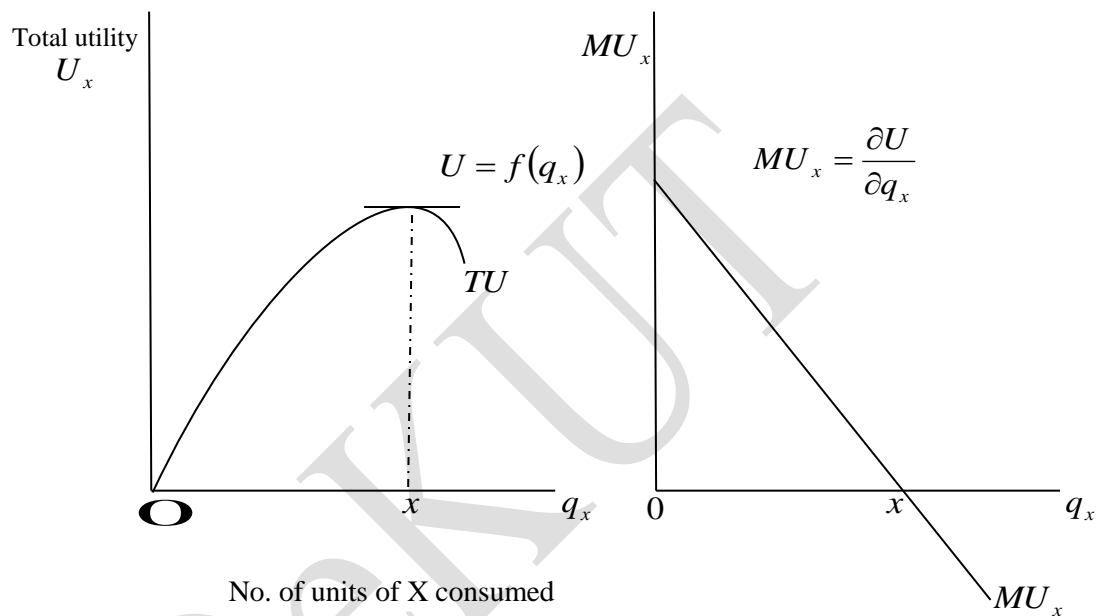
Marginal utility

This is defined as the extra utility derived from the consumption of an extra unit of the commodity, the consumption of all other commodities remaining constant.

$$\text{Marginal utility} = \frac{\text{Change in Total Utility}}{\text{Change in Output}}$$

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

The following two figures show total utility and marginal utility curve, representative



To be able to draw the two diagrams we have assumed that total utility is derived from commodity x.

From fig. (a), total utility increased but at a decreasing rate, up to a quantity x, and then start decline.

From fig. (b), the marginal utility of commodity x may be depicted by a line with a negative slope. Marginal utility of x declines continuously and become zero at quantity x, and become negative beyond quantity x.

The law of diminishing utility

This law states that; “As more and more units of a commodity are consumed, total utility increases but at diminishing marginal utility or “As more and more units of a commodity are consumer marginal utility eventually diminishes.

Alternatively, the law says, that the marginal utility of each (homogenous) unit decreases as the supply of units increases

ASSUMPTIONS (AXIOM) MADE UNDER CARDINAL APPROACH

Axiom- statement that is accepted as true without further proof or argument

1. **Rationality:-** the consumer is rational and aims at maximizing his utility subject to the constraint imposed by his income level.
2. **Cardinal utility:-** utility of each commodity is measurable conveniently in monetary units by the amount of money the consumer is willing to pay for extra unit of commodity.
3. **Constant marginal utility of money:-** this assumption is necessary if the monetary unit is used as the measure of utility. The essential features of a standard unit of measurement are that it be constant. If marginal utility of money changes as income increases (or decreases) the measuring-rod for utility becomes inappropriate for measurement.
4. **Diminishing marginal utility:-** this means that utility gained from larger/additional quantities of a commodity declines.
5. Total utility depends on the quantities of the individual commodities (x_1, x_2, \dots, x_n) that make up the basket of goods. Hence, total utility $(U = f(x_1, x_2, \dots, x_n))$

Derivation of the equilibrium condition for the consumer

- Consumer is said to be at equilibrium when he maximizes his utility.
- To derive the condition for utility maximization we start by considering a simple model of a single commodity x.

$$U = f(q_x) \quad \text{Here } q_x \text{ means quantity of x.}$$

- The consumer can either buy x or retain his money Y.
- If the consumer buys q_x , his expenditure will be $p_x \cdot q_x$
- Since utility is measured in monetary units, the consumer seeks to maximize the difference between his utility (U) and expenditure $(p_x \cdot q_x)$

$$\text{i.e. } U - p_x \cdot q_x$$

- The necessary condition for a maximum is that the partial derivative of the function with respect to q_x be equal to zero.

$$\text{Thus } \frac{\partial U}{\partial q_x} - \frac{\partial(p_x \cdot q_x)}{\partial q_x} = 0$$

Simplifying we obtain

$$\frac{\partial U}{\partial q_x} = p_x \text{ or } MU_x = p_x \dots\dots\dots (i)$$

- Equation (i) defines the equilibrium condition for the consumer and it states that the marginal utility of x is equated to market price of x.
- Thus, if $MU > p_x$, the consumer can increase his welfare by purchasing more units of x. notice, owing to law of diminishing marginal utility, as he consumes more of x, $MU_x < p_x$, the consumer can increase his total satisfaction by reducing quantity of x purchased, hence keeping more income unspent.
- If there are more commodities (x, y, \dots, n) , the condition for the equilibrium is the equality of the ratios of the marginal utilities of the individual commodities to their prices.

$$\text{i.e. } \frac{MU_x}{p_x} = \frac{MU_y}{p_y} = \frac{MU_n}{p_n} = \lambda$$

λ represents marginal utility of money expenditure.

- In the above expression it can be observed that; utility derived from spending an additional unit of money must be the same for all commodities in the market.

Illustration

Question: determine the equilibrium quantities of commodities x and z for a consumer whose total utility (U) and other relevant variables are given below;

$$U = 20x - 4z^2 + 40z - x^2$$

Income level $Y = Ksh.48$

Price of $x(p_x) = ksh.2$

Price of $z(p_z) = ksh.4$

Be sure to obtain the maximum utility level.

Solution

Step 1: at equilibrium (utility maximization point)

$$\frac{MU_x}{p_x} = \frac{MU_z}{p_z} \dots\dots\dots(1)$$

$$\text{Step 2: } MU_x \frac{\partial U}{\partial x} = 20 - 2x = 0 \dots\dots\dots(2)$$

$$MU_z = \frac{\partial U}{\partial z} = 40 - 8z = 0 \dots\dots\dots(3)$$

$$\text{Step 3: } \frac{MU_x}{p_x} = \frac{MU_z}{p_z} \Rightarrow \frac{20 - 2x}{2} = \frac{40 - 8z}{4}$$

$$10 - x = 10 - 2z$$

$$\text{Hence } x = 2z \dots\dots\dots(4)$$

Step 4: but: if consumer buys q_z and q_x units of z and x, his expenditure would be:

$$Y = p_x \cdot q_x + p_z q_z$$

$$48 = 2x + 4z \dots\dots\dots(5)$$

Step 5: substituting equation (4) into 5 we obtain:

$$48 = 2(2z) + 4z$$

$$48 = 8z$$

$$\bar{z} = 6 \text{ units}$$

Step 6: substituting $\bar{z} = 6 \text{ units}$ in equation (4) to obtain.

$$\bar{x} = 2(6) = 12 \text{ units}$$

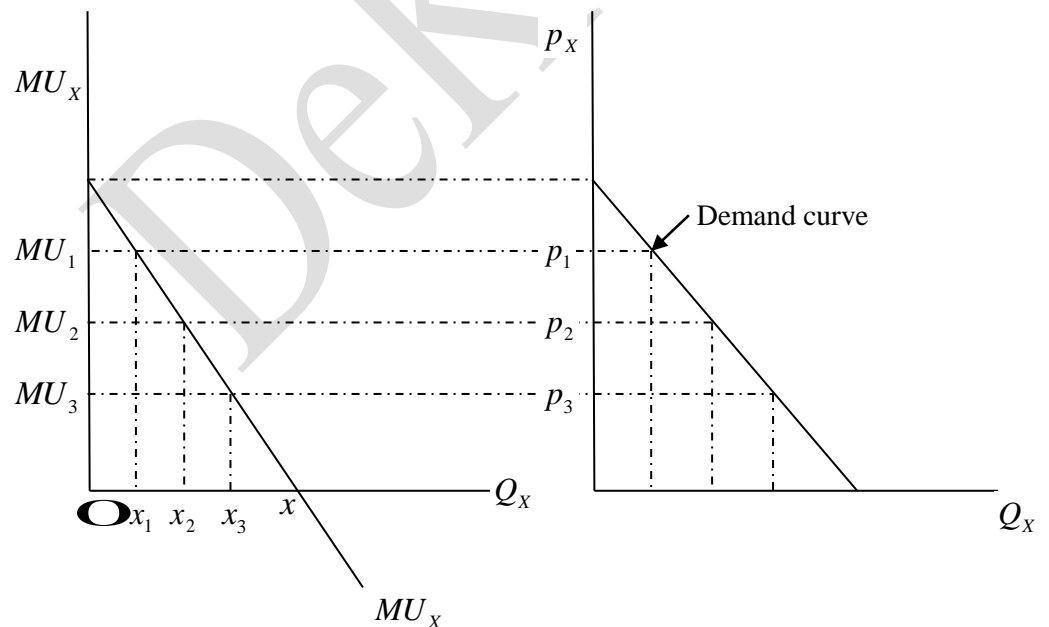
Therefore equilibrium quantities are

$$\bar{z} = 6 \text{ units and } \bar{x} = 12 \text{ units}$$

DERIVATION OF THE DEMAND CURVE FOR THE CONSUMER

The derivation of demand is based on the axiom of diminishing marginal utility.

In our earlier discussion we saw that marginal utility of say commodity x may be depicted by a line with a negative slope.



- Fig a
- Fig b
- From Fig a, marginal utility of x declines continuously and becomes negative beyond quantity x.
- If the marginal utility is measured in monetary units, the demand curve for x is identical to the positive segment of the marginal utility curve.

- At equilibrium, $MU_x = p_x$
- Hence, at x_1 , MU is MU_1 . This is equal to p_1 in diagram (b)
- Similarly, at $x_2, MU_2 = p_2$ and so on.
 $x_3, MU_3 = p_3$
- Hence at p_1 the consumers demand x_1 quantity

At p_2 - x_2

At p_3 - x_3

- Thus, diagram b gives the demand curve for consumer, and it is defined by the positive segment of the marginal utility curve in figure a.
- The negative section of the MU curve does not form part of the demand curve, since negative quantities do not make sense in economics.

Limitations of the Cardinalists approach to utility

- It's difficult to make interpersonal comparison of utility
- The actual measurement of utility requires a control experiment and such an experiment is impossible to carry out in practice
- It assumes the constant utility of money which is unrealistic because marginal utility of money increases with income
- It assumes homogeneity of goods
- It assumes that consumers are rational beings

ORDINAL UTILITY (INDIFFERENCE CURVE ANALYSIS)

1. **Rationality:-** consumer is assumed to be a utility maximizer, given his income and market prices. So, he will choose a combination of goods that maximize his utility.
2. **Utility of ordinal:-** the consumer is able to rank his preference (order the various baskets of goods) according to the satisfaction of each basket. Therefore the consumer need not measure utility to make his choices.
3. **Consistency of choice:-** it is assumed that the consumer is consistent in his choice, that is, if in one period he prefers bundle A to B, he will not choose B over A in another period. If both bundles are available to him. The consistency assumption may be symbolically written as follows:
4. **Transitivity of choice:-** if bundle A is preferred to B, and B is preferred to C, then bundle A, is preferred to C.

That is if $A > B$ and $B > C$ then $A > C$

5. **Installation axiom (not getting satisfied):-** consumer will prefer a combination of goods that has more units than that with less units. For example. The consumer will prefer combination C because it has the highest number of oranges and mangoes

6. Total utility for the consumer depends on the quantity of the commodities consumed.

$$\text{i.e. } U = f(q_1, q_2, \dots, q_x, q_y, q_n)$$

7. **Diminishing marginal rate of substitution:-**

Marginal rate of substitution refers to the slope of indifference curve. it measures how much of say good x, must a consumer give up in order to consume an additional unit of good y, holding utility constant (while still achieving the same level of satisfaction) as shall be seen in the discussion

combination	orange	Mangoes
A	10	6
B	11	6
C	12	7

combination	orange	Mangoes
A	10	6
B	11	6
C	12	7

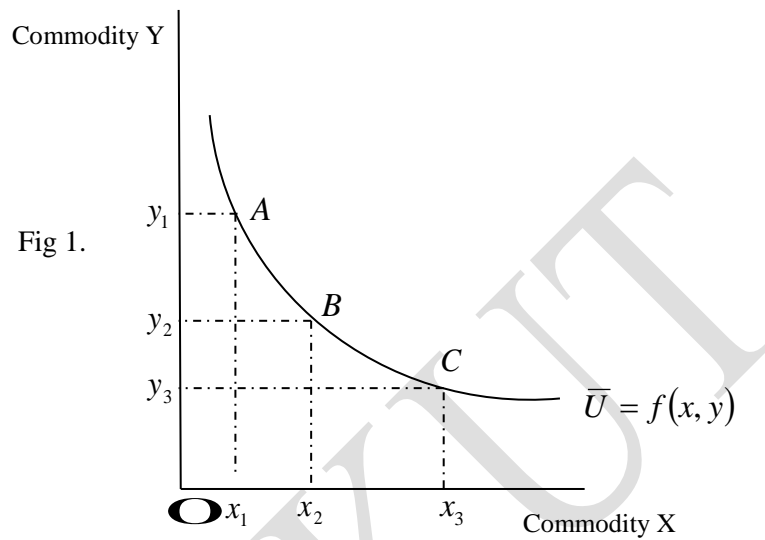
that follows, indifference curves are assumed to be **convex** to the origin, implying that their slopes decreases (in absolute terms) as we move along the curves from the left downwards to the right. Diminishing MRS simply means that, it becomes increasingly difficult to substitute x for y as we move along the indifference curve.

Indifference curve

Indifference curve

An indifference curve can be defined as a curve that joins combinations of two

commodities which yield the same level of satisfaction (utility) to the consumer.



Along the indifference curve utility is constant (\bar{U}) whether he consumes at point A, B, or C, so consumer is indifference about the different combinations.

Indifference map

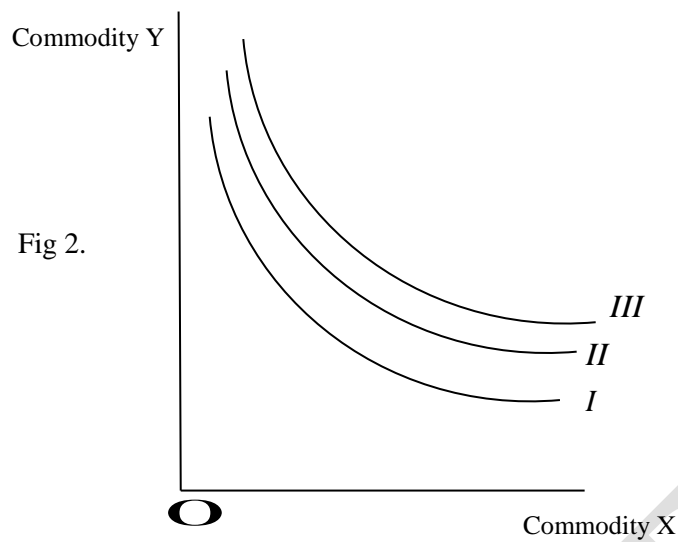
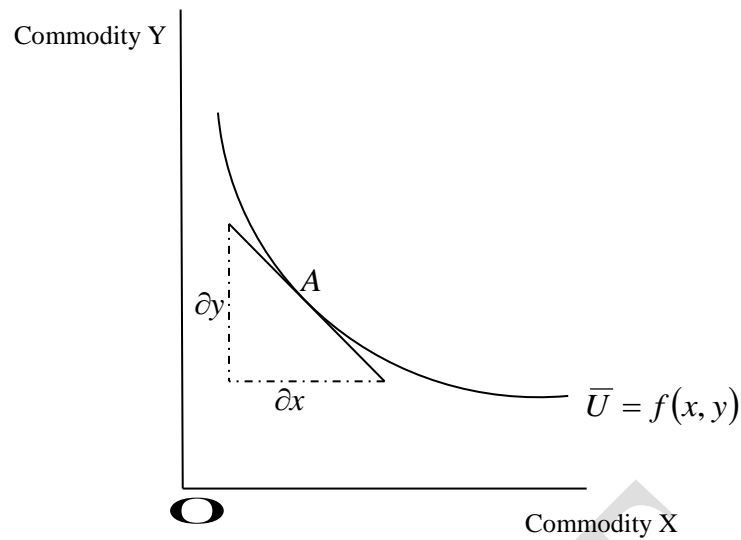


Fig 2.

- An indifference map shows all the indifference curves which rank the preference of the consumer.
- Combinations of goods lying on a higher indifference curve (as III) yields higher level of satisfaction and are preferred to those on lower indifference curves (as I) which yield lower utility.
- In figure I it can be observed that the consumer must give up consuming some units of y if he must consume more units of x, while still realizing same utility level. That is, if he is at point A where he is consuming y_1 units of y and x_1 units of x, to consume x_3 , he will reduce the consumption of y to y_3 (by $y_1 y_3$)
- However, the indifference curve is assumed to be convex to the origin. This is a clear indication that, although commodities y and x could be substituted for each other, but this would only be to contain extent. Good x and y are not perfect substitutes.
- **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.
- It is given by the negative of the slope of an indifference curve at any point along the indifference curve.



- Slope of indifference curve at point A is given by the slope of the tangent at point A.
 - Therefore slope = $\frac{\partial Y}{\partial x}$
 - The value of $\frac{\partial Y}{\partial x}$ is negative.
 - Therefore, the absolute value of the slope of indifference curve is the $MRS_{x,y}$.
- To get absolute value, multiply $\frac{\partial Y}{\partial x}$ by (-1)
- Therefore $\left| \text{slope of indifference curve} \right| = -\frac{\partial Y}{\partial x} = MRS_{x,y}$
 - Implicit in the definition of MRS is the concept of marginal utility and it can be proved that,

$$\frac{\partial y}{\partial x} = MRS_{x,y} = \frac{MU_x}{MU_y} \text{ or } -\frac{\partial x}{\partial y} = MRS_{y,x} = \frac{MU_y}{MU_x}$$

Proof

- total utility function in the case of two commodities x and y is

$$U = f(x, y)$$

- the equation of an indifference curve is

$$U = f(x, y) = k(\text{constant no change})$$

- take total differential of the utility function to obtain

$$\begin{aligned}\partial U &= \frac{\partial U}{\partial y} \cdot \partial y + \frac{\partial U}{\partial x} \cdot \partial x \\ &= MU_y \cdot \partial y + MU_x \partial x\end{aligned}$$

- This can be read that total change in utility caused by change in y and x is approximately equal to the change in y multiplied by its marginal utility, plus the change in x multiplied by its marginal utility.
- Recall that along any particular indifference curve utility does not change whether you consume at point A, B or C as in our former case.
- Hence total differential is by definition equal to zero.

$$\text{Hence } \partial u = (MU_y) \partial y + (MU_x) \partial x = 0$$

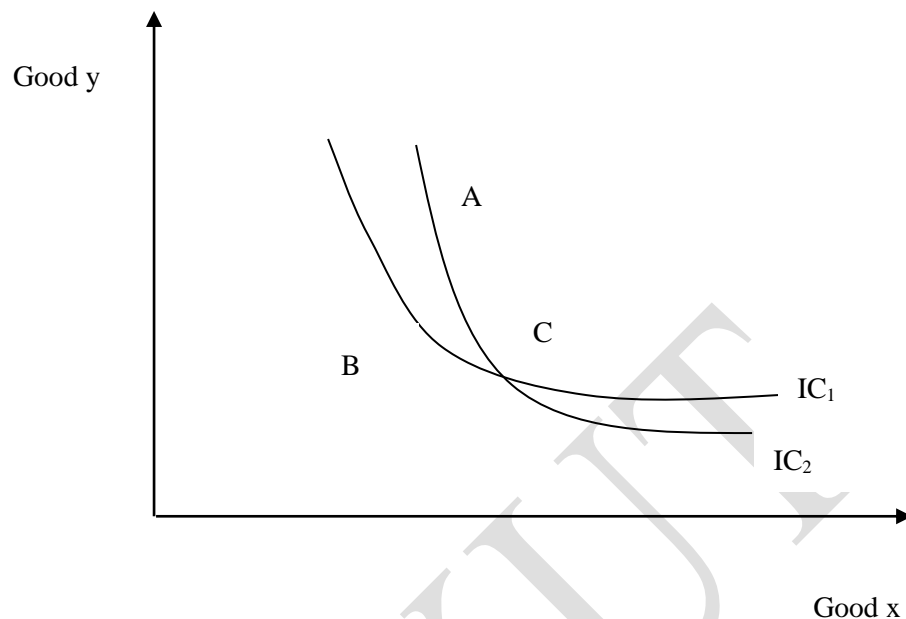
Rearrange to obtain

$$\begin{aligned}-MU_y \partial y &= MU_x \partial x \\ \frac{-\partial y}{\partial x} &= \frac{MU_x}{MU_y} = MRS_{x,y}\end{aligned}$$

$$\text{Or } \frac{-\partial x}{\partial y} = \frac{MU_y}{MU_x} = MRS_{y,x}$$

Properties of Indifference Curves

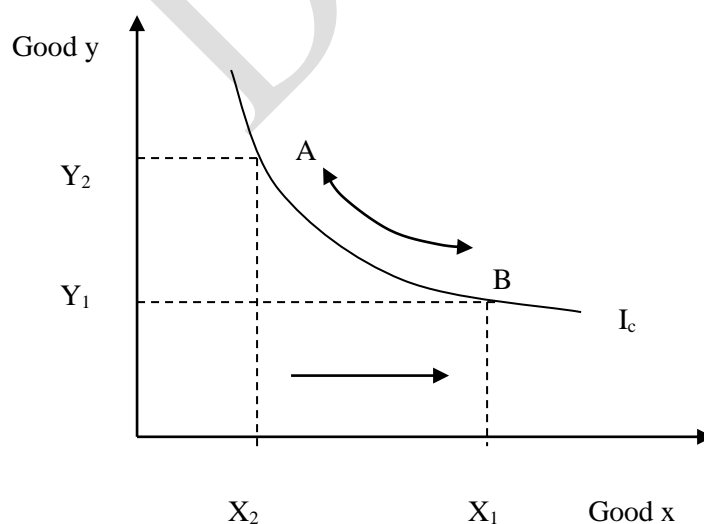
1. They are non-intersecting



The individual is indifferent between combination A and C and should thus also be indifferent between combinations A and B. However, this would be irrational since A contains more units of Y but the same units of X as B. We conclude that to be consistent with rationality the indifference curves can't intersect.

2.

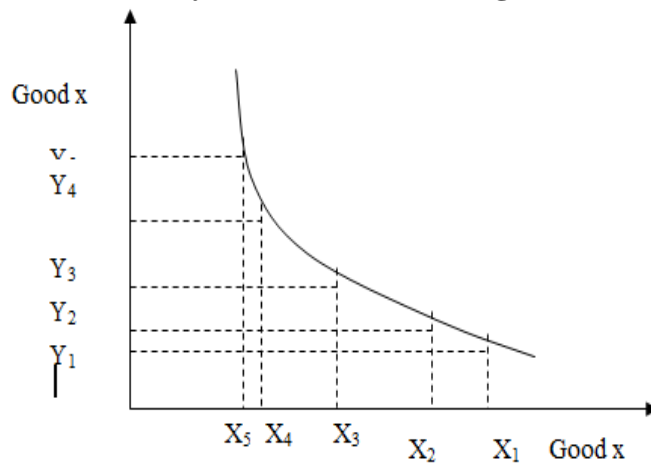
Indifference curves slope downwards from left to right (downward sloping)



For utility to remain unchanged as units of Y are given up, additional units of X must be consumed as shown by the movement from A to B where the

consumer reduces the units of Y from Y_2 to Y_1 and increases the units of x from X_2 to X_1 .

3. They are convex to the origin

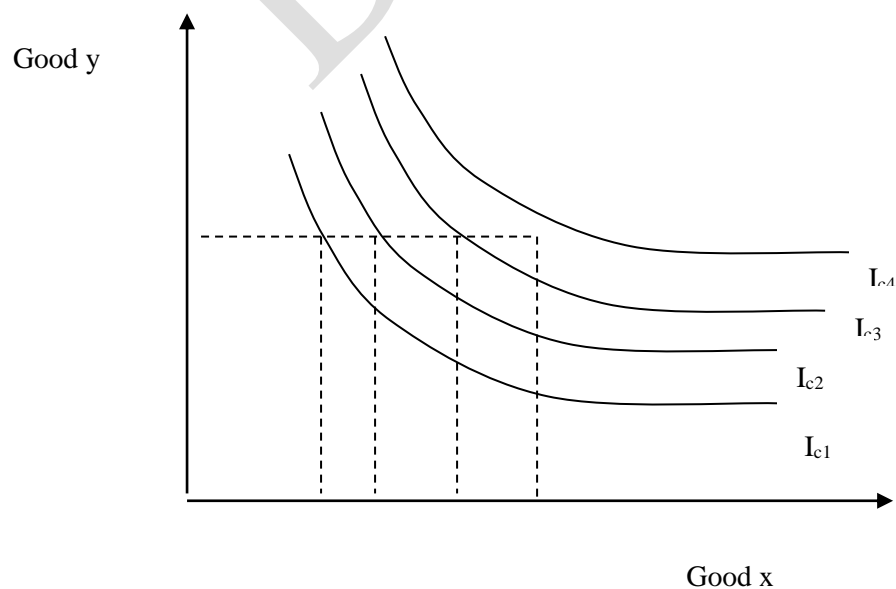


As more and more units of Y are given u, successively bigger quantities of X must be obtained to compensate the consumers for this loss.

The convexity of the indifference curve is due to the diminishing marginal rate of substitution (DMRS)

The higher the indifference curve the higher the satisfaction/utility

The higher the indifference curve the higher the satisfaction/utility



Indifference curve 4 derives the consumer the highest amount of satisfaction while I_{C1} , derives the consumer the lowest amount of satisfaction.

THE BUDGET CONSTARINT (LINE) OF THE CONSUMER

- A budget line can be defined as a line that joins all combinations of two commodities a consumer can buy using his entire income.
- It is assumed that consumers' income is fixed, say at I , and he tries to allocate this income between two commodities x and y .
- How many of the two commodities to consume would depend on the prices of each.
- Assume price of commodity x is p_x and of commodity y is p_y .
- If q_x units of commodity x is consumed and q_y units of commodity y .
- The income constraint, in the case of two commodities, may be written.

$$I = p_x q_x + p_y q_y \dots \dots \dots (1)$$

- This can be presented graphically by the budget line whose equation is derived from equation (1) by solving for q_y

$$q_y = \frac{1}{p_y} I - \frac{p_x}{p_y} q_x \dots \dots \dots (2)$$

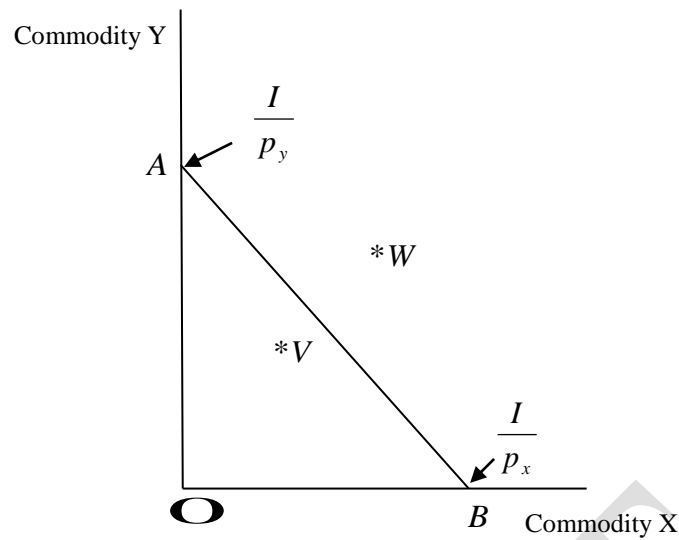
- Assigning successive values of q_x (given the income, I and the commodity prices, p_x, p_y), we may find the corresponding value of q_y .

Thus:

If $q_x = 0$ then all the income I is spent on $\frac{I}{p_y}$ unites of y .

If $q_y = 0$, then all the income I is spent on $\frac{I}{p_x}$ units of x

- These results are shown by points A and B in the figure represented below.
- If we join these points with a line we obtain the budget line.



- Geometrically the slope of the budget line is

$$\frac{OA}{OB} = \frac{I / p_y}{I / p_x} = \frac{p_x}{p_y}$$

Mathematically, the slope of the budget line is the derivative.

$$\frac{-\partial q_y}{\partial q_x} = \frac{p_x}{p_y}$$

- The negative sign shows that the budget line is negative sloped.
- Notice that the slope of the budget line is the ratio of price of x and y.
- The budget line can also be called **consumption possibility line**. It shows the region within which consumer could afford to consume. At point V, the consumer does not utilize fully his income, and so he saves part of the income. At point W, he cannot afford because it is beyond his level of income.
- The consumer can only operate in the shaded area called budget space which gives a set of all commodity bundle that may be purchased by spending some or whole of a given income level.

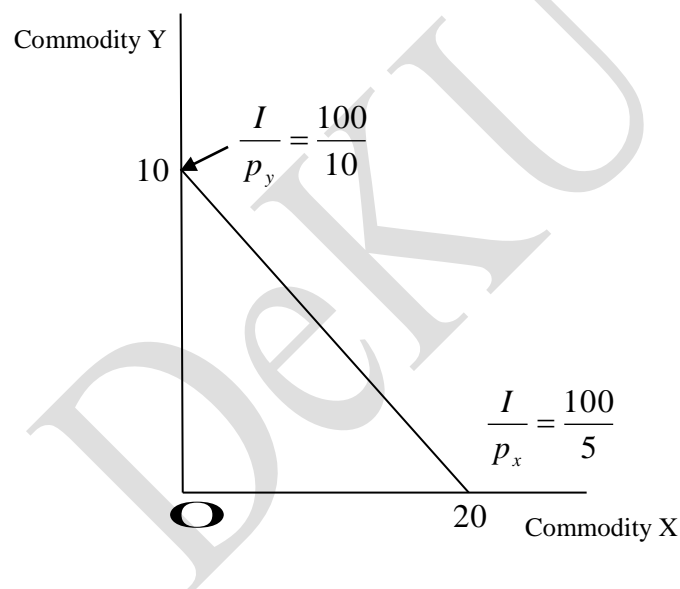
Changes in the budget line.

- It is important to note that changes in price of commodities concerned and changes in income level affect the budget line.
- Initially let $I = Ksh100$, $p_x = Ksh 5$, $p_y = Ksh 10$

$$I = p_x \cdot x + p_y y$$

$$100 = 5x + 10y$$

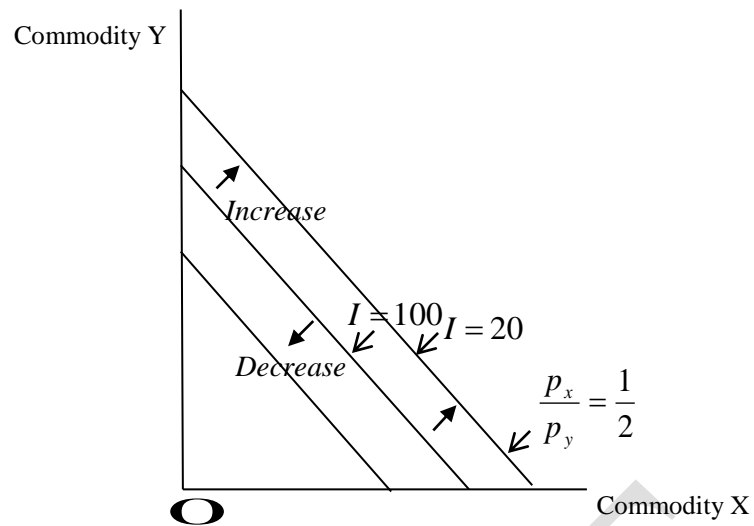
$$\begin{aligned} \text{Budget line} = y &= \frac{100}{10} - \frac{5}{10}x \\ y &= 10 - \frac{1}{2}x \end{aligned}$$



Case 1: increase in income

Let I increase to Kshs 200 with \bar{p}_x and \bar{p}_y .

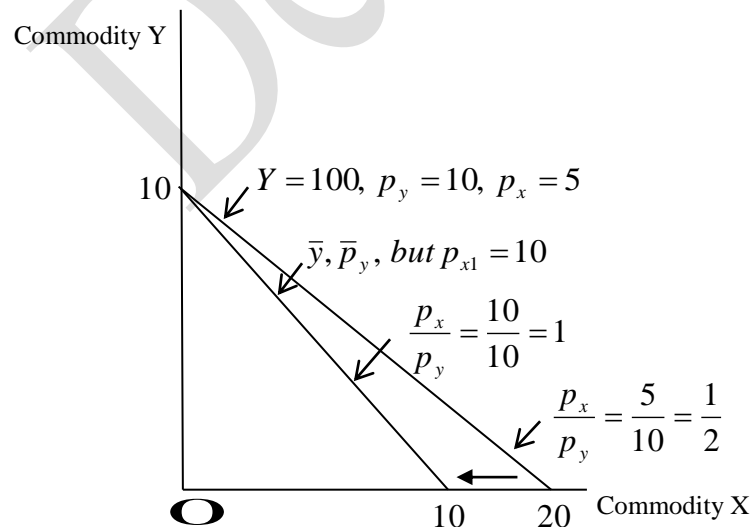
Then the budget line shifts totally outwards to the right and double units of each commodity will be consumed as shown below,



- Notice change in income does not affect the slope of the budget line.
- It should also follow that if income declines, budget line will shift inwards to the left.

Case 2: change in price of one commodity holding income and price of the other commodity fixed.

Suppose p_x increases from $p_x = 5$ to $p_{x1} = 10$ with \bar{I} and \bar{p}_y
 $I = 100$ $p_y = 10$



Therefore, increases in price of commodity x leads to less purchases of x worth the budget line swinging inwards. The new budget line becomes

more steeper as can be observed in the price ratios. Hence price ratio $\frac{p_x}{p_y}$ in absolute terms increases.

$$\frac{p_{x_1}}{p_y} > \frac{p_x}{p_y}$$

i.e. $\frac{10}{10} = 1 > \frac{5}{10}$

CONSUMER EQUILIBRIUM

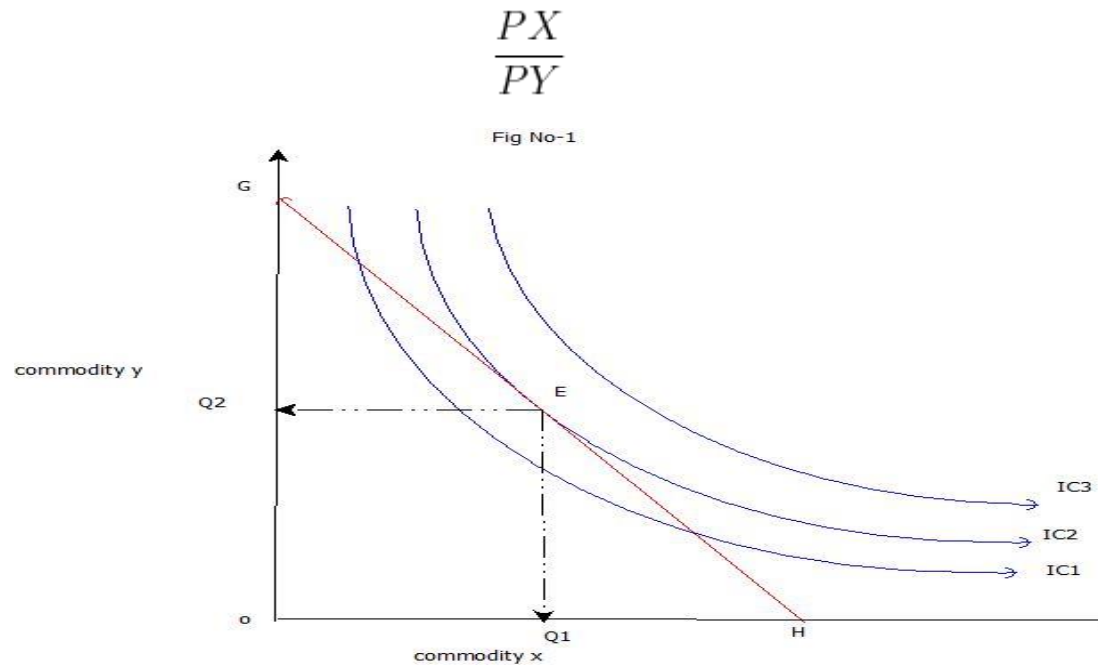
When consumers make choices about the quantity of goods and services to consume, it is presumed that their objective is to maximize total utility. In maximizing total utility, the consumer faces a number of constraints, the most important of which are the consumer's income and the prices of the goods and services that the consumer wishes to consume. The consumer's effort to maximize total utility, subject to these constraints, is referred to as the consumer's problem. The solution to the consumer's problem, which entails decisions about how much the consumer will consume of a number of goods and services, is referred to as consumer equilibrium.

Assumptions

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

Conditions for consumer's equilibrium

- A given budget line must be tangent to an indifference curve, or the marginal rate of substitution between commodity X and commodity Y ($MRS_{x,y}$) must be equal to the price ratio between the two goods



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

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

At the tangency point E the slope of the price line GH and indifference curve are equal. Slope of the indifference curve shows the marginal rate

of substitution of X for Y. The price line indicates the ratio between the prices of two goods (P_X/P_Y). Thus at the equilibrium point E, $MRS_{XY} = \text{Price of good x} / \text{Price of good y} = P_X/P_Y$

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

The consumer's equilibrium position is where the budget line is tangential to an indifference curve.

Point e is the consumer's equilibrium position since budget line AB is tangential to I_{C2} . At point e, the consumer consumes C_e units of clothing and F_e units of food.

NB: Utility maximizing position: Consumers' equilibrium refers to the combination of two goods that yields the maximum utility to the consumer given the consumer's budget constraint i.e. the consumer is said to be maximizing his utility subject to the budget constraint.

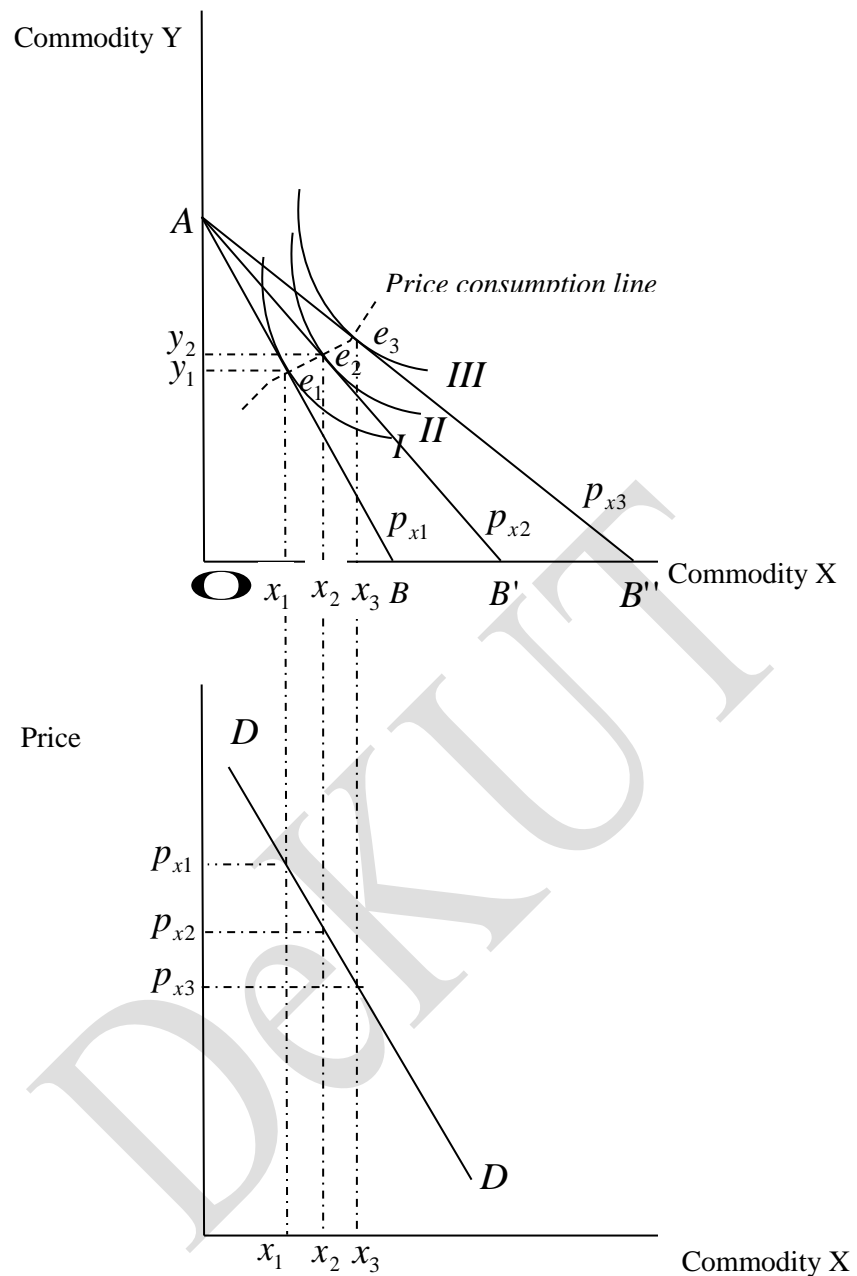
For a consumer to maximize his utility, two conditions must be fulfilled.

For a consumer to maximize his utility, two conditions must be fulfilled.

DERIVATION OF DEMAND CURVE USING THE INDIFFERENCE CURVE APPROACH

Graphical derivation of the demand curve.

- Suppose the price of commodity x falls, with price of commodity y and income level (I) remaining unchanged.
- The budget line will tilt outwards to the right from AB to AB' to AB'' as shown below.



-
- It can be noted that as price of commodity x falls from p_{x1} to p_{x2} to p_{x3} , more of good x is consumed because it becomes cheaper.
- The real income or purchasing power of income increases thus leading consumer to consume more of commodity y too. (see figure A)
- As can be observed also in figure A, the new budget lines associated with decreased prices are tangent to higher indifference curves (e.g. AB' is tangent to indifference curve II, and AB'' to indifference curve III).
- The new equilibrium occurs to the right of the original equilibrium (for normal goods) showing that as prices falls more of the commodity will be bought.

- The line joining equilibrium points e_1 , e_2 and e_3 is called **Price Consumption Line/Curve (PCC)**.
- From the PCC line, we can derive the demand curve for commodity x.
- It has been observed that ;

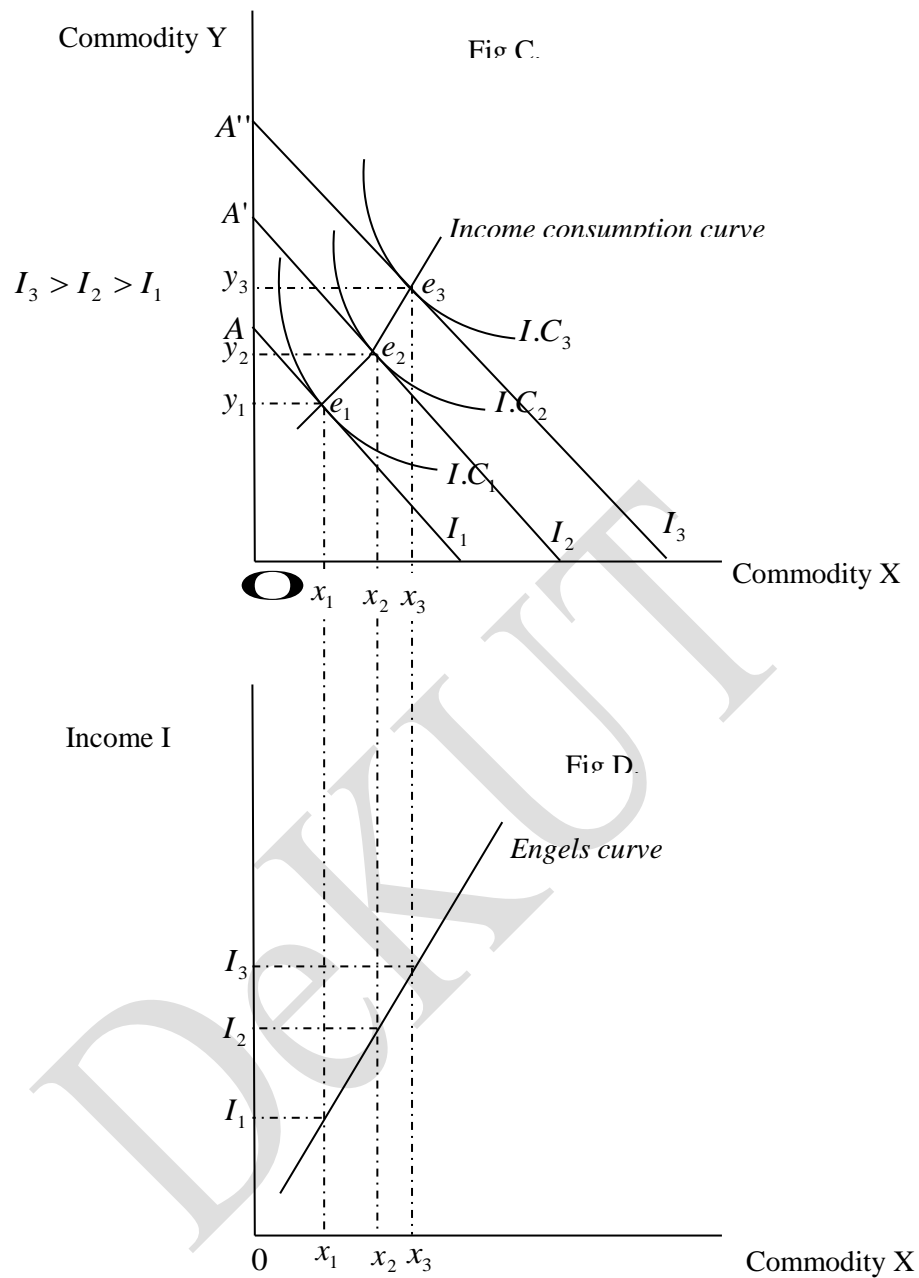
At point e_1 the consumer buys quantity x_1 at price p_{x1} .

At point e_2 the price p_{x2} is lower than p_{x1} and the quantity demanded has increased to x_2 and so on.

- This relationship between price and quantity shown in figure B to obtain a demand curve.
- The demand curve in figure B is downwards slopping, thus obeying the law of demand which states that, quantity bought increases as the price falls.

Engels curve

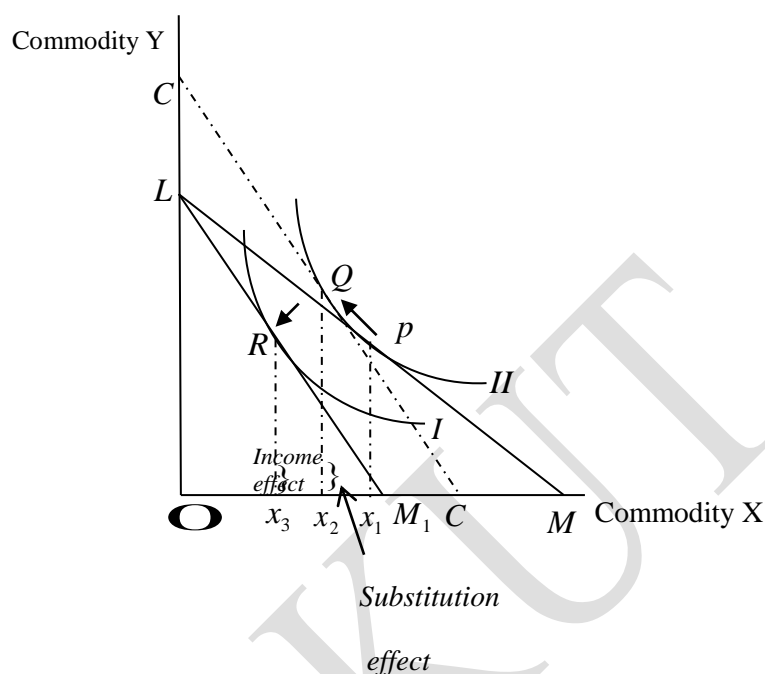
- Same approach could be used to derive the angels curve. recall from earlier discussion on demand that angels curve shows relationship between income and quantity of goods consumed.
- First consider that income increases prices of commodities x and y remaining unchanged.
- Constant increase in income causes budget line to shift to the right from AB to $A'B'$ to $A''B''$.
- Notice increase in income will lead to increase in consumption of both good x and y.



- The ICC shows equilibrium combinations of x and y consumed at various levels of income, with prices remaining constant.
- From fig c it can be observed that associated with higher income I_1, I_2, I_3 is higher levels of consumption x_1, x_2 and x_3 .
- If we plot relationship between I and x, we obtain engels curve, which is positively sloped.
- In our discussion of demand, it was observed that for normal goods, engels curve will be positively sloped, and vice versa for inferior goods.

INCOME AND SUBSTITUTION EFFECT OF A PRICE CHANGE

CASE 1: substitution and income effects for normal good in case of a price rise



- We start by assuming that the consumer is at equilibrium at point p on indifference curve II purchasing units of x .
- Supposing the price of commodity x rises, the price of good y and money income remaining constant, the budget line will tilt inwards from LM to LM_1 .
- The consumer will move to a new equilibrium position at R on indifference curve I. at this point quantity demanded decreases from Ox_1 to Ox_3
- The overall changes in quantity demanded from equilibrium position p to R is referred to as the **total effect of a price change**.
- The total effect is negative because quantity demanded is reduced from Ox_1 to Ox_3 as price rises.
- The total effect of a price change can be split into two effects.
 - (i) Substitution effect
 - (ii) Income effect
- In this example, whenever the price of x rises with price of y and money income remaining constant, two things happen.

- (i) The consumer may be induced to substitute y for x because x is relatively expensive., so as to attain same level of satisfaction as before a price increase. The opposite would take place in case of a fall in price of x. this is called **substitution effect of price change**.
- (ii) The increase in price of x (money income remaining constant) cause the consumer's real income to decrease. The size of the bundle of goods and services a consumer can buy declines. He will thus be unable to consume more of x or y. the consumer's level of satisfaction must decline. The change in quantity demanded resulting exclusively from a change in real income, price of y and money income held constant is what is referred to as **income effect of price changes**.

SUBSTITUTION EFFECT

- From the figure as price of commodity x increases, the consumers real income declines. That is, level of satisfaction declines, as indicated by the movement from indifference curve II to indifference curve I.
- For the consumer to attain same level of satisfaction as before an increase in the price of x, and a decline in real income, he must be given an additional money income just sufficient to compensate him for the loss in real income. That is, the consumer is given a **compensatory payment** just sufficient to remain on indifference curve II under new price regime.
- Since budget line LM_1 represent the new price regime, the compensatory payment is graphically shown by constructing a fictitious budget line tangent to the **original** indifference curve, but whose slope corresponds to the new price ratio.
- Line CC is the fictitious budget line, and it is tangent to the original indifference curve II at point Q. note also that CC is parallel to the new budget line LM_1 thereby reflecting the new price ratio.
- The substitution effect is represented by the movement from the original equilibrium position at P, to the imaginary equilibrium position at Q both points being situated on the original indifference curve. in terms of quantity, the substitution effect is the reduction in quantity demanded from Ox_1 to Ox_2 or by x_1x_2 units.
- Movement along same indifference curve simply shows that, consumers attempt to substitute away from the relatively expensive good to the cheaper one.
- If we were to explain the substitution effect when the price of x declines, we would assume that the consumer is compensated by decreasing his money income by an amount just sufficient to maintain real income constant at the new price ratio.

INCOME EFFECT

- In determining the substitution effect, one is constrained to movement along the original indifference curve.
- However, the total effect of a price change money income and the prices of other commodities held constant, always entails a shift from one indifference curve to another, or a change in real income.
- If consumers real income is to fall from the level represented by the fictitious budget line CC, the movement from the imaginary equilibrium position Q on indifference curve II to the actual new equilibrium R on indifference curve I indicates the **income effect**.
- Note that since CC and LM_1 are parallel, the movement doesn't involve a change in the relative prices, it is a real income phenomenon.
- The reduction in quantity demanded from Ox_2 to Ox_3 measures change in quantity demanded attributable exclusively to the decline in real income, the change in relative price already having been accounted for by the substitution effect.
- In conclusion the total effect of a price change is the sum of the substitution and income effect.

$$\text{Total effect} = SE + IE$$

DISTINCTION BETWEEN SUBSTITUTION AND INCOME EFFECT IN THE CASE OF NORMAL, INFERIOR AND GIFFEN GOODS

CASE1: NORMAL GOOD

For normal good the income effect reinforces the substitution effect.

$$\downarrow p \rightarrow \uparrow \text{real income} \rightarrow \uparrow Q_d \text{ income effect}$$

$$\downarrow p \rightarrow \uparrow Q_d \text{ because of substitution effect.}$$

So both effects move in the same direction for normal good quantity demanded always varies inversely with price.

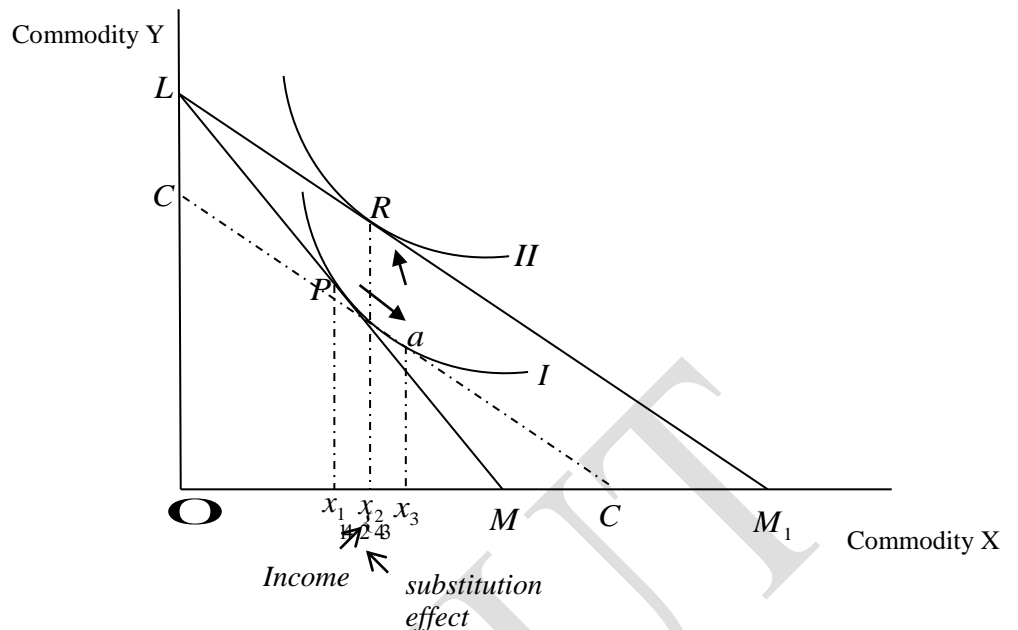
CASE 2: INFERIOR GOOD

An inferior good is one for which the quantity demanded varies inversely with real income.

$$\uparrow \text{real income} \rightarrow \downarrow Q_d$$

The substitution and income effect in this case will move in the opposite directions.

An income effect will be less than the substitution effect of a price change.



- As price of inferior good declines, budget line LM will tilt outwards to LM_1 . The new equilibrium point becomes point R on indifference curve II.
- Total effect of price change is $Ox_3 - Ox_1 = x_1x_3$
- Because the consumers real income has increased, we compensate him by decreasing his money income so that he remains on original indifference curve I.
- The decrease in money income is shown by drawing an imaginary budget line CC, which has same price ratio as LM_1 and which is parallel to the budget line.
- The substitution effect is represented by the movement from point p to Q along the same indifference curve. a fall in price of x causes the consumer to increase his consumption of the cheaper commodity x and reduce the consumption of commodity.
- Thus substitution effect associated with the fall in p_x is positive ($Ox_2 - Ox_1 > 0$)
- As a result of fall in price of good x, real income of consumer increases. The movement from the imaginary equilibrium position Q on indifference curve I to actual new equilibrium R on indifference curve II indicate **income effect**.
- For inferior goods, an increase in real income leads to a fall in quantity demanded from Ox_2 to Ox_3 .

- Notice income effect associated with the fall in p_x is negative ($Ox_3 - Ox_2 < 0$)
- Since $SE > IE$, it will offset the negative income effect. So net effect of a price decline will be positive $Ox_3 - Ox_1 = x_1x_2 > 0$

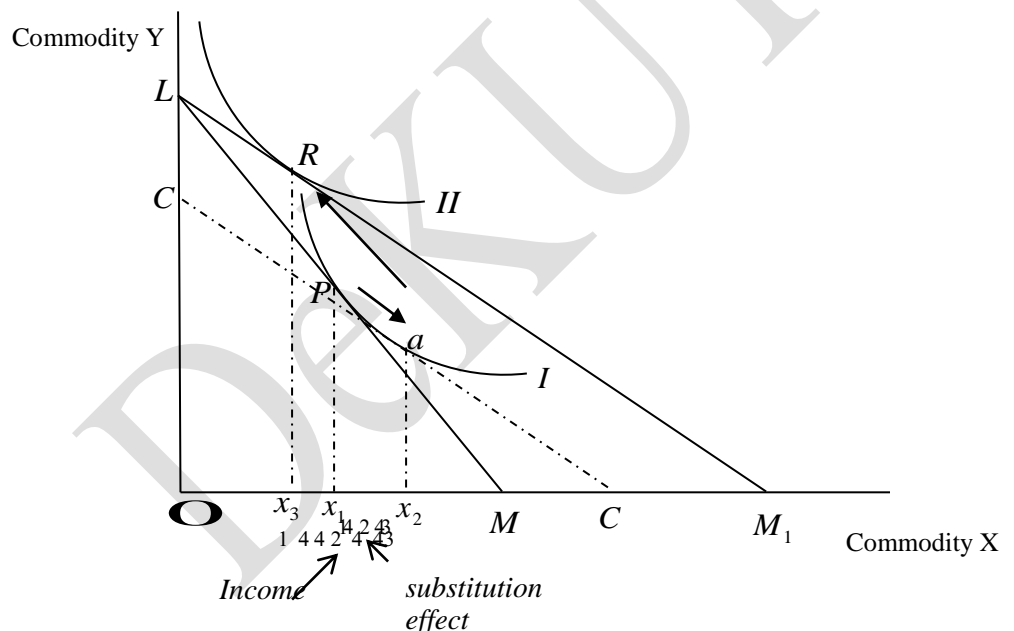
$$(\text{total effect} = SE + IE = (Ox_2 - Ox_1) + (Ox_3 - Ox_2) = (Ox_3 - Ox_1) > 0)$$

- So price and quantity demanded will be inversely related in the case of inferior goods.

CASE 3: GIFFEN GOODS

Quantity demanded increase with increase in price and vice versa.

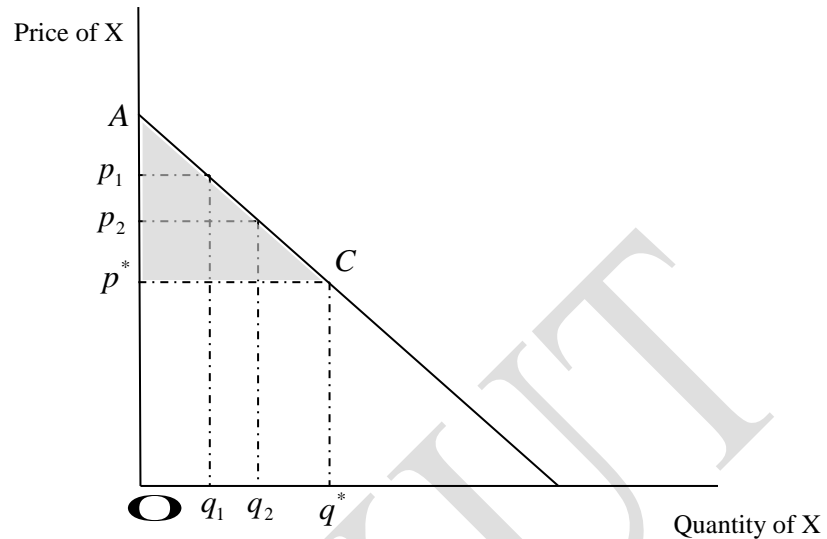
For giffen goods the income effect is so strong that it move then offset substitution effect.



- Substitution effect = $(Ox_2 - Ox_1 = x_1x_2 > 0)$ it is movement from P to Q.
- Income effect = $(Ox_3 - Ox_2 = x_3x_3 < 0)$ it is not only negative but large enough to offset positive substitution effect.
- Total effect = $SE + IE = (Ox_2 - Ox_1) + (Ox_3 - Ox_2) = Ox_3 - Ox_1 = x_3x_1 < 0$
- Thus in the case of giffen good the law of demand wont hold. A decrease in price leads to a decrease in quantity demanded. Thus demand curve will be positively sloped.

THE CONSUMER SURPLUS

- It was introduced by Marshall. It is defined as the difference between the actual market price and any price above the market price consumers will be willing to pay for a given commodity rather than do without it



- p^* is the market price and quantity demanded at market price is q_x^* . He is willing to pay p_1 for q_1 , p_2 for q_2 etc.
 - The fact that the market price is lower than the price he would be willing to pay for the initial units of x implies that his actual expenditure is less than the amount he would be willing to spend to acquire q_x^* .
 - ACp^* is consumers surplus or Marshallian surplus.

IMPORTANCE OF INDIFFERENCE CURVE ANALYSIS

- It helps in the derivation of the demand curve
- It helps in the derivation of the Engel curve
- It can be used to examine the different welfare effects of different government policies e.g. the effect of taxation on consumption of commodities
- It can be used in international trade to examine the effect of free trade and restrictions in trade.
- It provides an explanation why a change in price leads to a change in quantity demanded by distinguishing between the substitution and income effect of a price change.
- It can be used to examine the effect of a change in the cost of living on welfare.
- It can be used in labour economics to explain the tradeoff between work and leisure.

Unit summary



Summary

In this unit you learned the three theories of consumer behaviour. We have also seen how Engel curve and demand curves are derived and the income, substitution and total effect

[Continue your body text here]

Assignment



Assignment

Derive demand curve and Engel curves for a consumer

[Continue your body text here]

Assessment



Assessment

Question: determine the equilibrium quantities of commodities x and z for a consumer whose total utility (U) and other relevant variables are given below;

$$U = 20x - 4z^2 + 40z - x^2$$

Income level $Y = Ksh.48$

Price of $x(p_x) = ksh.2$

Price of $z(p_z) = ksh.4$

Be sure to obtain the maximum utility level.

Using diagrams discuss the properties of indifference curves

[Continue your body text here]

Unit 6

THEORY OF PRODUCTION

Introduction

[Add introductory text here]

Upon completion of this unit you will be able to:



Outcomes

- Discuss factors of production and their rewards.
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].
- [verb] [complete the sentence].



Terminology

[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]
[Term]:	[Term description]

Factors of production

These are the resources/inputs that are used in production. They include

- a) land
- b) labour
- c) capital

- d) entrepreneurship

1. Land

This refers to the natural resources that are given free by nature. Also referred to as God – given resources they include, soil, sunshine, water, minerals air etc.

Characteristics

- i) Its basic factor of production
- ii) Its limited in supply
- iii) It's a fixed factor of production
- iv) It provides raw materials, that are useful in production
- v) It provides space for buildings
- vi) It's both mobile and immobile

The reward for land is rent or royalty

2. Labour

Refers to the human effort, both mental and physical that used in production

Characteristics

- i) It's a basic fact of production
- ii) It may be manual semi skilled, skilled or highly skilled
- iii) It increases the productivity of land
- iv) It can't be stored
- v) The efficiency of labour may be improved through
 - Good health
 - Education and training
 - Industrial organizations and equipment
 - Working environment
 - Degree of specialization
 - Climate conditions
- vi) labour is both mobile and immobile

Mobility of labour

Refers to the case in which labour moves from one occupation to another or one profession to another.

Types of mobility of labour

- a) Geographical mobility: refers to the movement of labour from one geographical location to another.
- b) Occupational mobility: refers to the movement of labour from one occupation to another e.g. from agriculture to industry.
- c) Vertical mobility: refers to the movement of labour from one job position to another through promotion.
- d) Horizontal mobility. Refers to the movement of labour from one organization to another but within the same job position.

Advantages of mobility of labour

- i) Leads to a higher pay
- ii) Leads to creation of employment
- iii) Increase social interaction
- iv) Leads to exchange of skills and talents

Barriers to mobility

- i) Trade union barriers
- ii) Cultural barriers
- iii) Professionals barriers
- iv) Cost of moving
- v) Family ties
- vi) Social ties

The reward for labour is salary and wages

3. Capital

Refers to goods that are man-made and are helpful in further production e.g. machines, money. Money is part of capital as it's used to buy other goods that are used in further production.

Characteristics

- i) It's manmade and thus its supply is controlled by man.
- ii) Payment for capital is calculated in terms of time
- iii) It increases the productivity of land
- iv) It increases the efficiency of labour
- v) It may be liquid, real or human capital
- vi) Capital is both mobile and immobile

Payment for capital is called interest

4. Entrepreneurship

It also called organization or management

Characteristics

- Undertakes all risks
- Introduces capital
- Organizes the other factors of production
- Manages the production process
- Both mobile and immobile

- Markets the produce
- Reward is profit or loss

TYPES OF PRODUCTION CURVES

Here distinction is made between three types of production curves.

- 1) Total product curve
- 2) Marginal product curve
- 3) Average product curve

1) **Total Product (TP)**

In the short run, production function gives the total (maximum) output obtainable from different amounts of the variable inputs, given a specified amount of the fixed input.

In the short-run, production function is written as $Q = f(\bar{K}, L)$, where capital is fixed and labour is variable.

2) **Average Product (AP) or Average Physical Product (APP)**

The average product of an input is that product divided by the amount of the input used to produce this output.

$$AP_L = \frac{Q}{L} = \frac{f(\bar{K}, L)}{L}$$

This can be read as average product of the variable input labour.

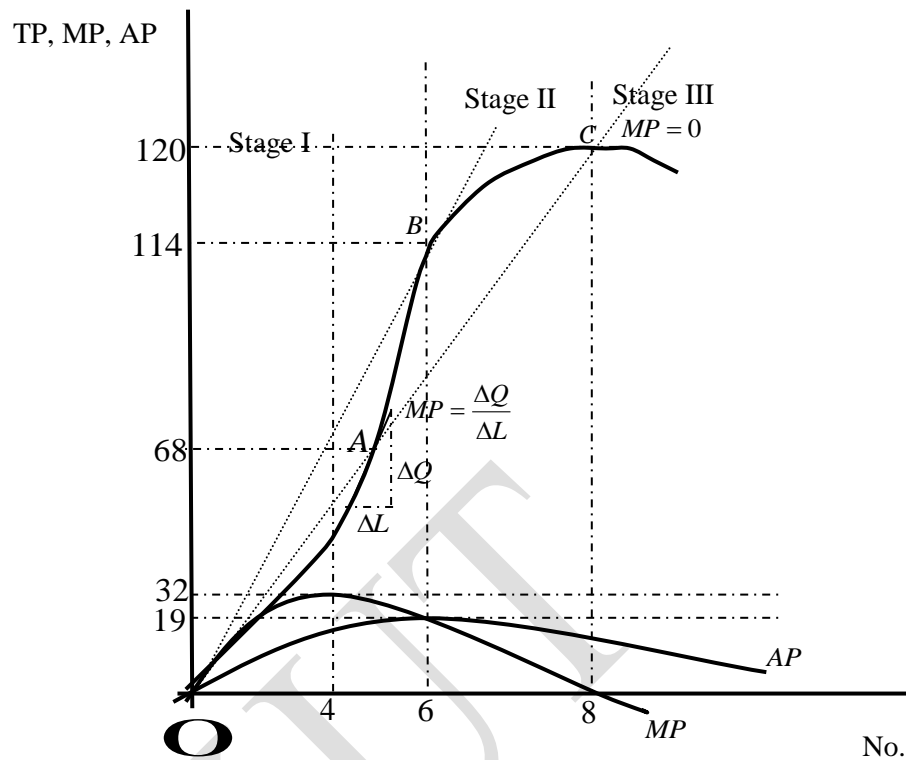
3) **Marginal Physical Product (MPP or MP)**

Is the change in total product that results from one unit change in the amount of variable inputs (e.g. labour), the fixed input remaining unchanged. (may also say, other inputs other than labour remaining unchanged)

Therefore marginal product of labour is the derivative of output with respect to labour.

$$MP_L = \frac{\partial Q}{\partial L} = \frac{\partial f(\bar{K}, L)}{\partial L}$$

No of capital	No. of labour	TP_L	$AP_L\left(\frac{TP}{L}\right)$	$MP_L\left(\frac{\Delta TP}{\Delta L}\right)$	Stages
1 unit	0.	0	0	0	I
1 unit	1.	5	5	5	
1 unit	2.	16	8	11	
1 unit	3.	36	12	20	
1 unit	4.	68	17	32	
1 unit	5.	95	19	27	II
1 unit	6.	114	19	19	
1 unit	0.	119	17	5	
1 unit	1.	120	15	1	
1 unit	2.	117	13	-3	
1 unit	3.	100	10	-17	



This is a short run case whereby not all inputs are variable. Labour (L) is variable, while capital is fixed at 1 unit.

TP Curve

From the table and figure, total output increases with more employment of labour, reaches a maximum at $Q_x = 120$, and number of labour employed equal 8. as more and more laborers are employed beyond 8, output starts to decline.

MP Curve

As more laborers are employed, marginal product of labour increases, reaching maximum at $L = 4$, then declines reaching zero, when $L = 8$ beyond $L = 8$, MP_L becomes negative.

AP Curve

Average product curve also increases initially as L increases, reaching maximum at $L = 6$ then start declining. AP_L remain positive as long as total product is positive.

RELATIONSHIP BETWEEN TP & MP

- 1) As long as MP_L is increasing, TP will continue to raise at an increasing rate. This is the case as labour increases up to 4.

Beyond $L=4$ up to $L=8$, MP_L starts to decline although it is still positive. TP continues to increase but at a diminishing rate.

- 2) When MP_L reaches zero, TP reaches its maximum. At this point $TP = 120$ while $L = 8$.
- 3) When MP_L becomes negative, TP will start declining so any employment beyond $L = 8$ yield negative MP.

- This bring us to the **law of diminishing returns** which states that:-
- If more and more units of a variable input (in our case labour) are applied to a given quantity of fixed input, the total output may initially increase at an increasing rate, but beyond a certain level of output, the rate of increase in the total output diminishes.
- The reason behind the operation of this law is that with increasing units of labour to a fixed factor (say capital) each additional worker has less and less tools and equipment to work with. Consequently, the productivity of the marginal worker eventually decreases. As a result, the total product increases at a diminishing rate beyond a point.
- For the law to hold the following two condition must be fulfilled.
 - 1) Some input(s) must remain fixed as the amount of the input in question, say labour is varied.
 - 2) Technology must remain unchanged, since a change in technical know-how would cause the entire TP curve to shift. An upwards shift in TP curve reflects a change to superior technology while a downwards shift reflects a change to inferior technology relative to existing one.

IMPORTANT RELATIONSHIP BETWEEN MPP_L & APP_L

- 1) $MPP_L > APP_L$ when APP_L is rising (MP_L is above AP_L)
- 2) $MPP_L = APP_L$ when APP_L is at maximum.
- 3) $MPP_L < APP_L$ when APP_L is declining (MP_L is below AP_L)

Proof

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

$$AP_L = \frac{Q}{L} = \frac{f(\bar{K}, L)}{L}$$

Case 1: $MPP_L > APP_L$ when APP_L is rising

When APP_L is rising it means $\frac{\partial AP_L}{\partial L} > 0$

To use quotient rule to find $\frac{\partial AP_L}{\partial L} = \frac{\partial \left(\frac{Q}{L} \right)}{\partial L}$

$$\text{Let } \begin{matrix} U = Q \\ V = L \end{matrix}$$

Quotient rule states that.

$$\text{If } y = \frac{U(x)}{V(x)} \text{ then } \frac{\partial y}{\partial x} = \frac{V \frac{\partial U}{\partial x} - U \frac{\partial V}{\partial x}}{V^2}$$

$$\therefore \frac{\partial AP}{\partial L} = \frac{L \frac{\partial Q}{\partial L} - Q \frac{\partial L}{\partial L}}{L^2} > 0$$

$$L \frac{\partial Q}{\partial L} - Q > 0$$

$$L \frac{\partial Q}{\partial L} > Q$$

$$\therefore \frac{\partial Q}{\partial L} > \frac{Q}{L}$$

Note that $\frac{\partial Q}{\partial L} = MP_L$ and $\frac{Q}{L} = AP_L$

Therefore we have proved that when AP_L is rising $MP_L > AP_L$

THE THREE STAGES OF PRODUCTION

Using figure 1 above, we can identify three stages of production.

Stage I:

- Marginal product continues to increase making total product increase at an increasing rate. Marginal product reaches maximum at $L = 4$
- It is a stage of increasing returns because output increases as you increase the use of the variable factor (Labour). Here fixed factors (capital) is under utilized. That is why as more and more workers are added utilization of machine increases and productivity of additional workers increases. At this stage it would be inefficient for firms to operate since there is still room for increased output and hence high profit.

Stage II:

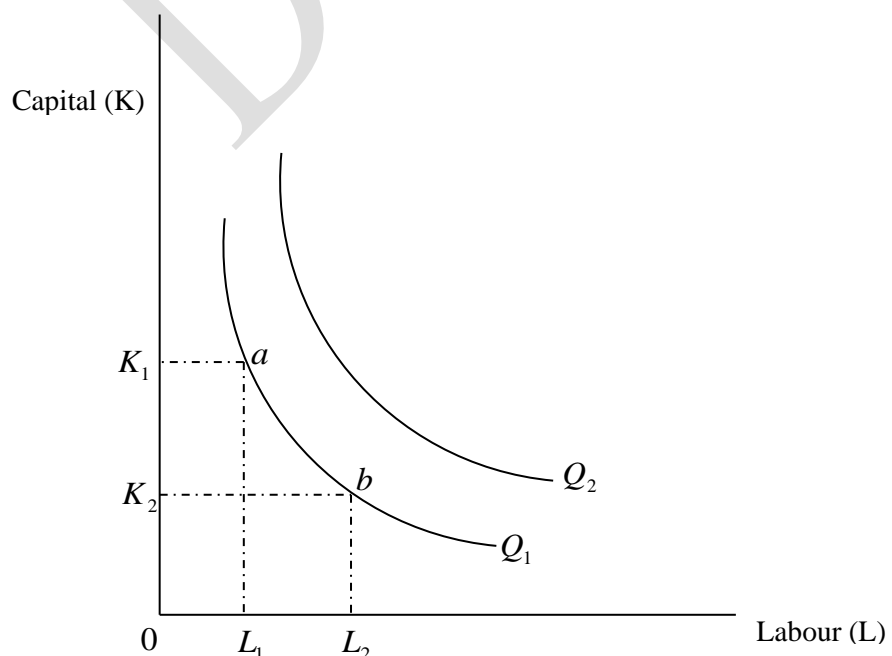
- Is a stage of diminishing returns MP starts declining until it reaches zero. Total product increases but at a diminishing rate and reaches maximum when $MP = 0$.
- Once optimum capital-labour ratio is reduced additional workers have less and less tools to work with. Consequently, the productivity of the marginal worker eventually decreases.
- Firms should operate in this stage because optimal utilization of factors is realized.

Stage III:

- It is the Stage of declining returns
- TP is declining and MP is negative.
- It will be very illogical for a firm to operate in this stage because employment of additional labour adds nothing to total product.
- Thus, stages I and III are irrational stages of operation. In stage I, capital is under utilized by small units of labour.
- In stage III, capital is over utilized/overburdened by large units of labour.
- Both extremes are uneconomical to operate in firms will thus operate in stage II, where MP is positive for both variables & fixed factors of production.
 - In the short-run, we assume that one factor of production remain fixed as the other one varies that is $Q = f(\bar{K}, L)$
 - However, in the long-run, all factors of production become variable so that $Q = f(\bar{K}, L)$. In isoquant analysis, all factors are assumed to be variable.

What is an isoquant?

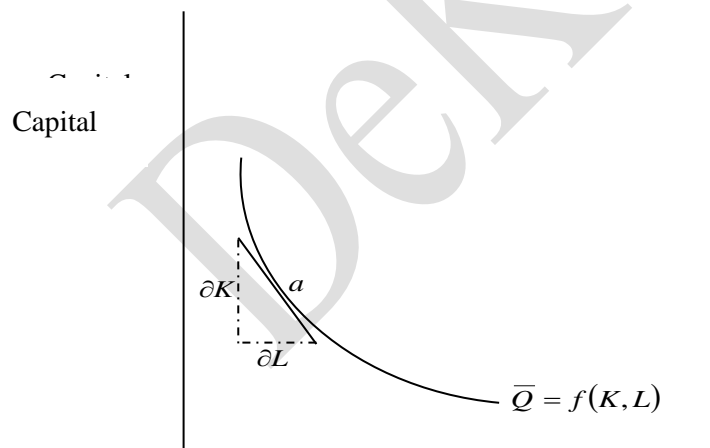
It can be defined as a curve joining various combinations of inputs that yield a given amount of output.



- Combination of inputs (a) and (b) yield same level of output.
- A higher isoquant to the right represents superior output ($Q_2 > Q_1$)
- The slope of the isoquant $\left(-\frac{\partial K}{\partial L}\right)$ defines the degree of substitutability of the factors of production (in our case, substitution between capital and labour)

Marginal rate of technical substitution (MRTS) of labour and capital.

Is the slope of isoquant it refers to the amount of capital (K) that firm must give up by increasing the amount employed of labour by one unit and still remain on the same isoquant (output level)



The slope of the isoquant at point (a) is given by the tangent at point (a)

$$\text{Therefore slope} = \frac{\partial K}{\partial L}$$

$$-\frac{\partial K}{\partial L} = MRTS_{K,L} = \frac{MP_L}{MP_K}$$

The above statement that MRTS is equal to the ratio of the marginal products of the factor can be proved

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

$$\partial Q = \frac{\partial Q}{\partial K} \cdot \partial K + \frac{\partial Q}{\partial L} \cdot \partial L = 0$$

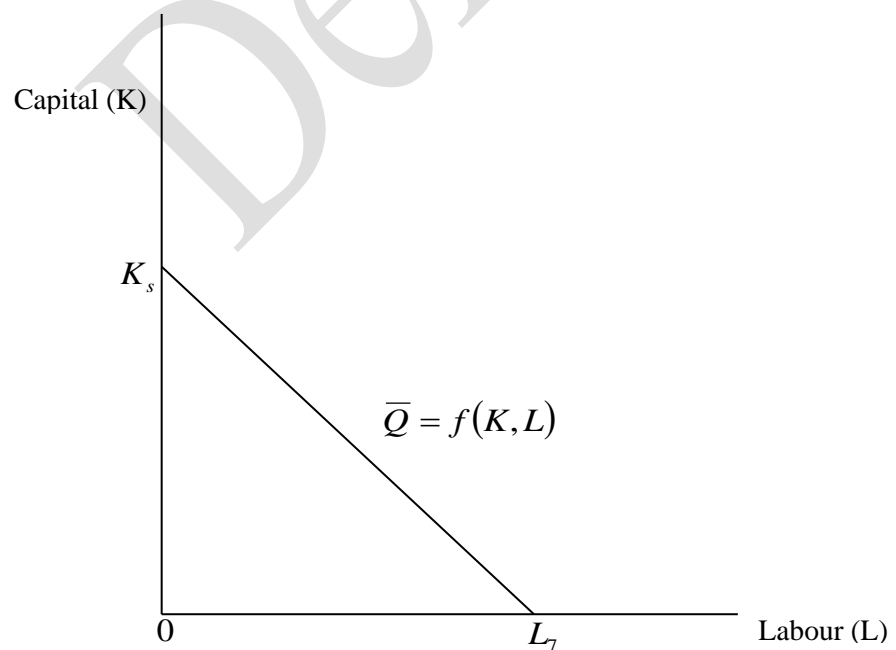
$$MP_K \partial K = MP_L \partial L$$

$$-\frac{\partial K}{\partial L} = \frac{MP_L}{MP_K}$$

SHAPES OF ISOQUANTS

Isoquants may assume various shapes depending on the degree of substitutability.

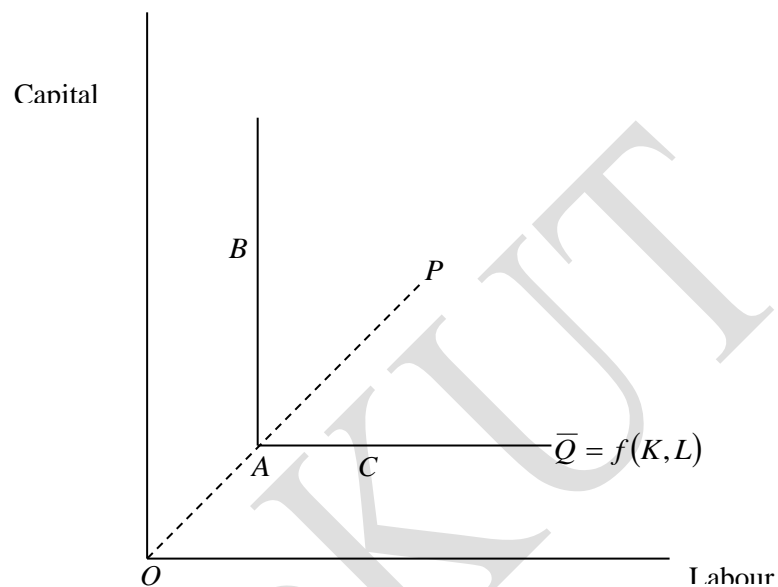
1) Linear isoquant



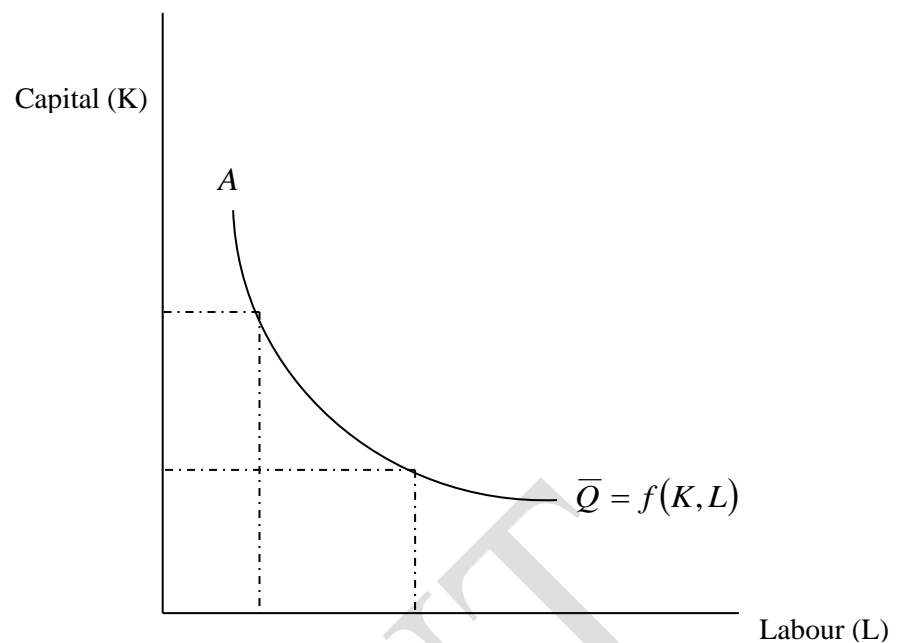
It reflects perfect substitution between factors of production i.e. Q could be produced wholly by using only capital and zero units of labour.

It represents infinite methods of production, which in economic analysis is unrealistic assumption.

2) Input- output isoquant (Leontief isoquant)



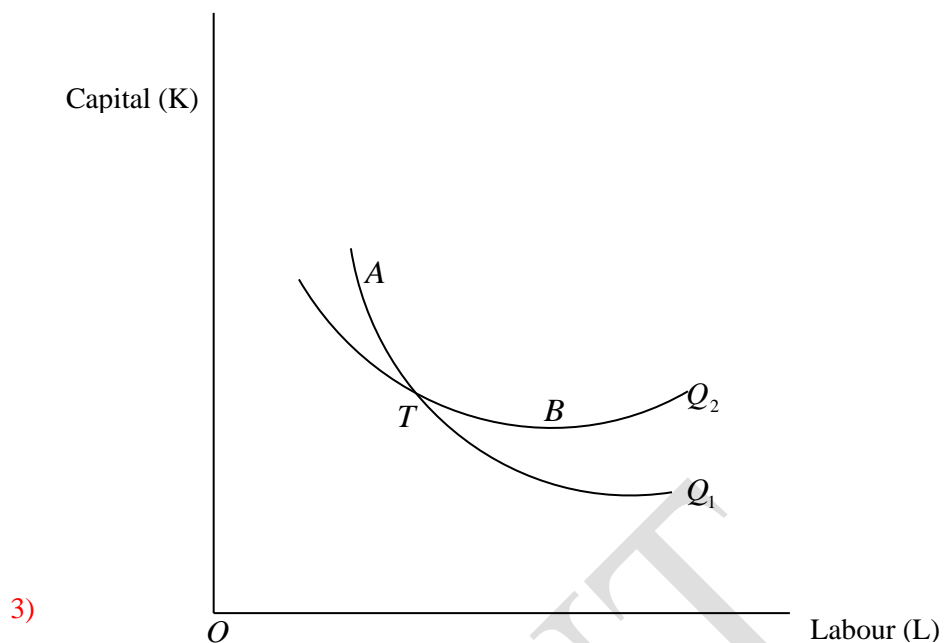
- In this group of isoquants input cannot be substituted for one another.
- There exist only one single production process (P).
- All efficient production must take place at the corner of the isoquant (point A). the input combination represented by points B and C yield the same output as point A, but the A combination enables the use of less capital than the B combination with the same labour, or less labour than the C combination with capital the same.
- **Smooth convex isoquant**



- Assume continuous substitutability between K and L over a certain range AB, beyond which factors cannot substitute each other.
- This type of isoquant is mostly adopted in economic theory because it is mathematically simpler to handle by the rules of calculus.
- E.g. to get its slope we differentiate the equation $\frac{\partial K}{\partial L}$.

CHARACTERISTICS OF ISOQUANTS

- 1) Are downwards sloping within the relevant range. Increasing one factor would require that the other factor be decreasing to yield same level of output.
- 2) Isoquants do not intersect.



If the two intersect it means that combination of K and L at point T would yield higher output Q_2 as well as Q_1 which may not be the case.

- 3) Superior isoquants are represented by those far away from the graph origin.
- 4) Isoquants are convex to the origin within the relevant range. This implies that the slope of the isoquant decreases (in absolute terms) as we move downwards along the isoquant, showing the increasing difficulty in substituting K for L.

THE LAW OF RETURN TO SCALE

This is a long-term analysis of production it shows by how much total output will change as a result of a change in all factor inputs by same proportion.

Suppose we start from an initial level of input and output.

$$X_0 = f(L, K)$$

And we increase all the factors by the same proportion k . We will clearly obtain a new level of output X^* , higher than the original level X_0

$$X^* = f(kL, kK)$$

If X^* increases by the same proportion k as the input, we say that there are **constant returns to scale**.

If X^* increases less than proportionally with the increase in the factors, we have **decreasing returns to scale**.

If X^* increases more than proportionally with the increase in the factors, we have **increasing returns to scale**.

EQUILIBRIUM OF THE FIRM

The goal of any firm is to maximize profit.

$$\pi = R - C$$

Where

R is revenue

C is cost.

- The firm strives to choose an optimal combination of factors of production that would maximize profits.
- The problem facing the firm would be that of constrained profit maximization.
- Constrained profit maximization may take one of the following forms.

Case 1: **maximize output subject to a cost constraint**

Assumptions

- i) Price of output is given (\bar{p}_x)
- ii) Price of factor inputs are given
 - i.e. \bar{w} is given wage rate (price of labour)
 - \bar{r} is given price of capital

In the case total cost (c) is given.

Therefore $(\bar{c}, \bar{p}_x, \bar{w}, \bar{r})$, implying that the profit maximization problem can be stated as

$$\begin{aligned} \text{Max}\pi &= R - \bar{c} \\ &= \bar{p}_x \cdot x - \bar{c} \end{aligned}$$

Clearly, maximization of π is achieved in this case if x (*output*) is maximized, since \bar{c} and \bar{p}_x are given constants.

Case b: maximizing profit π if output and price are given.

For example, a contractor want to build a ridge (x is given) with the maximum profit

In this case;

$$\text{Max}\pi = \bar{p}_x \bar{x} - c$$

Maximization of profit can only be achieved by minimizing cost.

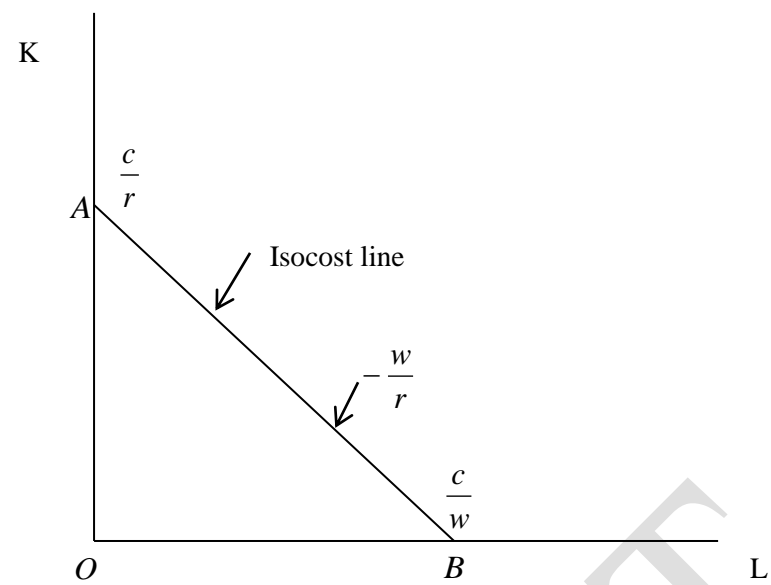
Cost function is

$$C = w \cdot L + r \cdot K$$

Isocost line

In the same way we derived a budget line fro consumers budget constraint, we can derive an isocost line from the cost function.

Isocost line is a locus of all combinations of factors the firm can purchase with a given monetary cost outlay.



When :

$$K = 0$$

$$L = \frac{C}{w}$$

When:

$$L = 0$$

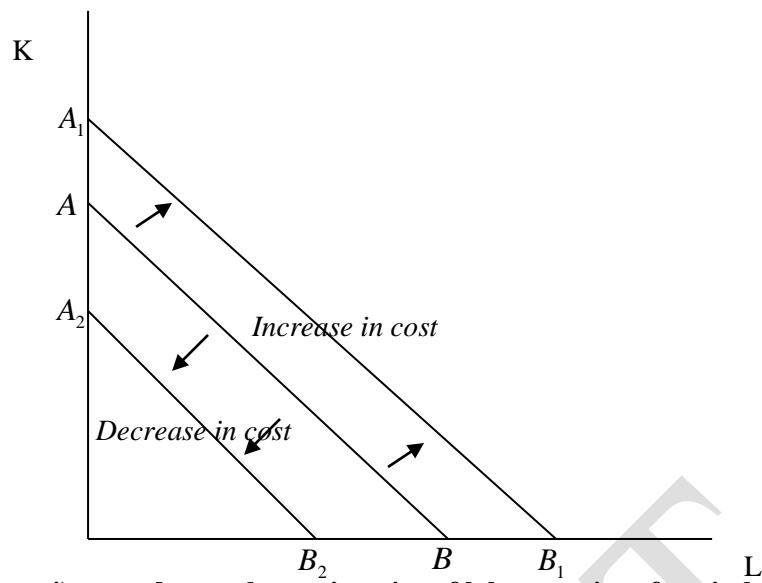
$$K = \frac{C}{r}$$

$$\text{Slope} = \frac{OA}{OB} = \frac{-\frac{C}{r}}{\frac{C}{w}} = \frac{w}{r}$$

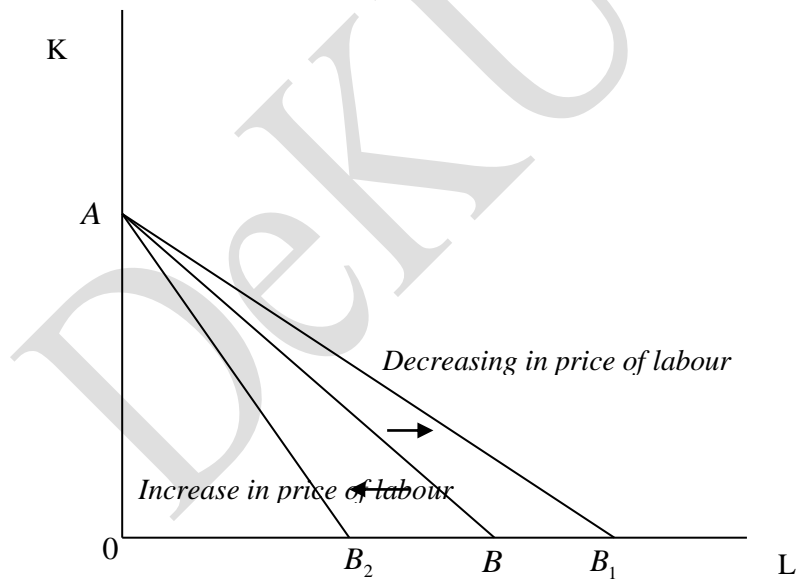
Slope of the isocost line is equal to the ratio of the prices of the factor of production.

Shifts of isocost lines

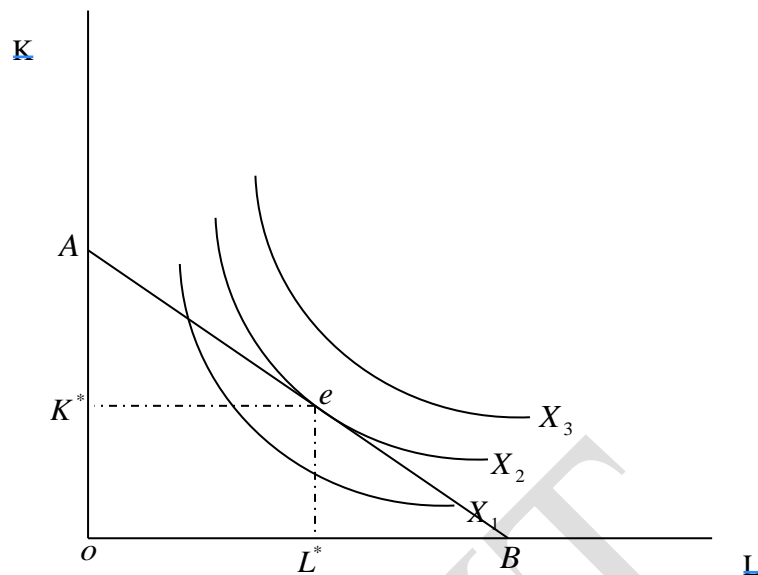
- i) Due to change in expenditure or cost



i) due to change in price of labour, price of capital and cost being held constant.



EQUILIBRIUM OF THE FIRM



Firm is maximizing output subject to cost constraint.

Equilibrium is attained at the point of tangency between isocost line and the isoquant at point e.

The optimal combination of inputs that maximize output is (K^*, L^*)

The maximum level of output the firm can produce given cost constraint is x_2 .

At point e, the slope of isocost line $\left(\frac{w}{r}\right)$ equal the slope of the isoquant

$$\left(\frac{MP_L}{MP_K}\right)$$

$$\text{i.e. } MRTS = \frac{MP_L}{MP_K} = \frac{w}{r}$$

this constitute the first condition for equilibrium.

second condition is that isoquant be convex to the origin.

THE THEORY OF COSTS

This is concerned with analysis of firms output and pricing decisions. The objective of the firm is to maximize profit. It uses inputs (factors) of production

and through a process of production, firms will desire to spend as little as possible, thus the firms will have to minimize the cost as its objective.

The total cost is a multivariable function, that is, it is determined by many factor. Symbolization we may write the cost function as

$$C = f(X, T, P_f)$$

Where:

C is total cost

X is output

T is technology

P_f is price of factors.

For simplicity purpose, cost are graphically shown as a function of output, $C = f(X)$, ceteris paribus. If other factors do change their effect on costs is shown graphically by a shift of cost curve.

Fixed costs (FC)

These are those costs of the firm which are independent of output i.e. they are constant at all level of output e.g. salaries, rent etc.

Variable costs (VC)

Are those costs of the firm that are dependent on output i.e. they change with changes in output e.g. wage transport costs, storage costs etc

TOTAL COSTS (TC)

Total cost = fixed costs + variable costs

Quantity (Q)	Fixed cost (Fc)	Variable costs (VC)	Total costs (Tc= Fc+Vc)	Marginal cost	Average total cost	Average fixed cost (AFC=Fc/q)	Average variables = AVC = Vc/R
0	55	0	55	-			

1	55	30	85	30	85	56	30
2	55	55	110	25	55	27.5	27.5
3	55	75	130	20	43.33	18.33	25
4	55	105	160	30	40	13.75	26.25
5	55	155	210	50	42	11	31
6	55	225	280	70	46.67	9.17	37.5
7	55	315	370	90	52.86	7.86	45
8	55	425	480	110	60	6.88	53.126
9	55	555	610	130	67.78	6.11	61.67
10	55	705	760	150	76	5.5	70.5

Marginal costs (MC)

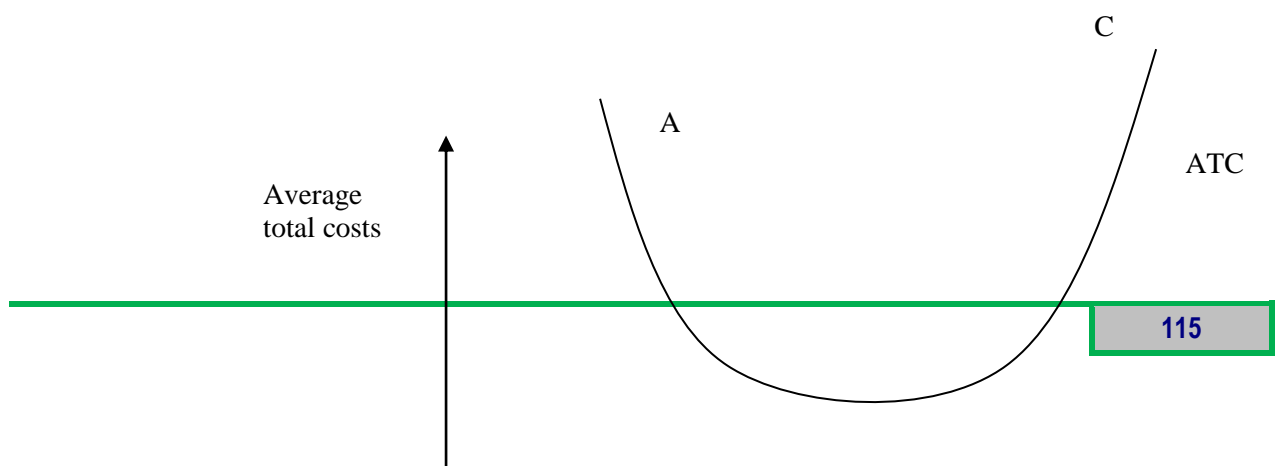
This is the extra cost incurred in producing an extra unit of output

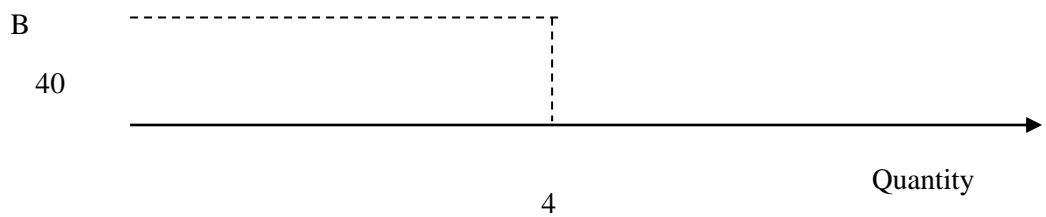
$$MC = \frac{\text{Change in Total Costs}}{\text{Change in Output}}$$

$$MC = \frac{\Delta TC}{\Delta Q}$$

AVERAGE TOTAL COST CURVE

AVERAGE TOTAL COST CURVE





Between point A and B, the average total costs are decreasing/falling because of economies of scale.

Economies of scale Include

1. **Technical economies.** As a firm increases its scale of production, it's able to adopt more efficient, machines leading to a decrease in its costs of production.
2. **Financial economies.** As a firm increases its operations, it's able to acquire wider sources of capital more easily and cheaply thus reducing its costs of production.
3. **Managerial economies.** A firm that produces on large scale is able to employ qualified personnel leading to efficiency and quality management thus reducing its costs of production.
4. **Buying economies.** A large firm buys raw material in bulk and hence enjoys trade discount which reduces its costs of production.
5. **Marketing economies.** A firm that sells in bulk incurs low marketing costs e.g low advertising costs.
6. **Research and development economies.** A large firm is able to carry out its own research and development leading to cost reduction innovations.
7. **Specialization and division of labour.** A large firm is able to employ specialized labour leading to production of high quality products and hence high profits.
8. **Risk bearing, economies.** A large firm is able to diversify in various markets and hence spread its risks and faces emergencies.
9. **Transport economies.** The transportation costs per unit are lower for a large output than for a low output. A large firm is also able to use its own vehicles and this reduces the costs of production.
10. **Staff welfare economies.** Large firms are able to take care of the social welfare of their employee. This leads to high motivation high productivity, and low costs of organizing labour.

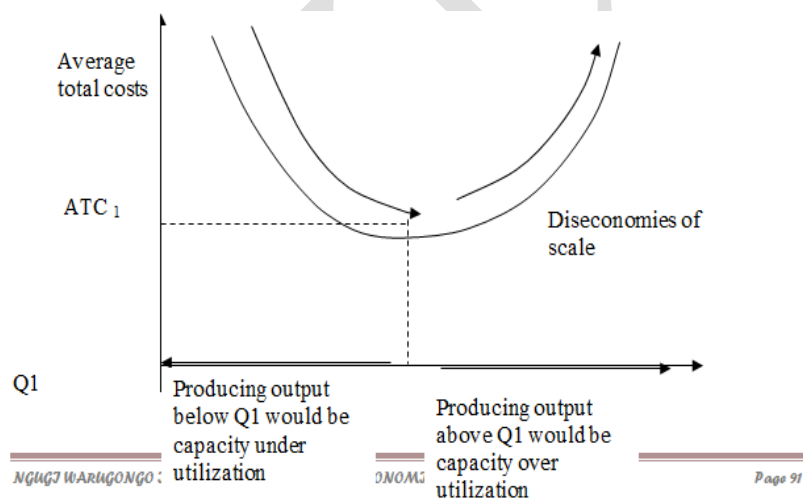
Between point B and C, the average total costs are increasing because of diseconomies of scales.

Diseconomies of Scale

Include

- a) **Organization problems.** As a firm increases its scale of production, it may become too congested and hence difficult to organize labour and this increases the costs of production.
- b) **Bureaucracy:** Decision making in a large firm is long and slow since many people have to be consulted and time wasting leads to an increase in the costs of production.
- c) **Exhaustion of raw materials.** As a firm becomes large it may exhaust its raw materials and be the acquisition of new sources of raw materials may be too expensive leading to an increase in the costs of production.
- d) **Storage problems.** Over production in large firm leads to storage problems and this may cause wastage and losses to the firm.
- e) **Exhaustion of market.** A large firm may eventually exhaust its own market due to change in fashion tastes and preference.
- f) Lack of adequate means of transport
- g) Corruption and mismanagement of resources
- h) Use of obsolete technology
- i) Theft and vandalism of the firm's assets by employees
- j) Industrial disputes e.g. strikes

THE OPTIMUM SIZE OF A FIRM



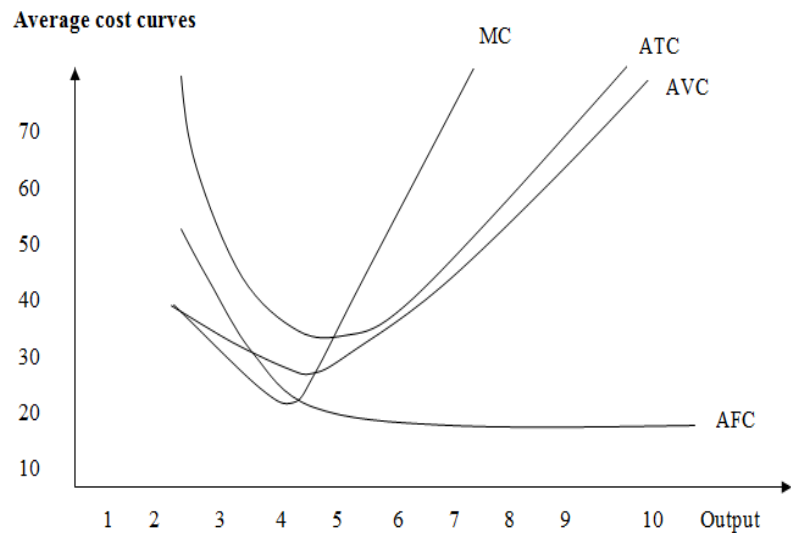
It's profitable for a firm to continue producing output level up to Q_1 because producing output up to Q_1 the firm would incur decreasing costs i.e. it would enjoy economies of scale. Thus from an output level below Q_1 , the firm would be under utilizing its capacity

On the other hand, producing an output level above Q_1 would be unprofitable as the firm would incur increasing costs i.e. diseconomies of scale. Thus for any output level above Q_1 , the firm would be over utilizing its capacity.

NB: The optimum size of a firm would be that output level that a firm produces where there are no economies of scale and no diseconomies of scale and the average total costs are at their minimum. This is the ideal size of a firm.

THE RELATIONSHIP BETWEEN THE AVERAGE COST CURVES

The average fixed costs fall with increase in output levels. The marginal cost curve cuts all the average cost curves. It cuts the ATC and AVC at the minimum points. If MC is less than any average cost curve, then the average cost curve falls.

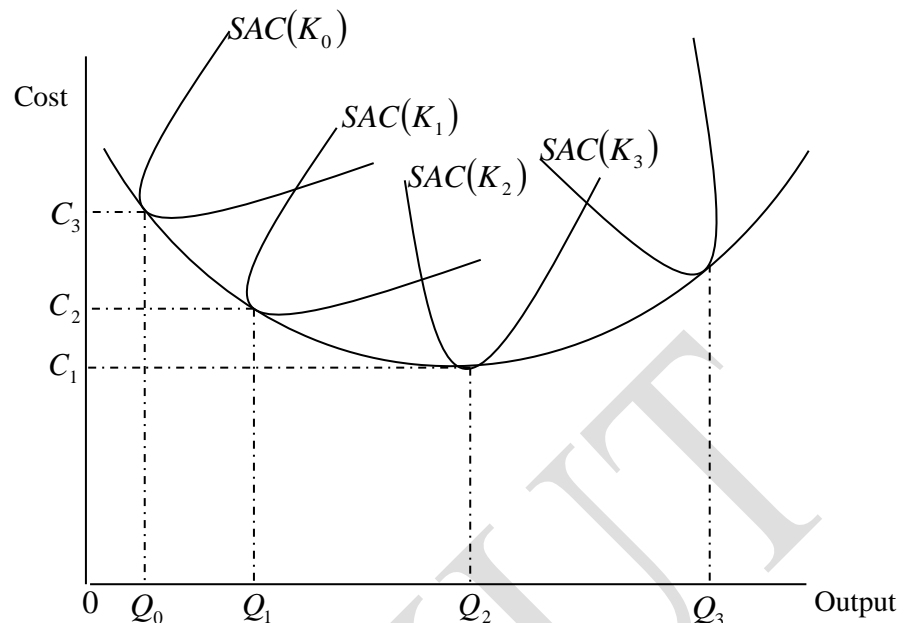


NB

- Any average cost curve is pulled downward if marginal cost is less than the average cost.
- When marginal cost is equal to any average cost then the average cost curve is no longer pulled downwards.
- When marginal cost is greater than the average cost then any average cost curve is pulled upwards except for the AFC curve.

LONG RUN COST

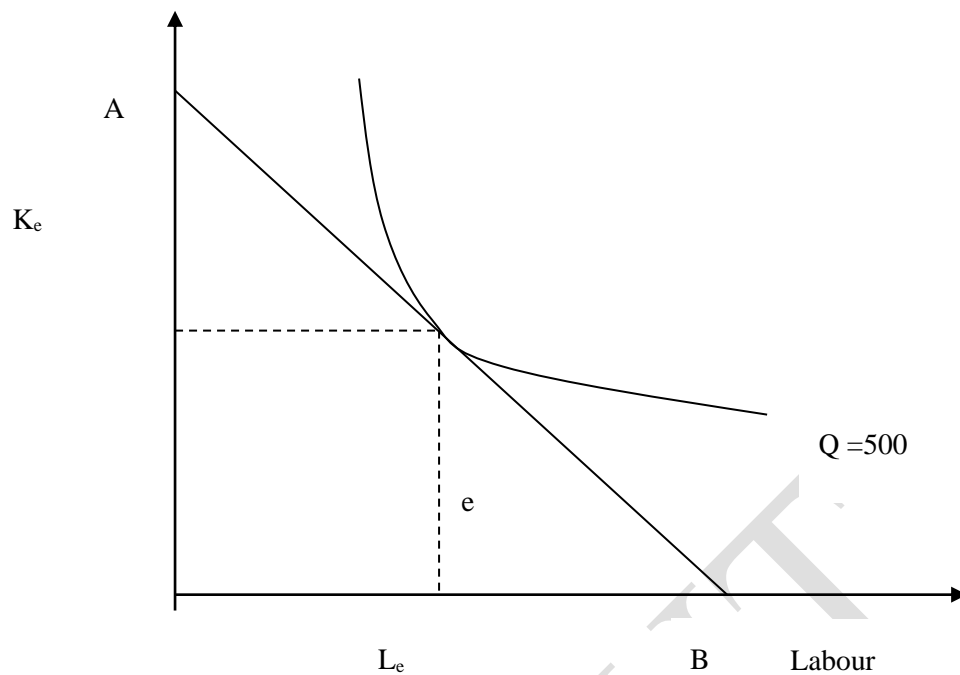
LONG RUN AVERAGE COST CURVE.



- In the long run planning period is long enough for a firm to be able to vary all factors of production it uses.
- A long run is composed of a series of short run alternative situations.
- Each situation comprises of a certain quantity of a fixed input (e.g. capital) which various units of variable inputs.
- $SAC(K_1)$ is a short run average cost curve associated with K_1 units of capital input. $SAC(K_0)$ is a short run average cost curve associated with a lower amount of capital.
- If we join the minimum point of the SAC curve, LAC curve is obtained.
- The LAC curve is also known as **envelope curve** or **planning curve**, because it covers various short-run average cost curves.
- It shows the least possible cost per unit of producing various output using different sizes of plants (capital).
- For instance, for the firm to produce Q_2 units of output, it would be appropriate to employ K_2 units of capital because it maximizes cost ($SAC(K_1)$ is at its maximum). The firm would pay a higher cost if it tried to produce Q_2 with K_1 units of capital.

THE OPTIMAL POINT OF A FIRM

This is that point where the isocost is tangential to an isoquant. Point e in the diagram below is the optimal point because the isocost AB is tangential to the isoquant



Where

AB = Isocost

E = Optimal point of the firm

K_e = Equilibrium units of capital

L_e = Equilibrium units of labour

At point e, K_e units of capital and L_e units of labour are used to produce 500 units of output.

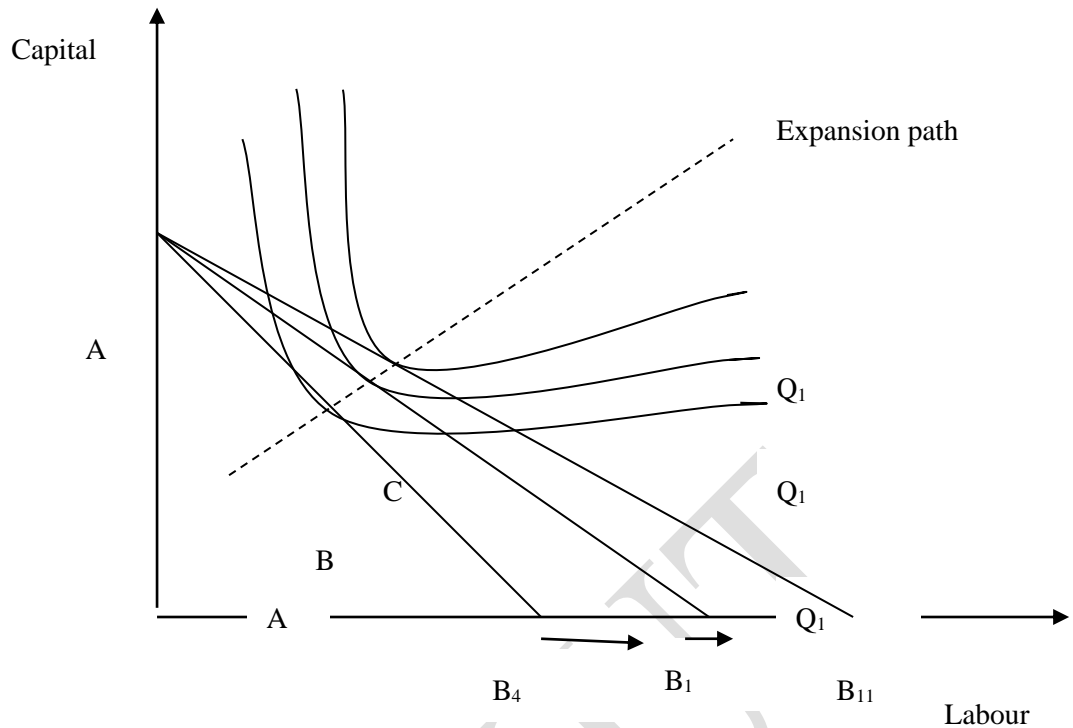
NB: For the optimal point of a firm to be obtained, two conditions must be fulfilled.

- ❖ The isocost must be tangential to an isoquant
- ❖ The ratio of marginal product of the factor to price must be the same for both factors i.e.

$$\frac{MP_k}{P_k} = \frac{MP_L}{P_L} \quad \text{and} \quad \frac{MP_k}{MP_L} = \frac{P_k}{P_L}$$

Effects of a change in the price of a factor of production e.g. decrease in the price of labour

A fall in the price of labour, leads to an increase in the demand for labour.



A, B, C = Firm's optimal point

$Q_1 \dots\dots Q$ = Isoquants

$AB \dots\dots A^n B^n$ = Isocost

As a result of this, the isocost line tilts from AB to A_1B_1 to AB_{11} . The optimal point of the firm shifts from point A to B to C. ***Tracing the optimal point of the firm gives you the expansion path.***

Least Cost Factor Combinations

If a firm wishes to maximize its profit, it must keep its costs as low as possible given its level of output. In the language of economists, the firm must use a least cost combination of inputs. A least cost combination of inputs is a combination of inputs that will enable a firm to produce a particular level of output for the lowest level of costs i.e. it's the combination of inputs that will enable a firm to produce the greatest amount of output possible for a given amount of money.

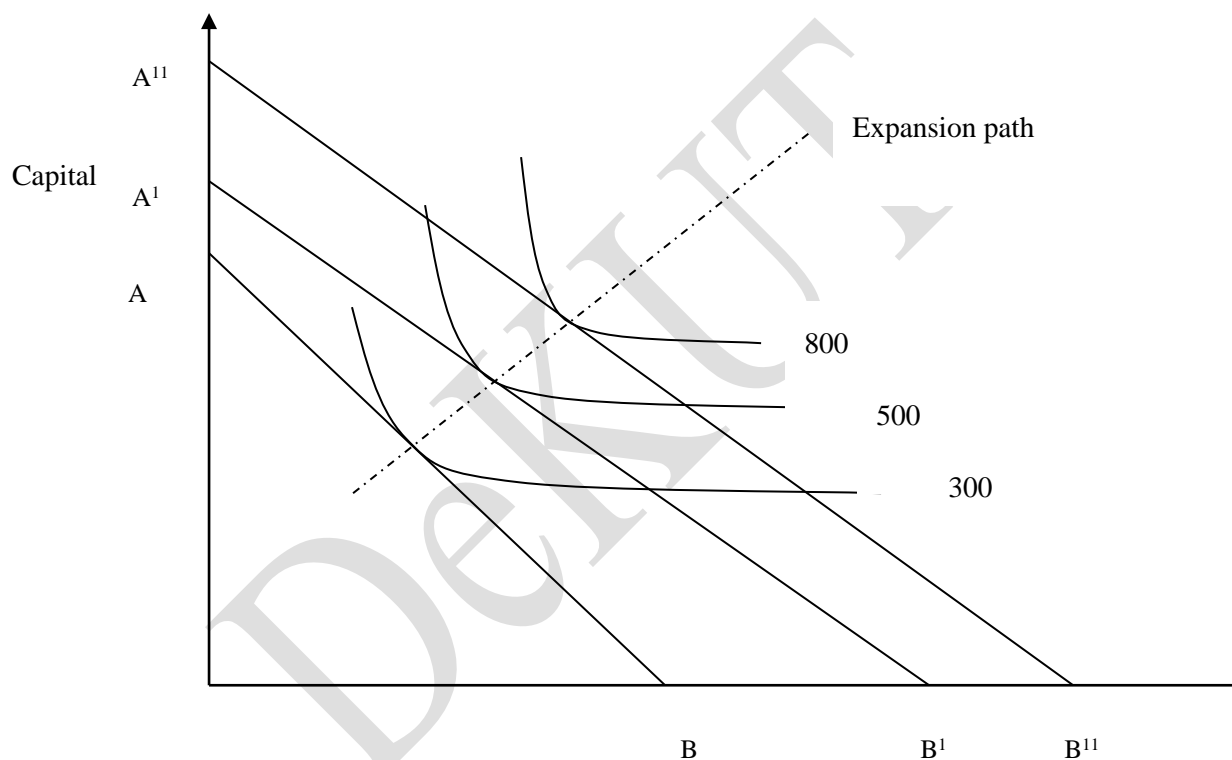
DECISION RULE

For a firm to have a least cost combination of inputs, eg of labour and capital , its necessary that the following condition holds.

$$\frac{MP_k}{P_k} = \frac{MP_l}{P_l}$$

Expansion Path

This is a locus of points joining various optimal points of the firm.



Unit summary



Summary

In this unit you learned the factors of productions and their rewards, production function and stages of production. We have also looked at isoquants, law of returns and the three stages of productions. We have also looked at the theory of cost and relationship of MC, AVC, AFC

[Continue your body text here]

Assignment



Assignment

Write short notes about

- the advantages and disadvantages of economies of scale
- localization of business enterprises

[Continue your body text here]

Assessment



Assessment

1. Define the following terms as used in economics

- Total product
 - Isocost
 - Diseconomies of scale
 - Fixed cost
2. Discuss using graphs, the shapes of isoquants
 3. List and explain the different types of economies of scale

[Continue your body text here]

Unit 7

MARKET STRUCTURES

Introduction

There exist various market structures, each distinguished by some distinct characteristics. Any hypothetical firm will be classified in any of this model. There is a set of different assumption on which each of this market structure is based upon. There is also a variety of different reasons as to why each of these distinct structures exists:

Economists group industries into 4 distinct market structures.

1. Pure competition
2. Pure monopoly
3. Monopolistic competition
4. Oligopoly

Upon completion of this unit you will be able to:

- *Describe* types of markets structures.
- *Explain* characteristics of all market structures.
- *Graph* the short and long run pricing decision for each market
- *Elaborate* equilibrium condition for each market.
- *Discuss* the sources of monopoly power and how it is sustained.
- *[verb]* [complete the sentence].



Outcomes



Terminology

Market structure:	[Term description]
Perfect competition:	[Term description]
Monopoly:	[Term description]
Oligopoly:	[Term description]
Monopolistic Competition:	[Term description]
[Term]:	[Term description]

[Term]: [Term description]

[Term]: [Term description]

PROFIT MAXIMISATION

Firms attempt to maximize profits

$$\pi = TR - TC$$

For firm to be able to maximize profits;

First order condition

$$\frac{\partial \pi}{\partial Q} = 0$$

$$\frac{\partial \pi}{\partial Q} = \frac{\partial TR}{\partial Q} - \frac{\partial TC}{\partial Q} = 0$$

But: $\frac{\partial TR}{\partial Q}$ is marginal revenue.

$\frac{\partial TC}{\partial Q}$ is marginal cost.

Therefore, for profit maximization

$$MR = MC$$

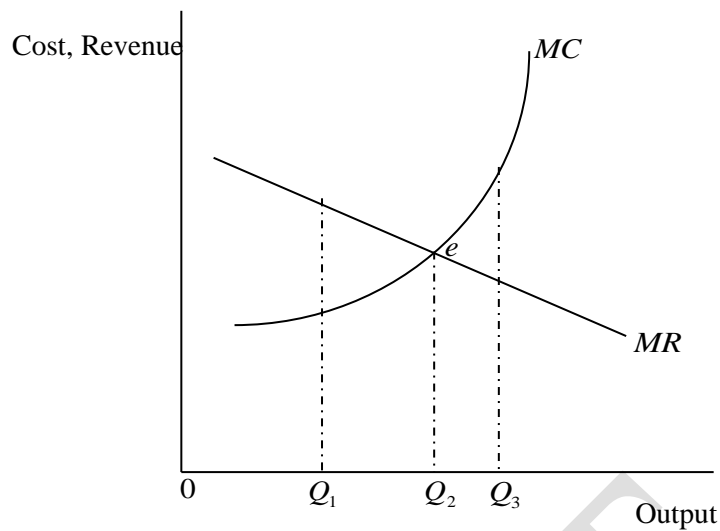
Second order condition for profit maximization

$$\frac{\partial^2 \pi}{\partial Q^2} < 0$$

$$\frac{\partial^2 \pi}{\partial Q^2} = \frac{\partial MR}{\partial Q} - \frac{\partial MC}{\partial Q} < 0$$

$$\therefore \frac{\partial MR}{\partial Q} < \frac{\partial MC}{\partial Q}$$

The second condition simply implies that the slope of the marginal cost should be greater than the slope of marginal revenue.



- (i) Q_2 would be the equilibrium output because $MR = MC$. It is the only point where π is maximized.
- (ii) At Q_1 $MR > MC$. If output is increased, it will add more to revenue than to the cost. This implies that increasing output would further increase profits.
- (iii) At Q_3 $MC > MR$. If output is increased, you add more to cost than to revenue. Thus increasing output would reduce profits.

Characteristics/Assumptions

The market structure is based on the following characteristics.

- **Very Large Numbers of participants**

A basic feature of this market is the presence of a large number of independently acting sellers, offering their products in the market. There exist an infinite number of buyers and sellers, each of whom has no influence on the market prices and output of the commodities in question.

- **Standardized Product**

There is a standardized (identical or homogenous) product. As long as the price is the same, consumers will be indifferent about which seller to buy the product from. Buyers view the product of firms A, B, C and D as perfect substitutes. Because firms sell standardized products, they make no attempt to differentiate their products and do not engage in other forms of non-price competition.

- **Price Takers**

Individual firms exert no significant control over product price. Each firm produces such a small fraction of total output that increasing or decreasing its output will not perceptibly influence total supply or, therefore, product price. Firms are price takers, and they cannot change market price but can only adjust to it. I.e. individual competitive product is at the mercy of the market.

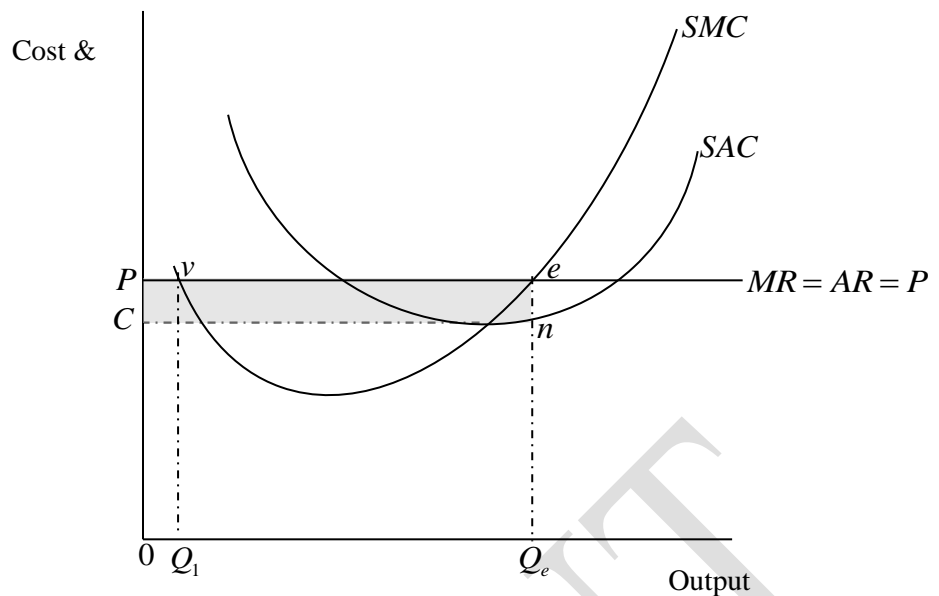
- **Free entry and Exit**

New firms can freely enter and existing firms can freely leave the market. No significant legal, technological, financial, or other obstacles prohibit new firms from selling their output in his market.

- Profit maximization:- all firms in the industry aim to maximize profit. No other goals are pursued.
- No government regulation:- government does not interfere with the market through imposing tariffs, subsidies etc. the forces of demand and supply are the ones which are left to bring the market back to equilibrium.
- Free mobility of factors of production:- factors of production are free to move from one firm to another throughout the economy. Labour is not unionized.
- Perfect knowledge. All sellers and buyers have complete knowledge of the conditions of the market. Information is free and costless. Under these conditions uncertainty about future development in the market is ruled out.
- No Transportation cost and if they do exist, they are the same for all the buyers and sellers.

SHORT-RUN EQUILIBRIUM OF FIRM UNDER PERFECT COMPETITION.

The term equilibrium of the firm can be defined as a situation where the firm does not wish to change the size of its output (i.e.) it is satisfied with the amount it is producing and therefore there is no need to vary the size of its plant. It follows therefore that the point of equilibrium of a firm is where the firm is making the highest profit and this is at a point where marginal cost equals marginal revenue ($MC = MR$)



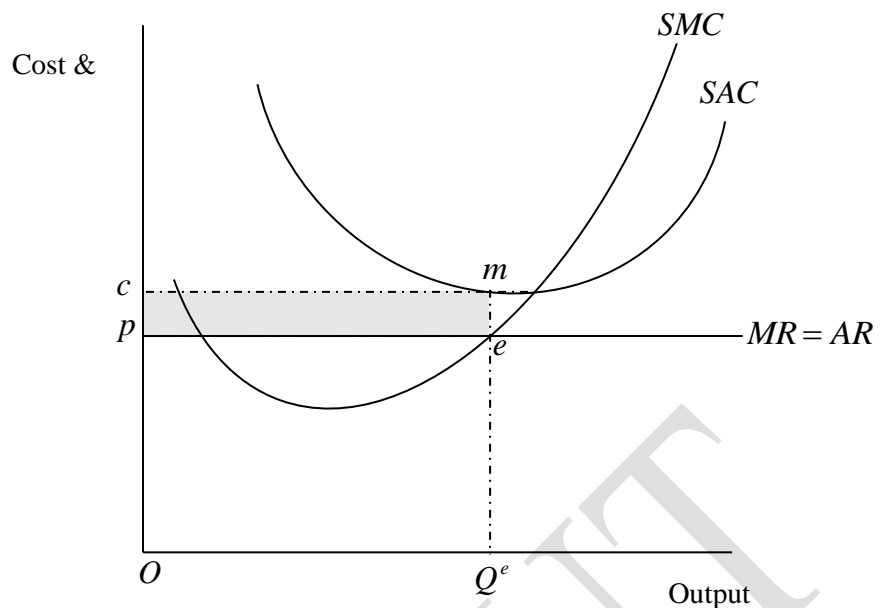
From Figure above, we note two points at which $MC = MR$, these are point v and point e. even though point v fulfills the condition ($MC = MR$), it cannot be the equilibrium point of the firm. Since $MC > MR$ implying that additional output adds more cost than revenue and therefore loss. Therefore it is at point e that the producer would be at equilibrium.

The sufficient condition therefore is for the MC to cut the MR curve from below. that is, slope of MC must be greater than slope of MR.

In the short-run, depending on the position of the average cost curve, the firm can make excess profit or loss. In this example the firm makes excess profits represented by shaded region PCne.

Short run equilibrium price is therefore p, and equilibrium output is Q_e

In short run a firm could also make losses as shown in Figure 3b.



To show the loss, draw the SAC curve above the AR curve. Area CPEM represents the excess loss.

LONGRUN EQUILIBRIUM OF THE FIRM

Since entry into the industry is free in case of perfect competition, the existence of excess profits (sometimes called super normal profits) attract other firms to enter the industry.

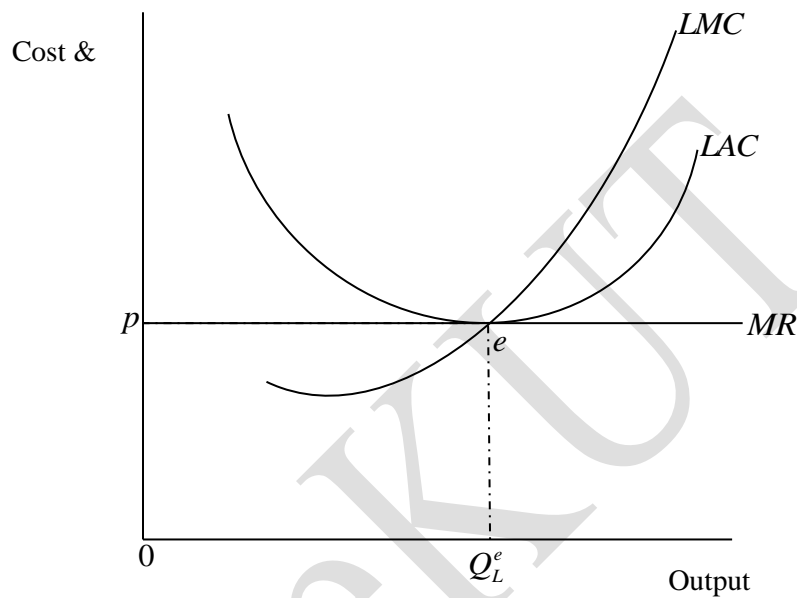
Or alternatively, existence of excess loss would cause some firms to exit the industry.

As new firms enter the industry, supply also increases. Due to the increased supply, the price in the market will fall and hence the price charged by the firm will also fall. The higher profits that were being enjoyed by the firms will start to drop.

In the long run, the firm will be at equilibrium when the excess profits have been exhausted and no new firms are attracted to enter the industry and when there are no losses to force the firm will be in the long run equilibrium when it is only enjoying normal profits.

A normal profit is defined as the rate of returns on capital just sufficient to provide capital investments necessary to develop and operate a firm.

The firm would enjoy normal profits where the long run marginal cost of the firm equals average cost and equal marginal revenue ($LMC = LAC = MR = P$), that is, at the point where long run AC is at its minimum.



At point e, ($LMC = LAC = MR = P$)

Normal profit = $OpeQ_L^e$

Here the firm is earning enough to keep it in the industry.

MONOPOLY

Characteristics Monopoly

Following are the features or **characteristics** of Monopoly :-

1. A single seller has complete control over the supply of the commodity.
2. There are no close substitutes for the product.

3. There is no free entry and exit because of some restrictions.
4. There is a complete negation of competition.
5. Monopolist is a price maker.
6. Since there is a single firm, the firm and industry are one and same i.e. firm coincides the industry.
7. Monopoly firm faces downward sloping demand curve. It means he can sell more at lower price and vice versa. Therefore, elasticity of demand factor is very important for him.

Source of monopoly

- (a) Ownership (sole owner) of strategic raw materials or exclusive knowledge of some production process.
- (b) Government licensing only a single firm to produce a given product (e.g. electricity by KPLC) or the imposition of trade barriers to exclude foreign competition.
- (c) Where production involves enormous economies of scale that can only be reaped by one firm e.g. in transport, electricity, communication and some cases of public utilities. This may be called natural monopoly.
- (d) Limiting pricing e.g. price undercutting, heavy advertisement, continuous product differentiation etc. to create barriers to potential competition and make entry unattractive.

TYPES OF PRICE DISCRIMINATION

1. It may be **personal** based on the incomes of the customers. Doctors and lawyers charge different fees from different customers on the basis of the incomes of the customers. Higher fees are charged to rich persons and lower to the poor.
2. Price discrimination may be based on the **nature of the product**. Paperback is cheaper than the deluxe editions of the same book, for the former is bought by the majority of readers and the latter by libraries. Unbranded products, like open tea, are sold at lower prices than branded products like Brook bond or Lipton tea.

Economy size tooth pastes are relatively cheaper than ordinary-sized tooth pastes. In the case of services too, such price discrimination is practiced when off-season rates of hotels at hill stations are very low as compared to the peak season. Dry-cleaning firms charge for two while they clean three clothes during off-season; whereas they charge for two while they clean three clothes during off-season; whereas they charge more for quick service in peak season.

3. Price discrimination is also related to the **age, sex and status** of the customers. Barbers charge less for children's haircuts. Certain cinema halls admit ladies only at lower rates. Military personnel uniforms are admitted at concessional rates in some cinema houses.
4. Discrimination is also based on the **time of service**. Cinema houses at certain places, like New Delhi, charge half the rates in the noon show than in the afternoon shows.
5. There is **geographical** or local discrimination when a monopolist sells in one market at a higher price than in the other market.
6. Discrimination may be based on the **use of the product**. Railways charge different rates for different services. Less is charged for the transportation of coal than for bales of cloth on the same route. State power boards charge low rates for industrial use than for domestic consumption of electricity.

CONDITIONS FOR DISCRIMINATION

For price discrimination to exist the following conditions must be satisfied.

- 1) **Market Imperfections**. Price discrimination is possible when there is some degree of market imperfection. The individual seller is able to divide and keep his market into separate parts only if it is imperfect. Customers do not move readily from one market to the other because of ignorance or inertia.

- 2) ***Agreement between Rival Sellers.*** Price discrimination also takes place when the seller of a commodity is a monopolist or when rival sellers enter into an agreement for the sale of the product to different products to different customers. This is usually possible in the sale of direct services. A single surgeon may charge a high fee for an operation from a rich patient and relatively low fee from a poor patient. In places where a number of surgeons and physicians practice, they charge their fees according to the incomes of the patients. The rate or fee is fixed for each category of patient. Lawyers charge from their clients in proportion to the degree of risk or amount of money involved in a law suit. Price discrimination is possible in the case of services because there is no possibility of resale
- 3) ***Geographical or Tariff Barriers.*** Discrimination may occur on geographical grounds. The monopolist may discriminate between home and foreign buyers by selling at a lower price in the foreign market than in the domestic market. This type of discrimination is known as “dumping.” It can only be successful if the commodities sold abroad can be prevented from being returned to the home country by tariff restrictions. Sometimes transport costs are so high that they act as a safeguard against the return of dumped goods. Geographical discrimination satisfies Pigou’s first condition for discrimination ‘when no unit of the commodity sold in one market can be transferred to another.
- 4) ***Differentiated Products.*** Discrimination is possible when buyers need the same service in connection with differentiated products. Railways charge different rates for the transport of coal and copper. For they know that it is physically impossible for a copper merchant to convert copper into coal for the purpose of transporting it cheap. This satisfies Pigou’s second condition that ‘no unit of command, proper to one market can be transferred to another.’ It also applies to discrimination based on age, sex, status, and income of buyers of services. For instance, a rich man cannot become poor for the sake of getting cheap medical facilities.

- 5) ***Ignorance of Buyers.*** Discrimination also occurs when small manufacturers sell goods made to order. They charge different rates to different buyers depending upon the intensity of their demand for the product. Shoe-makers charge a high price for the same variety from those customers who want them earlier than others. For the same variety of shoes, different buyers are also charged different prices because individual buyers are not in a position to know the price being charged to others.
- 6) ***Artificial Difference between Goods.*** A monopolist may create artificial differences by presenting the same commodity in different quantities. He may present it under different names and labels, one for the rich and snobbish buyers and the other for the ordinary. Thus he may charge different prices for substantially the same product. A washing soap manufacture may wrap a small quantity of the soap, give it a separate name and charge a higher price. He may sell it at Rs 5.50 per kg. as against Rs 5.00 for the unwrapped soap.
- 7) ***Difference in Demand.*** For the discrimination, the demand in the separate markets must be considerably different. Different prices can be charged in separate markets based on differences of elasticity of demand. Low price is charged where demand is more elastic and in high price in the market with the less elastic demand.

DEMAND AND REVENUE CURVES FOR MONOPOLIST

Unlike in perfect competition where a firm is a price taker, so that $P = MR = AR$, in the case of monopoly demand and marginal revenue will vary.

These will vary because the monopoly has the power to influence market price by deciding on the amount of output to offer in the market for sale.

Monopolist demand curve will be down ward sloping.

For simplicity assume a linear demand function of the form,

$$Q = b_0 - b_1 P \dots\dots\dots (i)$$

To plot it, make P subject of the formula.

$$P = \frac{b_0}{b_1} - \frac{1}{b_1} Q \dots\dots\dots (ii)$$

Total revenue for monopolist

$$TR = P \cdot Q \dots\dots\dots (iii)$$

Substitute (ii) into (iii)

To obtain

$$TR = \frac{b_0}{b_1} Q - \frac{1}{b_1} Q^2 \dots\dots\dots (iv)$$

$$AR = \frac{TR}{Q} = \frac{b_0}{b_1} - \frac{1}{b_1} Q \dots\dots\dots (v)$$

Note that $AR = P$ in the monopolist case.

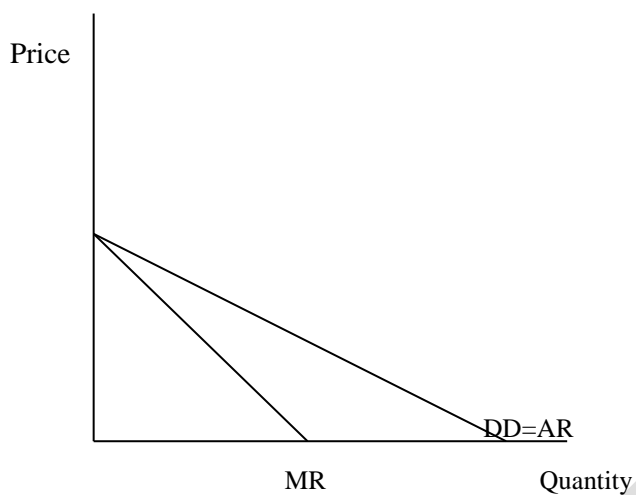
$$MR = \frac{\partial TR}{\partial Q} = \frac{b_0}{b_1} - \frac{2}{b_1} Q \dots\dots\dots (vi)$$

Note that the slope MR is twice the slope of AR.

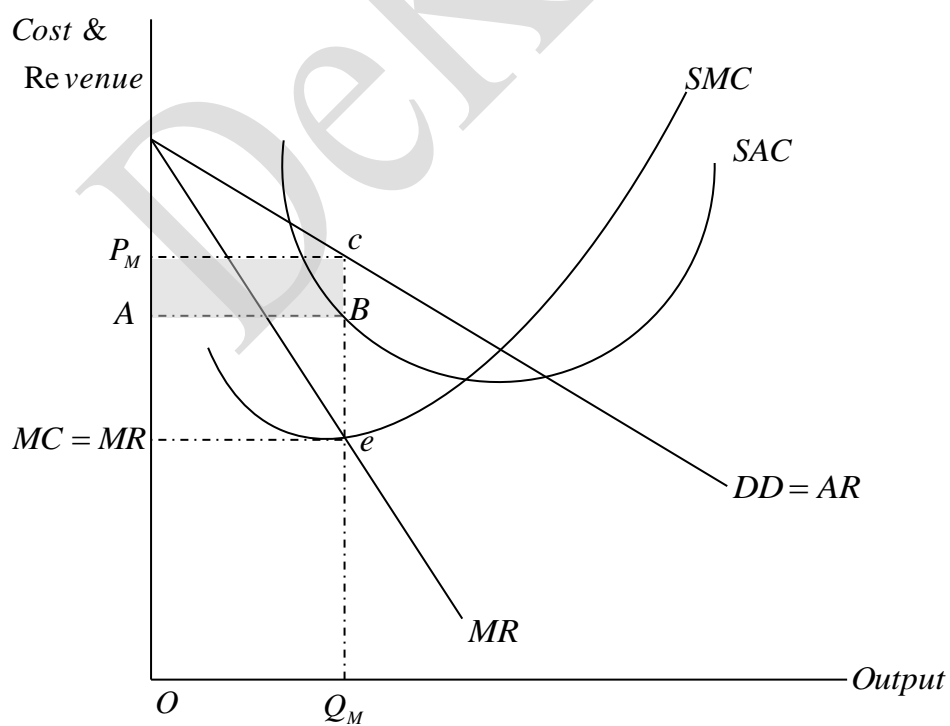
$$\left(\frac{\partial MR}{\partial Q} = \frac{-2}{b_1} \text{ \& } \frac{\partial AR}{\partial Q} = \frac{-1}{b_1} \right)$$

Both intercept the price axis at $\frac{b_0}{b_1}$

GRAPHICAL PRESENTATION



SHORT RUN EQUILIBRIUM UNDER THE MONOPOLY



For monopolist to maximize his short run profit, that is be in equilibrium at point where $MR = MC$. This will be at output level Q_m . Price per unit charged by a monopolist is P_m

The firm makes supernormal profits represented by shaded area $P_m ABC$

OLIGOPOLY

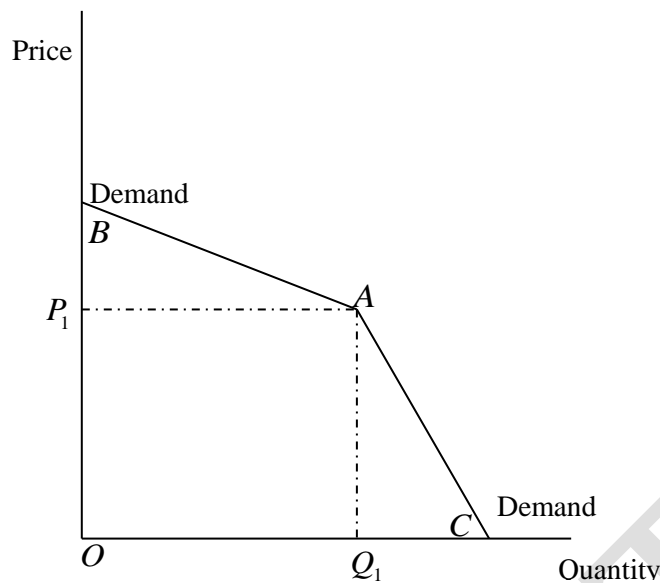
This is a market structure characterized by few large seller/firm that supply the whole market. The product they sell may or may not be differentiated.

If it is differentiated, the market structure is called **differentiated oligopoly**. The products they sell are differentiated in the minds of customers by say branding but these products are close substitutes as is the case with monopolistic market structure/ competition.

If the products are identical, the market structure is called **pure or perfect oligopoly**. Buyers have little cause for preferring the product of one producer to that of another (e.g. petroleum products of different oil companies). Examples of markets under oligopoly include markets for aluminum processing, glass, petroleum, automobile assembling etc.

Characteristics

- (a) Few sellers in the market
- (b) Demand curve of oligopolistic producers is a kinked demand curve as shown in the diagram below.



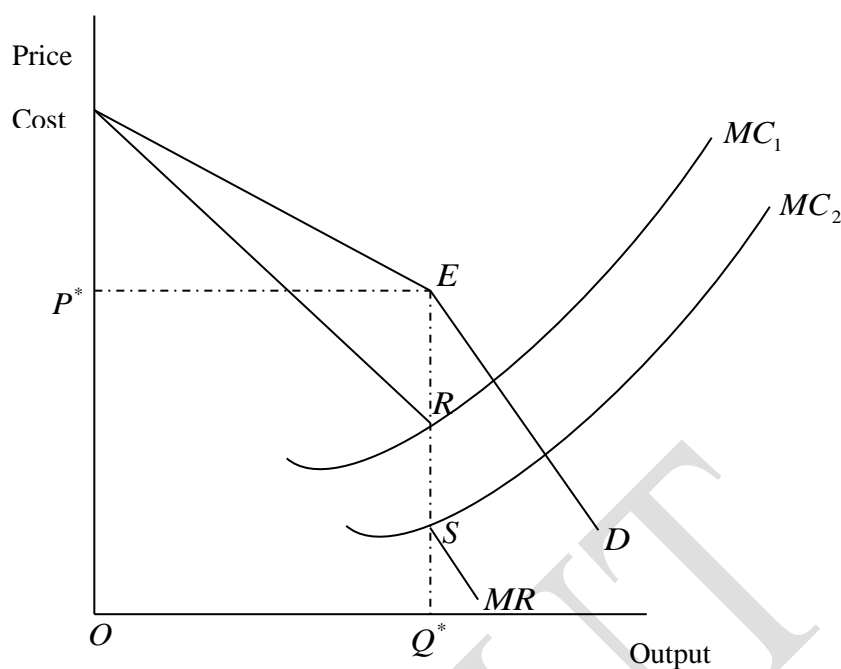
In the above diagram, it can be seen that the demand curve is kinked at point A and AB of the demand curve shows elastic demand situation, while AC shows an inelastic demand situation.

This is because under normal circumstances if an oligopolistic producer increased the price above P_1 the consumer will respond by cutting down the consumption of their commodity by large amount and therefore AB of the demand curve has to show a fairly elastic demand situation.

On the other hand, if the oligopolistic producer decides to reduce his price below P_1 other sellers would also reduce their price such that he would not be able to increase his sale by a greater proportion hence the portion AC of demand curve has to show an inelastic demand situation.

- (c) There is price rigidity in oligopolistic market. This is mainly because an oligopolistic producer cannot predict the reaction of other producers in the market in case he raised or lowered the prices.
- (d) Because sellers are few sometimes they can come together and form one organization the aim being to be able to control price fall by controlling the supply of their commodities in the market. When sellers come in one organization with the aim of controlling supply we say that they have formed a cartel organization.
- (e) Oligopolistic producers normally try to influence the demand they face through vigorous advertisement campaign.

EQUILIBRIUM IN OLIGOPOLISTIC FIRM



- Due to the kink in the demand curve of the oligopolist, his MR curve is discontinuous at the level of output corresponding to the kink.
- The MR has two segments: segment dR corresponds to the upper part of the demand curve, while the segment from point 5 corresponds to the lower part of the kinked-demand curve.
- Equilibrium of the firm is defined by the point of the kink because at any point to the left of the kink MC is below the MR, while to the right of the kink the MC is larger than the MR. thus total profit is maximized at the point of the kink.
- However, this equilibrium is not necessary defined by the intersection of the MC and the MR curve. Intersection of the MC with the MR segment requires abnormal high or abnormally low cost, which are rather rare in practice. The discontinuity (between raids) of the MR curve implies that there is a range within which cost may change without getting the equilibrium P^* and Q^* of the firm.
- In the figure, as long as MC passes through the segment RS, the firm maximize its profits by producing P^* and Q^* . Thus the kink can explain why price and output will not change despite changes in cost (within the range RS defined by the discontinuity of the MR curve).

Monopolistic competition

Monopolistically competitive market is similar to a perfectly competitive market in that it assumes many of its assumptions like existence of many firms/sellers and buyers, freedom of entry, exit etc. However it differs from

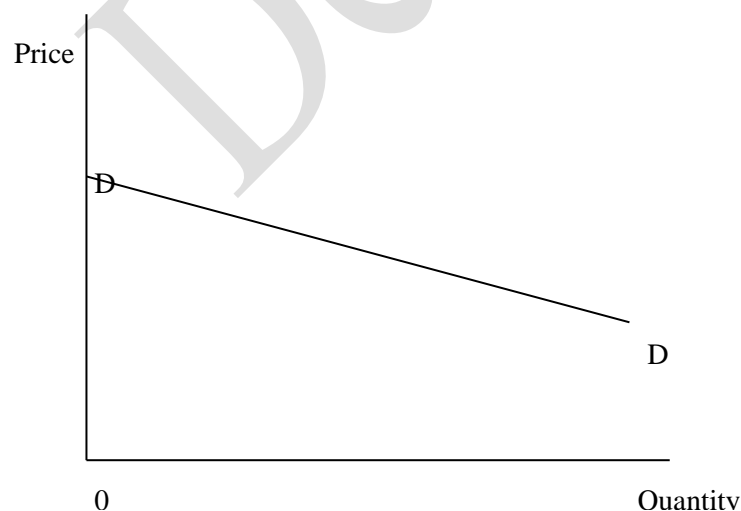
perfect competition in that the product is differentiated and not homogeneous. Each firm in the market sells a brand of the product that differs in quality, appearance or reputation, and it is the sole producer of its brand or of the particular brand.

Major characteristic

There are six characteristics of monopolistic competition (MC):

- product differentiation
- many firms
- free entry and exit in long run
- Independent decision making
- Market Power
- Buyers and Sellers have perfect information
- The goal of the firm is profit maximization both in the short run and in the long run.
- Price of factors and technology are given.

The demand curve of a monopolistic competitive firm is highly elastic but not perfectly elastic.



Sellers can charge a different price from one another but these differences in prices are not big because the goods are close substitutes.

SHORT-RUN AND LONG-RUN EQUILIBRIUM UNDER MONOPOLISTIC COMPETITION.

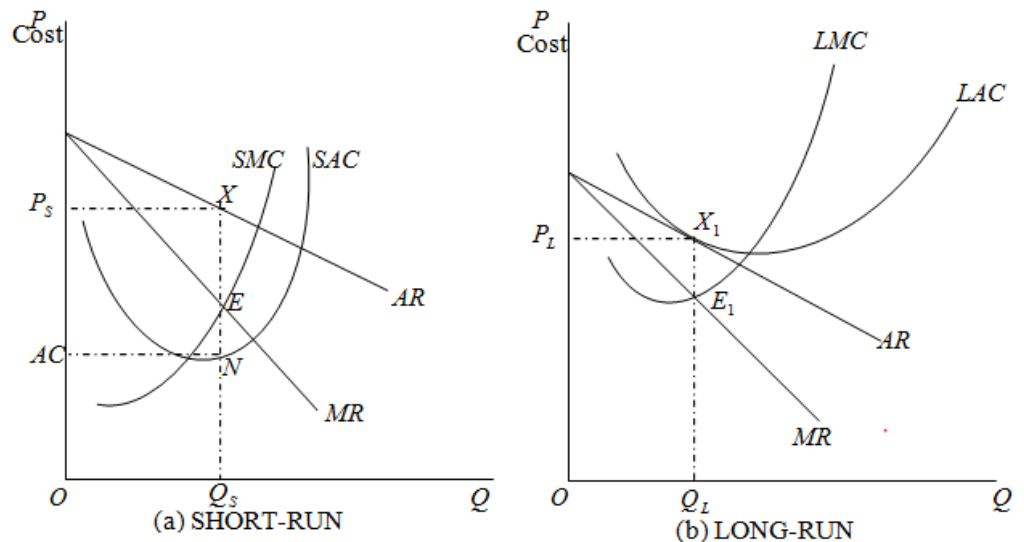


Figure 4(a) indicates the short-run equilibrium of a monopolistic firm. Here the behaviour of the firm is just like a monopoly which maximizes profit by equating MR and MC. This would be at point E. the firm produces output OQ_s in the short-run, and charges a price OP_s . The firm makes supernormal profits represented by area $P_s X N A C$.

The firm is able to make supernormal profits in the short-run because its product is differentiated from rival products, and the time is short enough so that no rival firm could change its strategy in the short-run.

However this situation may not continue for longer period. Since entry into the industry is free, new firms will enter the market whenever they find occurrence of the short-run economic profit for the existing firms.

This results in a competitive adjustment process in the market which stops at the point when the profit margin completely vanishes from the market for every firm. (i.e. firms earn normal profits) this situation will be called the long-run equilibrium of the monopolistic firm.

Long-run equilibrium will be at point X_1 in figure 6(b), when the demand curve is tangent to the average cost curve, showing no profit no loss situation.

The tangency point showing the long-run equilibrium will be before the minimum of the average cost curve because the demand curve is downwards sloping though elastic in nature.

Unlike in perfect competition where long-run equilibrium condition was for $P = AC = MC = MR$, for monopolistic competitive firm, $MR = MC$ and $P = AC$. This means that just below point X_1 in figure 6 (b), the $MR = MC$ condition will be satisfied.

Unit summary



Summary

In this unit you learned the key objective of any firm, characteristics and equilibrium conditions for each market

[Continue your body text here]

Assignment



Assignment

Write a term paper on market structures

[Continue your body text here]

Assessment



Assessment

Discuss the main characteristic of oligopoly

Elaborate on how monopoly is maintained in a country

Explain using graph the short run and long run equilibrium condition of an oligopoly firm

[Continue your body text here]

DEKUT