

PRINCIPLES OF ECONOMICS

AEM 102

PROF. O.F. ASHAOLU



RECOMMENDED TEXTBOOK: Salvatore, D. and Diulio, E. A. (1996)
Principles of Economics, 2nd Edn., Schaum's Outlines 400pp.

- **Course Coordinator:** Prof. O.F. Ashaolu
- **Other Lecturers:** Dr. A.E. Obayelu
- Dr. (Mrs) T.O. Oyekale
- Dr. (Mrs) S.B. Ibrahim
- Dr. (Mrs.) A.O. Arowolo
- Dr. (Mrs) E.T. Tolorunju
- Dr. A.S. Coster
- Dr. S.O. Oladeji
- Dr. (Mrs). F.O. Oke
- Mr. R.O. Aminu
- Mr. F.P. Oyawole
- Mr. S. Afolayan



WEEKS:

- 1 INTRODUCTION TO ECONOMICS and THE ECONOMIC PROBLEM
- 2-4 DEMAND, SUPPLY, EQUILIBRIUM and ELASTICITY
- 5 UNEMPLOYMENT, AND NATIONAL INCOME
- 6 CONSUMPTION, INVESTMENT AND EXPORTS
- 7 INFLATION, DEFICITS AND DEBT
- 8 THEORY OF CONSUMER DEMAND and UTILITY
- 9 COSTS OF PRODUCTION



1.0 INTRODUCTION TO ECONOMICS

- Learning outcomes:
- At the end of this presentation, students should be able to understand the following:
 - 1.1. The Subject Matter of Economics
 - 1.2. The Methodology of Economics
 - 1.3. The Use of Tables, Graphs and Equations



1.1. THE SUBJECT MATTER OF ECONOMICS

Economics is a **social science**.

The Adam Smith's definition says that Economics is a social science which studies human behavior as a relationship between ends and scarce means, which have alternative uses.

It studies **individuals and organizations** engaged in **production, distribution and consumption** of goods and services (using **scarce** resources of land, labour, capital).

The study of Economics involves three different **tools** which are:

1. Principles
2. Theories and
3. Models.



PRINCIPLES, THEORIES AND MODELS

1. Principles:- are basic laws of the discipline

e.g. (a) an increase in the price of a commodity results in a decrease in the demand for the commodity, *Ceteris paribus* (other things being equal).

(b) The law of diminishing returns which states that the more a variable input is used in production with fixed inputs, the less is its marginal product.

(c) Consumption of a commodity increases as consumer's income increases

2. Theories: – these are further explanations of the general principles

e.g., the consumer theory which states that consumption is a function of income.

- Quantity demanded for a commodity falls as its price increases
- Quantity supplied of a commodity increases as its price increases



3. Models:- are mathematical relationships between economic variables in a phenomenon, e.g. Cost of production is a function of the quantity of the outputs produced

i.e. $C = f(Q)$. Where: C = Cost of production (₦),

Q = Output e.g. maize in tonnes , f =function

NOTE: There is a dependent variable (Regressand i.e. Cost)

There are independent variables (Regressors e.g. Quantity of output)

- Models are developed around the cause and effect of economic events.
- Also, models isolate a few of the most important determinants or causes of the economic events.
- They are used to:
 - i. Predict economic occurrences
 - ii. Develop policies that will prevent or correct economic problems e.g. unemployment, inflation, forex supply, forex demand, wastages in the economy.



BRANCHES OF ECONOMICS

Economics is subdivided into branches:

- Microeconomics
- Macroeconomics

Microeconomics studies the economic behavior of individual decision-making units e.g. farmers, consumers, companies and resource owners **in a free-enterprise economy.**

Macroeconomics studies the behavior of aggregates of economic activities e.g. aggregate demand, level of national income, aggregate output, level of employment, aggregate unemployment, the general price level and the balance of payment.



RELEVANCE OF ECONOMICS

- The performance of the economy (**economic condition**) affects all members of the nation.
- Economic conditions determine where we live (Villages, towns, cities), what we eat, when we eat, the school attended, whether we work or not and how much we earn.
- Economic conditions affect the peace and stability in our cities, nation and in the world – unemployment, inflation and corruption.
- Economics gives a better understanding of how the economy operates and what can be done to avoid, correct and alleviate unemployment, inflation and waste (**economic problems**).



1.2 THE METHODOLOGY OF ECONOMICS

Economic phenomena are **complex**, so, economists model economic behaviors.

In constructing a model, economists:

- (i) make assumptions which cut away unnecessary details; and
- (ii) reduce the complexity of the economic behavior.

The economic behavior is then presented as a relationship between a **dependent variable** (Regressand) and a few **independent variables** (Regressors)

- The economic behavior being explained is the dependent variable while the variables explaining that economic behavior are the independent variables.



Dependent variable: is a variable whose value depends upon another economic event. e.g. spending by an individual is dependent upon the receipt of income.

Independent variable: is a variable whose value determines the value of another (dependent) variable. e.g. an individual's income largely determines the amount that an individual can spend.

Frequently, the dependent variable is presented as depending upon one independent variable, with the influence of the other independent variables held constant. e.g. $C = f(Y_d/T, W, D)$

That is, C depends upon Y_d (given that other independent variables T , W and D are held constant).



- A manufacturer of Compact Discs (CD) must anticipate the quantity of CDs that individuals will buy. Purchases or demand, are probably influenced by a large number of variables such as
- X_1 (Price of each CD)
- X_2 (Price of CD players)
- X_3 (Price of Tapes)
- X_4 (Price of Tape desks)
- X_5 (People's income)
- X_6 (Desire to listen to music rather than watch videos)
- X_7 (Other non-specified variables)
- Hence the demand for CDs can be presented as
- $Q_{cd} = f(X_1/X_2, \dots, X_7)$. *Ceteris paribus*



An economic model also, specifies the type of relationship between the dependent and independent variables.

This relationship can be:

- (a.) positive or (b.) negative

(a.) **Positive relationship:** when the dependent variable moves in the same direction as the independent variable e.g. positive relationship between price (independent variable) and supply (dependent variable), *Ceteris paribus*.

e.g. $C=f(Y_d)$

$$C=a+bY_d$$

(b.) **Negative relationship:** when the value of the dependent variable increases as the value of the independent variable decreases e.g. as the price of a commodity increases, its demand decreases, *Ceteris paribus* (all things being equal).

e.g. $Q_d=f(P)$

$$Q_d=a-bP$$



1.3. THE USE OF TABLES, GRAPHS AND EQUATIONS

Models which simplify real economic relationships provide the frame work for:

- organizing data,
- empirically testing economic hypotheses
- and forecasting economic behavior.

Below is a consumer spending model with data on consumer spending for a hypothetical economy.

We shall:

- * graph the data with consumption on the Y-axis and disposable income on the X-axis
- *establish an equation for consumer spending; and
- *use the equation to forecast consumer spending.



TABLE 1: CONSUMPTION AND DISPOSABLE INCOME DATA (SCHEDULE).

	Disposable Income (X in Naira) Regressor	Consumption (Y, Kg) Regressand	$y=Y - \bar{Y}$	$x=X - \bar{X}$	xy	x^2
1	20,000	20,000	-2100	-2800	588 x10 ⁴	784 x10 ⁴
2	21,000	20,750	- 1350	- 1800	243x10 ⁴	324x10 ⁴
3	22,000	21,500	- 600	- 800	48 x10 ⁴	64x10 ⁴
4	24,000	23,000	900	1200	108x10 ⁴	144x10 ⁴
5	27,000	25,250	3150	4200	1323x10 ⁴	1764x10 ⁴
TOTAL	114,000	110,500	0	17325000	0	30800000
Average	$\bar{X} = 22,800$	22,100	$b = \frac{\sum(xy)}{\sum x^2}$	$b = \frac{2310}{3080} = 0.75$	$\Sigma(xy) = 2310 \times 10^4$	$\Sigma x^2 = 3080 \times 10^4$
SOURCE:	Survey Data					



EQUATION OF THE FUNCTION

The equation for above set of data.

- A linear relationship is evident in the graph.
- The appropriate equation is of the form:

$$Y = a + bX ,$$

This is a linear relationship, where,

- a is **the intercept** (a constant) and
- b is **the slope** (a constant too) is the coefficient of X,
- Y and X are called variables while
a and b are **constants/parameters** of the relationship



Using Ordinary Least Squares Regression Technique (OLS) Estimators

- With the assumption of a linear equation between Y and X,
- With 2 variables (One Dependent variable Y and one Independent variable, X)
- We can say: $Y = a + b X$
- a is intercept. This is the value Y assumes when $X=0$
- b is the slope = $\frac{\Delta Y}{\Delta X}$
- OLS estimator for $b = \frac{\Sigma(xy)}{\Sigma(x^2)}$,
- where $x=X-\bar{X}$, lower case x; deviation from the mean X
- and $y=Y-\bar{Y}$, deviation from the mean Y
- $a = \bar{Y} - b \bar{X}$



- $b = 231/308$
= 0.75
- $b = 0.75$
- $a = 22100 - 0.75 \times 22800$
- $a = 22100 - 17100$
- $a = 5000$
- $Y = 5000 + 0.75X$



GRAPH

- A graph is a visual presentation of the relationship between 2 variables or the behaviour of a variable over time.
- Graphs are useful in that they help establish relationships
- Whereas a verbal explanation may be misinterpreted, a graph provides a visual presentation which is easily appreciated
- Consumption is plotted on the vertical (Y)-axis
- Disposable income is plotted on the horizontal(X)-axis
- The dependent variable is usually on the vertical (Y)-axis
- The independent variable is usually on the vertical (X)-axis
- The consumption and disposable income display a positive relationship



GRAPH

Consumption

$C (\text{₹})$

$$C = f(a+bY_d)$$

$Y_d (\text{₹})$

Hay-Why-U

Fig.1: Consumption as a function of Disposable Income



CONSUMPTION AND DISPOSABLE INCOME DATA.

From Table 1, it is evident that consumption and disposable income display a positive relationship.

Note: A **Table/Schedule** is made up of a number of rows and columns of data.

The following must be specified for a Table: a title, a Table number, units of measurement of the data and the source of the data.



GRAPH AND EQUATION

In a graph, the following must, also, be specified: a title, a figure number, scale and axes (vertical and horizontal) identities with units of measurement.

The equation for above set of data.

A linear relationship is evident in the graph. The appropriate equation is, therefore of the form:



EQUATION OF THE FUNCTION

$$Y = a + bX ,$$

since it's a linear relationship

where: a is the intercept (a constant)

and b is the coefficient of X, or the slope of the equation

Y and X are the variables.

Hay-Why-U'



With observations on X and Y variables

Parameters of the relationship can be computed.

From Ordinary Least Squares (OLS) :

$$b = \frac{\sum(xy)}{\sum x^2}$$

$$a = \bar{Y} - b\bar{X}$$

x = deviations from the mean of X i.e. $x = X_i - \bar{X}$

y = deviations from the mean of Y, i.e. $y = Y_i - \bar{Y}$

Σ is summation sign

\bar{X} is mean of X

\bar{Y} is mean of Y

We can compute a and b , and insert in the equation, to have $Y = a + bX$

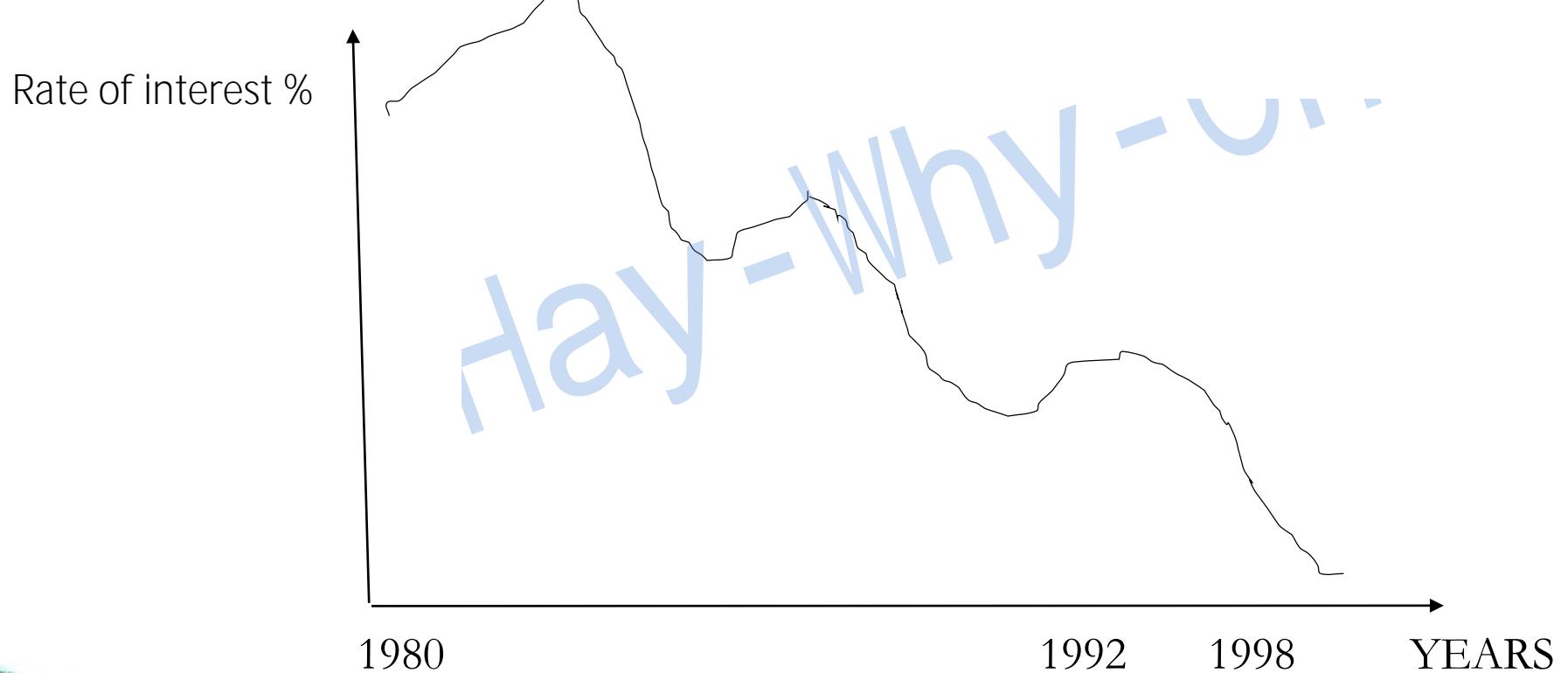


TIME SERIES GRAPH

- Suppose average yield on 3-month treasury bills from 1980 to 1998 are plotted with rate of interest on Y-axis and the year on X-axis. The graph will be a time series graph.
- A time series graph is one in which the behaviour of a single variable has been presented at various time intervals.
- The relationship between 2 variables can be presented over periods of time (in a time series graph) or at a point in time.



- We could plot a variable against the values it takes over time.
- This would give the time series graph.
- When 2 variables are plotted against one another, they represent the cross-sectional data, that is the values they take at a point in time.



BRAIN TEASERS

- Suppose consumption spending is presented as:

$$C = 50 + 0.50Y_d$$

- Create a Table that shows the amount consumed (C) when disposable incomes (Y_d) are N150, N200, N250, N300 and N350

- Graph the data from the Table and label it C_1 .

- Suppose the consumption equation changes to:

$$C = 75 + 0.50Y_d$$

- Plot the new consumption equation on the same graph and label it C_2 .

- What happens to the consumption line when the constant term (the intercept) of the consumption equation increases from N50 to N75?



BRAIN TEAZERS/ASSIGNMENTS

- Assume you are given the following data as the number of TV sets individuals are willing to buy from two cities –A and B at various prices

Prices(₦'00)	Q-City A	Q-City B
350	100	75
325	150	100
300	200	125
275	250	150
250	300	175



ASSIGNMENTS

- Plot these data with P on the vertical axis and quantity Q on the horizontal axis.
- Set price and quantity increments at N25 and 25 units
- For city A and B draw the demand graphs and label them D_1 and D_2
- Find the increase in TV quantities purchased in cities A and B when the price is lowered from N300 to N275



SLOPE OF LINES

- The slope of a straight line is the change in the vertical axis, ΔP divided by a change in the horizontal axis, ΔQ
i.e. line slope = $\Delta P / \Delta Q$
- Find the slope of the demand line D_1 and D_2 , when the price is lowered from N300 to N275
- Which demand line is more steeply sloped?
- What does the difference in the slope of demand lines D_1 and D_2 indicate?



- Re-plot the data. Plot price on the vertical axis in increments of N25 but plot quantity demanded on horizontal axis in increments of 50 units rather than 25.
- Virtually compare the demand lines in the 2 graphs.
- Does it appear that the steepness of the demand lines has changed?
- Has the slope of either demand line changed?
- Can one misinterpret the strength of the relationship of the 2 variables by virtual inspection of the data?



Summary of the Topic:

- Economics is a discipline which studies how scarce economic resources are used to maximize production for a society. Microeconomics studies the economic behavior of individual units; Macroeconomics studies the behavior of aggregates.
- Economic theories and models are developed to facilitate the understanding of complex economic phenomena. Models of economic behavior relate a dependent variable to a limited number of independent variables. The term *Ceteris paribus* is used when the value of all but one of the independent variables is held constant.
- Economics use tables, graphs, and equations to present modeled behavior. Graphs are useful in that they provide visualization of the relationship between two variables. An equation is a more concise presentation of a relationship and is essential for the forecasting of economic behavior.



PRINCIPLES OF ECONOMICS I

AEM 102/ AGRIC ECONS AND FARM MGT.

DR A. E. OBAYELU



Course Descriptions

Economic Problems (PART A)

- This module talks about:
- Some of the ways Economics have been defined
- Types of economic resources
- Fundamental economic problem

Hay-Why



LEARNING OBJECTIVES

At the end of this module, students should be able to:

1. Identify the various types of economic resources
2. Explain the basic economic problem
3. Explain the basic questions in economics due to the problem of scarcity



Recall some of the various definitions of Economics

- **Economics** is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses – Robbins
- **Economics** as the study of man in the ordinary business of life. Alfred Marshall
- **Economics** is a social science that seeks to analyze and describe the production, distribution, and consumption of wealth.
- **Economics** is not just about money but making different choices or alternatives
- **Economics** is the study of scarcity.
- Economics is the study of allocation of scarce resources to satisfy human wants.



What are Economic Resources?

- Economic resources also called the factors of production.
- Economic resources consist of:
 - (i) natural resources such as: minerals, forests, rivers and agricultural land. This we often call **land**
 - (ii) **Labor** : is human resource which consists of human beings who possess a wide array of skills needed to produce goods and services [or] all physical and mental talents of individuals or



What are Economic Resources? Conts

(iii) **Capital:** are human-made resources which consist of tools, equipment, machinery, buildings, financial instruments and transportation networks to facilitate production

Or all manufactured aids/tools/equipment used in producing goods and services, and cash

(iv) **Entrepreneurial ability:** This is a special labour skill. It includes: initiator, innovator, strategic decision maker, risk taker.

All these are used in the production of goods and services.

- They are **economic resources** because they are scarce (limited in supply and desired).



Rewards to Economic Resources

The respective returns to these resources is often described as

- **rent** for land;
- **wages** for labor;
- **interest** for capital; and
- **profit** for the entrepreneur.

That is, the owner of land is entitled to receive rent, the worker is entitled to receive a wage, the owner of capital is entitled to an interest payment, and the entrepreneur retains any profit.



FUNDAMENTAL ECONOMIC PROBLEMS

The basic economic problem is the issue of

- (i) Scarcity
- (ii) How best to produce and
- (iii) distribute these **scare resources**.

- Scarcity means there is a **finite** supply of goods and raw materials.
- Finite resources mean they are limited and can run out.



UNLIMITED WANTS

- **Unlimited wants** mean that there is no end to the quantity of goods and services people would like to consume.
- Because of unlimited wants – People would like to consume more than it is possible to produce (scarcity)
- Output is limited by the state of technology and the quantity and quality of the economy's resources, ie the quantity and quality of human, capital and natural resources

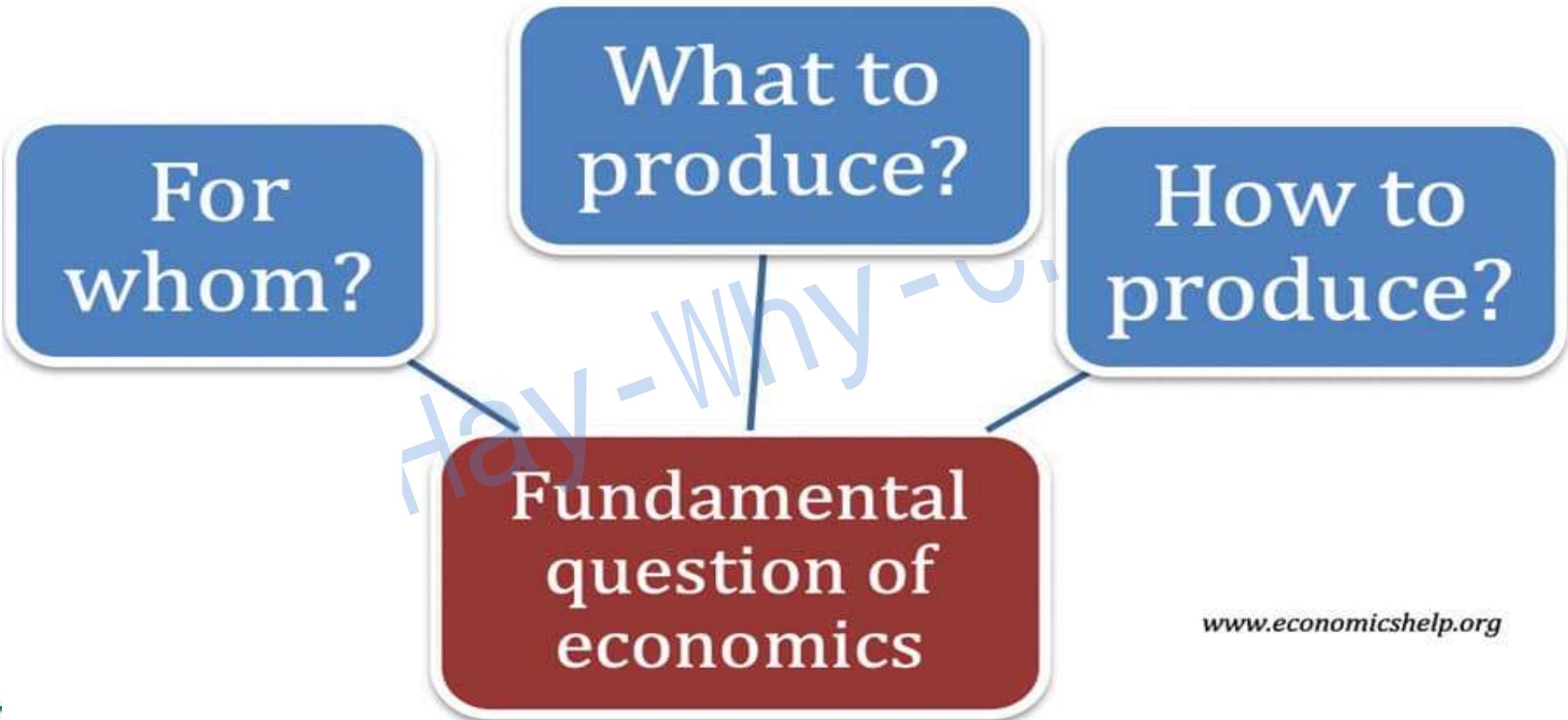


Why Cost/Price on Goods and Services?

- Because economic resources and output of goods and services are limited, the production of each good and services involves cost.
- Each good and service produced is supplied at a price greater than zero.
- Decisions must be made regarding
 - (i) What to produce
 - (ii) How to produce and
 - (iii) for whom to produce?



Fundamental Economic Questions



www.economicshelp.org

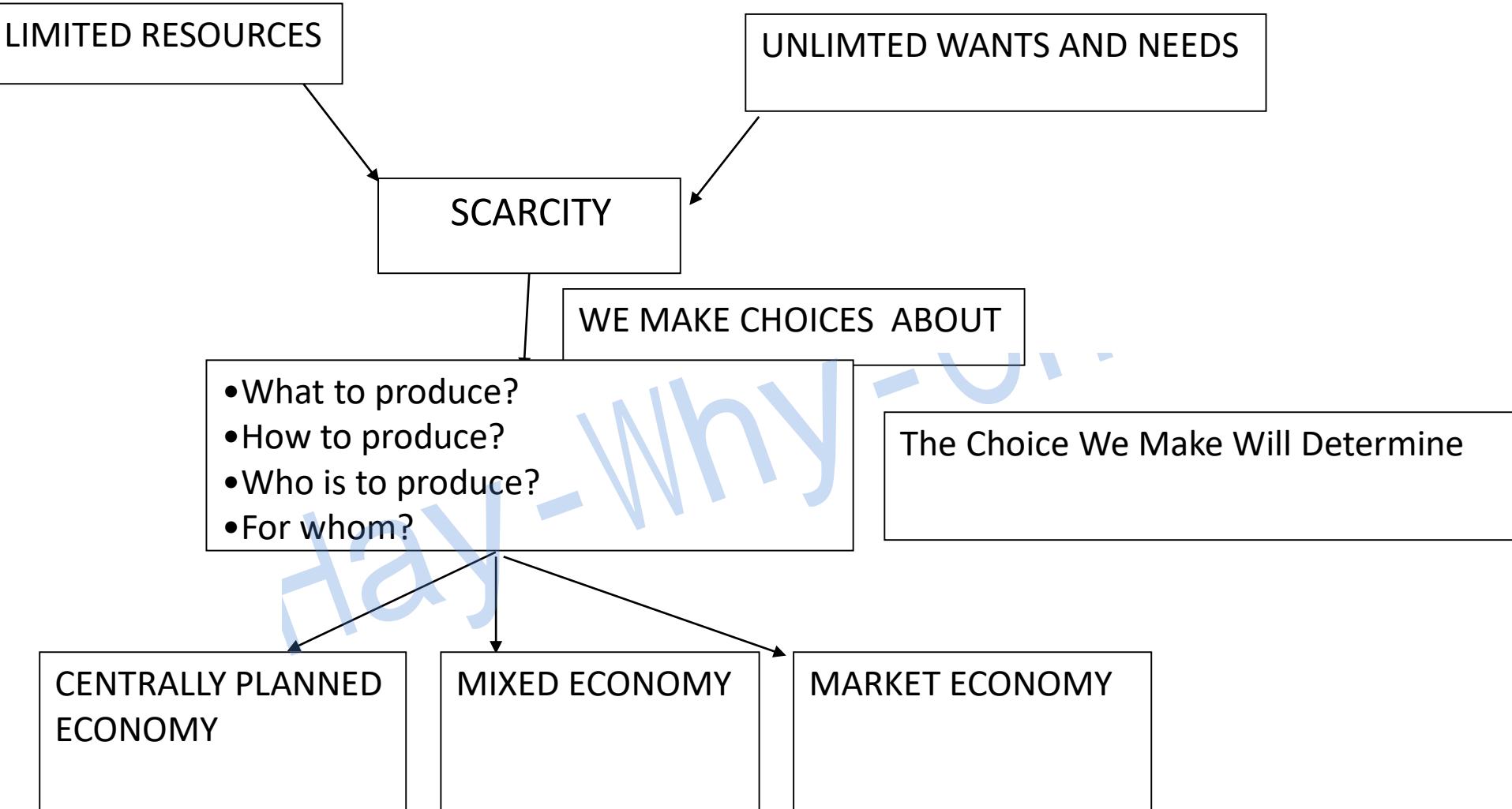


SCARCITY

- **Scarcity** is when the **means** to fulfill **ends** are limited and costly.
- We can say the central problem of all economies is scarcity
- Without scarcity, there is no economics
- Limited resources + Unlimited wants = Scarcity
- Scarcity is the basis of many economic concepts because it constrains or limits our behavior
- Scarcity exists worldwide because people want more goods and services than can be produced by each economy's limited supply of economic resources
- Scarcity is a fundamental problem for every society.



SCARCITY



What does scarcity do?

Scarcity forces individuals, firms governments and societies to make choices

Hay-Why-U-



Examples of Economic Problem

By Consumers/ Households

Households have limited income and they need to decide how to spend their finite income.

By Workers

Householders will also face decisions on how much to work. For example, working overtime at the weekend will give them extra income to spend, but less leisure time to enjoy it.

By Producers

A producer needs to remain profitable (revenue higher than costs). So it will need to produce the goods which are in high demand and respond to changing demands and buying habits of consumers



Examples of Economic Problem Conts

By Firms

Firms may also need to make long-term investment decisions to invest in new products and new means of production.

Government

The government has finite resources and its spending power is limited by the amount of tax that they can collect. The government needs to decide how they collect tax and then they need to decide whom they spend money on.

For example, the government may wish to cut benefits to those on low income to increase incentives to work.

However, cutting benefits will increase inequality and relative poverty.



WHAT TO PRODUCE?

- What to produce involves decisions about the **kind and quantities of goods and services to produce**
- Every society must decide how many mansions and low cost houses to construct
- How many schools and teachers to train
- How much food and medical service to supply
- How many civilian and defence goods and services to supply



HOW TO PRODUCE?

- How to produce involves decisions about techniques to use and how economic resources of labour capital and land are to be combined in producing an output.
- Labour, capital and land are resources or factors of production
- Do you use capital intensive or labour intensive production technique?



WHOM TO PRODUCE?

- For whom to produce involves decisions on the distribution of output.
- It is how what has been produced is to be distributed among members of the society
- Payment of income to individuals in the society, the price of each good and services, and the personal preferences of each individual will determine the distribution of goods and services among members of the society



OPPORTUNITY COST

- Decision on what to produce and how to produce involve opportunity costs.
- An opportunity cost is what is sacrificed to implement an alternative action.
- It is what is given up to obtain or produce a particular good or service
- For example what is given up to expand a country's military arsenal in a full employment economy is the decreased production of non-military goods and services



OPPORTUNITY COST Conts

- Opportunity costs are found in every situation in which scarcity necessitates decision making
- Opportunity cost exists for society as a whole
- The greater the number of people trained to provide medical services, the fewer are available to be teachers, lawyers, accountants, engineers.
- Therefore, the opportunity cost of training more people to provide medical service is the amount of legal, educational, accounting staff and engineers that will not exist



OPPORTUNITY COST Conts

- As more of a society's capital equipment is used to produce cars, less capital is available for production of washing machines, boats and bicycles.
- When more land is used to produce maize less is available for production of yams
- The opportunity cost of expanding maize production is the decreased amount of yam produced



OPPORTUNITY COST Conts

- Opportunity cost also exists for an individual.
- Time is a scarce resource
- The more time you spend studying, the less time is available for leisure activities such as sports, TV, and socializing.
- There is opportunity cost in last minute cramming for examination, it is the time you would otherwise have allocated to sleeping the night before



Summary: Basic Economic Decisions as a Result of Problem of Scarcity

- **What to produce** – This involves decisions about the kinds and quantities of goods and services to produce

- **How to produce** – This requires decisions about what techniques to use and how the economic resources are to be combined in producing output

- **For whom to produce** – this involves decisions on the distribution of output among the members of a society



PRINCIPLES OF ECONOMICS I

AEM 102/ AGRIC ECONS AND FARM MGT.

DRA. E. OBAYELU



Course Descriptions

Economic Problems (PART B)

- This module talks about:
- Scarcity and Market system
- Production possibility Frontier
- Principle of Increasing Costs

Day - Why - U -



LEARNING OBJECTIVES

At the end of this module, students should be able to:

1. Identify the characteristics of various economic systems and how the economic problems can be solved?
2. Explain Production Possibility Frontier (PPF) and its applications
3. Explain the principle of increasing costs

Day Why - You



SCARCITY AND THE MARKET SYSTEM

- Two of the most important economic decisions faced by a society are:
 - (i) deciding what to produce and
 - (ii) how to allocate resources among competing uses

The combination of goods and services to produce can be resolved by government command or through a market system



COMMAND ECONOMY

- In a command economy, a central planning board determines the mix of output
- The experience with central planning has not been very successful as evidenced by economies of Eastern Europe and former USSR



FREE MARKET ECONOMY OR A CAPITALIST MARKET ECONOMY/ LAISSEZ-FAIRE SYSTEM

- Free market is a market with no government interference. Government only provides defense and core services
- Households own resources, allocate resources through the workings of the price mechanism
- Prices resolves the three fundamental economic questions of what, how and for whom to produce
- The only goods and services produced are those which individuals are willing to purchase at a price sufficient to cover the cost of producing them



FREE MARKET ECONOMY Conts

- Because resources are scarce, goods and services are produced using the technique and resource combination which minimize cost of production
- Goods and services are sold to who are willing and have the money income to pay their prices
- What develops is a circular flow which is directed by the collective wants of the employable individuals in the society

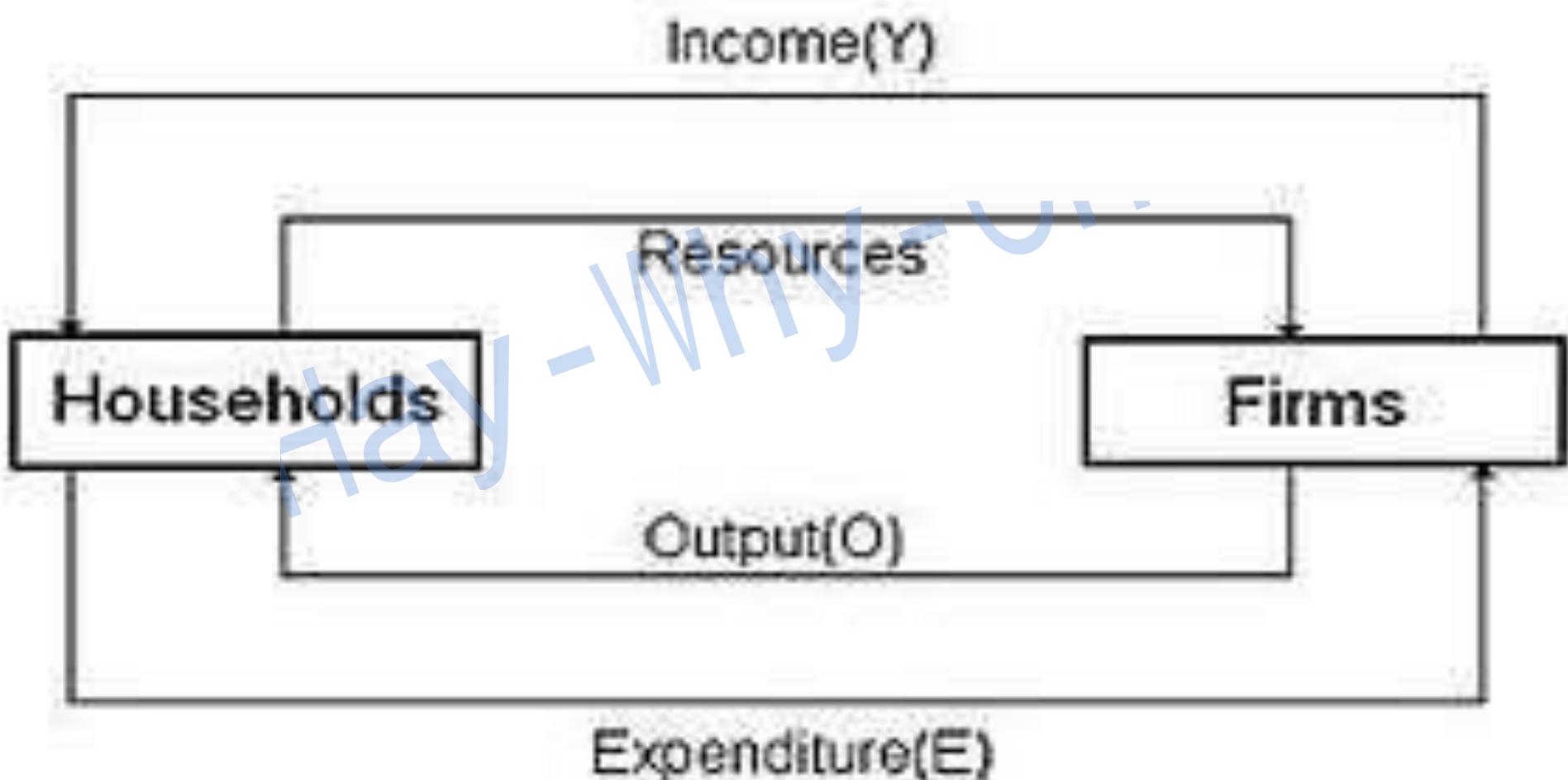


FREE MARKET ECONOMY _ How Economic Questions are Resolved

- In a market economy, economic decisions are decentralized and are made by the collective wisdom of the market place, (that is, prices resolve the three fundamental economic questions of what, how and for whom).
- The only goods and services produced are those which individuals are willing to purchase at a price sufficient to cover the cost of producing them



CIRCULAR FLOW OF RESOURCES, INCOME & SERVICES



Explanation of the Circular flow of income

The circular flow integral to a market system is shown in the above slide

1. Business firms purchase or hire economic resources owned by individuals in order to produce goods and services
2. Business firms make a monetary payment to individuals for the use of their resources
3. Individuals use the income received for the use of their resources to purchase the goods and services produced by business firms
4. Individuals receive the goods and services produced by business firms



How Economics Questions are Resolved

- What goods and services are produced is determined by the **spending preferences of individuals**
- How these goods and services are produced depends upon **relative scarcity of the resources needed for the production** and **the state of technology**
- To whom the output is distributed is determined by the **income received by individuals** in supplying resources to firms



How do we resolved Economic Questions under Mixed Economy System?

- Under this system, government replaces, regulates or modifies the price mechanism
- For instance, in US, government produces some goods itself e.g police protection, roads
- Government finances these expenditures by taxing the incomes of individuals and businesses
- Government also influences what to produce by imposing direct regulations on producers on specific goods and services



THE PRODUCTION POSSIBILITY FRONTIER (PPF)

- Production Possibility Frontier (PPF), is also known as the production possibility curve (PPC), or production possibility boundary (PPB), or Transformation curve/boundary/frontier
- It is the maximum amount of alternative combinations of goods and services that a society can produce at a given time when there is full utilization of economic resources and technology.
- is a curve which shows various combinations of the amounts of two goods which can be produced within the given resources and technology
- It represents a position of full employment of the economy's resources and full use of its technology



Shape of PPF

- PPFs are normally drawn as bulging upwards or outwards from the origin ("concave" when viewed from the origin),

Hay-Why-U'



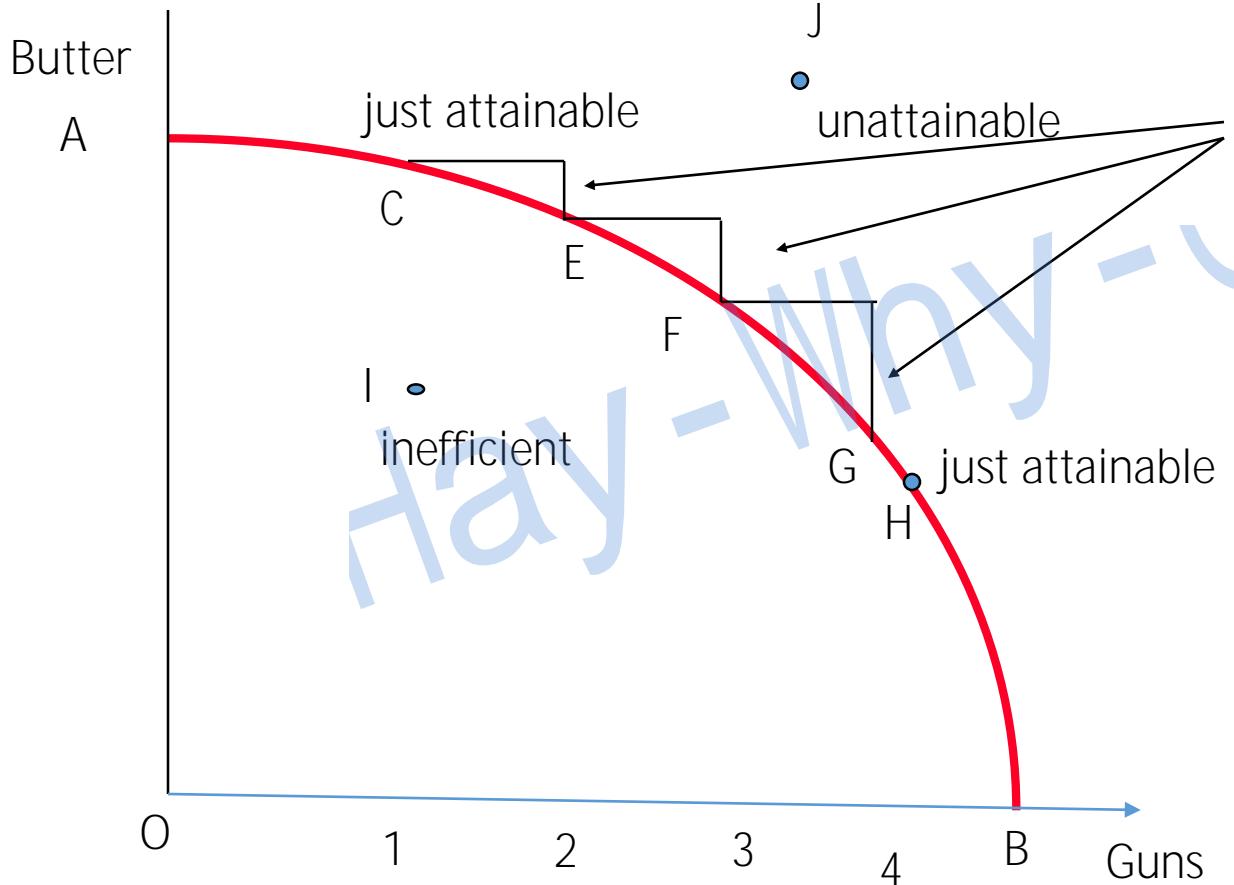
PRODUCTION POSSIBILITIES FRONTIER (PPF)

Conts

- The opportunity cost of an activity is the value of the resources used in that activity when they are measured by what they would have produced when used in their next best alternative.
- The PPC depicts not only limited productive capability and therefore the problem of scarcity, but also the concept of opportunity cost.
- When a country is on the PPC, to move from one point on the PPC to another point involves sacrifice



A TYPICAL PPF PICTURE



The marginal opportunity cost of guns in terms of butter is increasing as we move down the PPF!

The PPF is typically bowed-out or linear.
It is not bowed-in



POINTS TO NOTE ON PPF

- The PPF curve divides production space into 3 distinct areas:
 - points on the PPF curve, which are the **efficient points**
 - points outside the curve are the **unattainable points**
 - points on the inside of the curve are the **inefficient points**
- May - Why - U -
- the PPF curve also illustrates scarcity by dividing production space into attainable and unattainable levels of production



Explaining Points in PPF

- The **efficient points** are so because all available resources are utilized and there is full use of existing technology
- Positions outside PPF are **unattainable** because the PPF defines the maximum amount that can be produced at a given time.
- Positions within PPF are **inefficient** because some resources are either unemployed or under employed



THE SLOPE OF PRODUCTION POSSIBILITY FRONTIER(PPF)

- The slope of the PPF at any given point is called the marginal rate of transformation(of one product into another since a fixed level of resource is used) or marginal opportunity cost. That is, the opportunity cost of good X in terms of good Y at the margin
- A person with the lower marginal opportunity cost of an activity has the **comparative advantage at that activity.**
- That is, a person with the comparative advantage can produce the activity by giving up the smallest amount of the alternative activity.



ABSOLUTE VERSUS COMPARATIVE ADVANTAGE AS APPLIED TO TRADE

- Absolute advantage exists if your country uses fewer resources to produce a given unit of output than the other country.
- Comparative advantage exists if your country can produce the output at a lower marginal cost in terms of other goods foregone than the other country.
- Every country (or person, or economy) has a comparative advantage at some activity.
- Absolute advantage is not important and may not always happen. Sometimes people or countries have the absolute advantage in nothing, yet trade possibilities still exist.



Assume all the resources of an economy can be used to produce guns and butter.

- If all the resources are used to produce only gun, OB guns are produced
- If all the resources are used to produce only butter, OA butter are produced.
- AB represents the maximum that can be produced
- To produce a combination of guns and butter, you must make a sacrifice between the products

Hay-Why-U-



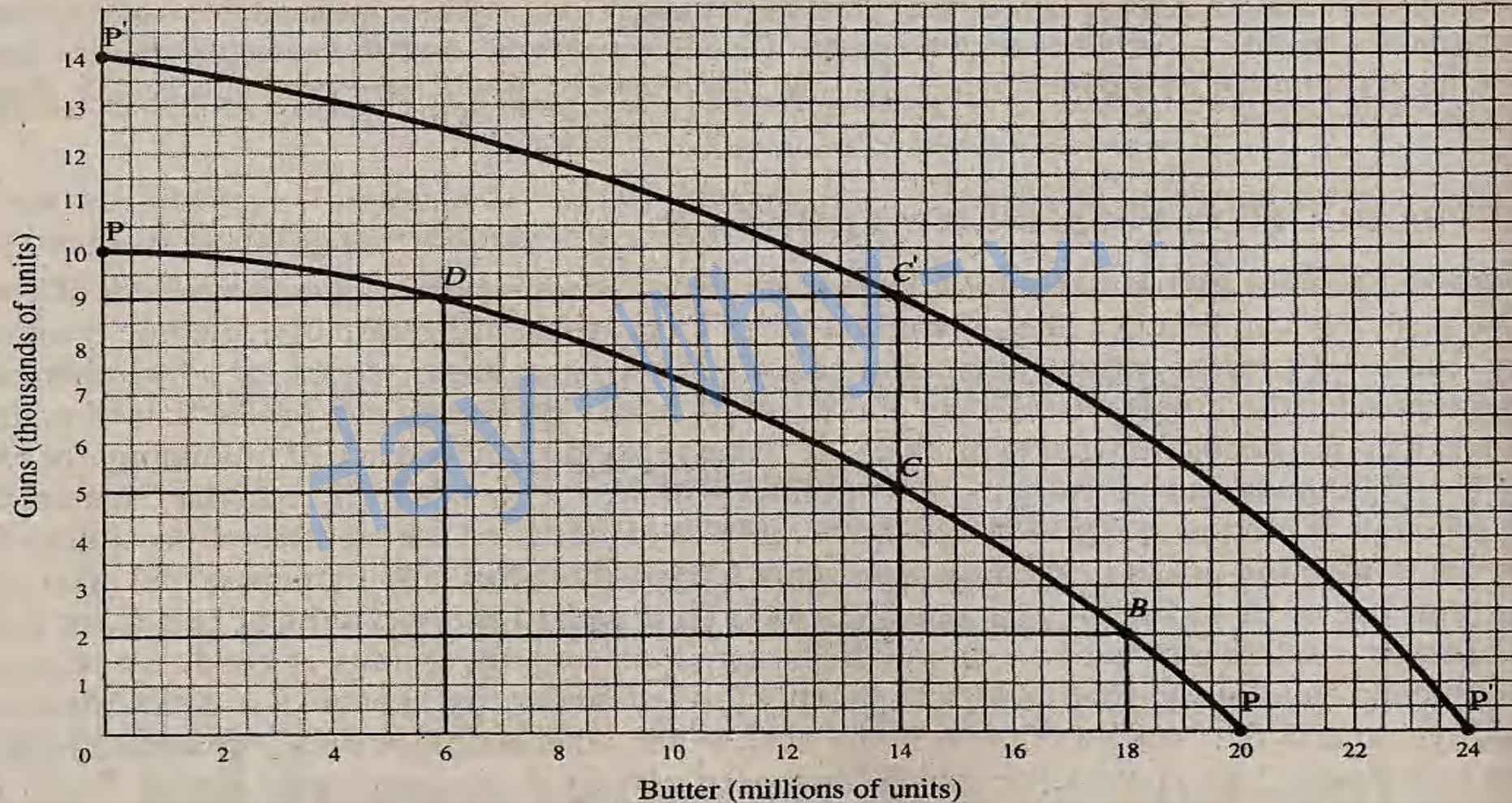
OUTWARD SHIFT OF PPF

The PPF can shift outwards over time as more resources become available and/or technology is improved

Growth in the economy's productive capability is depicted by the outward shift of the PPF from PP to P'P'



SHIFTING PPF Curve



PRINCIPLES OF INCREASING OPPORTUNITY COSTS

- Increasing opportunity cost of production of the first commodity illustrates the principle of increasing costs
- The law of increasing opportunity costs states that as production of a product increases, the cost to produce an additional unit of that product increases as well.



PRINCIPLE OF INCREASING COST

Table 2-2

Alternative or Point	Units of Food (millions)	Units of Clothing (thousands)	Cost of Additional Units of Food
A	0	10	
B	1	9	1
C	2	7	2
D	3	4	3
E	4	0	4

Hay - Why - You



The PPC of Data from Table 2.2

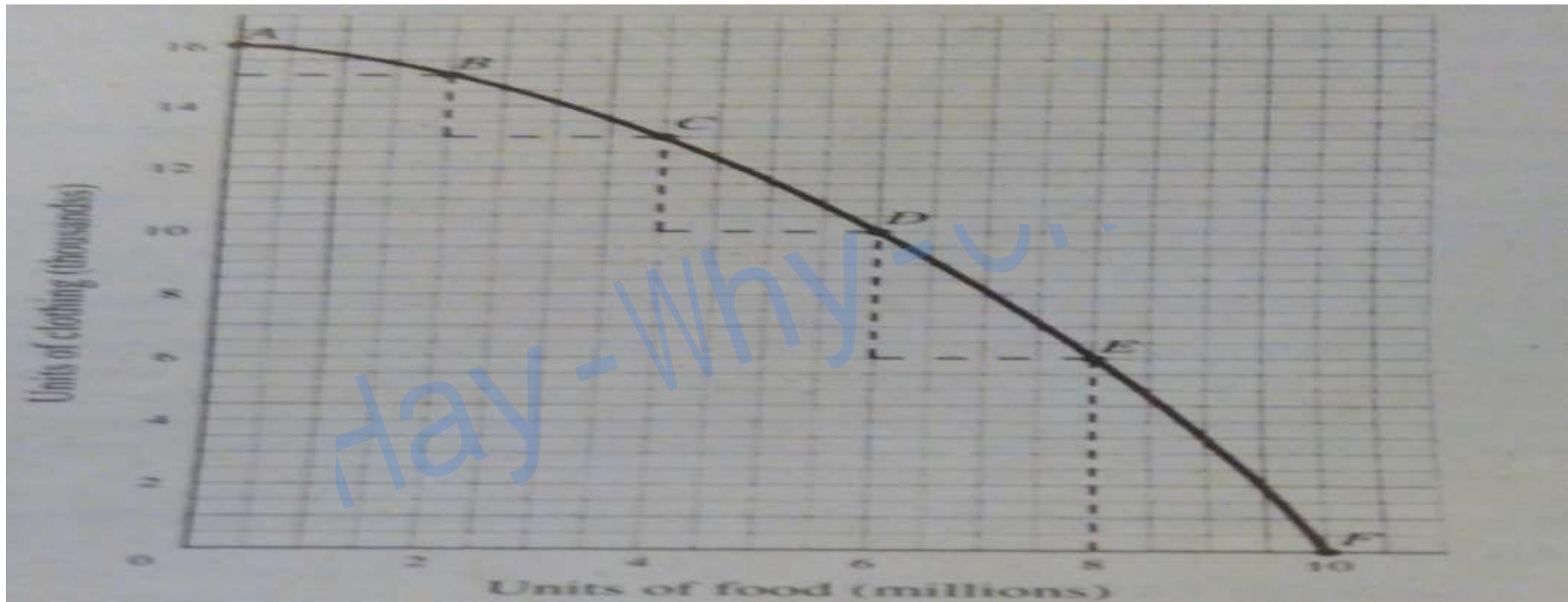


Fig. 2-6

THE APPLICATIONS OF PPF

- The Production Possibilities Frontier is a basic workhorse in economics.
- It is important for understanding some basic issues in economics.
- Great application is with international trade theory.
- Helps one to understand and distinguish between comparative advantage and absolute advantage.



ASSIGNMENT 1

- (a). Use the data from Table 1 to draw a PPF. Plot clothing production on the vertical axis and food production on the horizontal axis. Label the production alternatives A,B, C, D,E and F on the curve
- (b) On the same figure, label as point U the production of 3 thousand units of clothing and a 3 million units of food and as point H the production of 6 thousand units of clothing and 3.5 million units of food. What do points U and H indicate?
- (c) What is the difference between unemployed and underemployed economic resources?
- (d) When is the production efficient?



TABLE 1: PRODUCTION POSSIBILITY FRONTIER(PPF)

Alternatives or point	Units of food (millions)	Units of clothing (thousands)	Cost of additional units of food
A	0	8.0	
B	1	7.5	
C	2	6.5	
D	3	5.0	
E	4	3.0	
F	5	0.0	



Principles of Economics

AEM 102/AEFM DEPARTMENT

Hay - Why - U



MODULE II

DEMAND, SUPPLY, EQUILIBRIUM and ELASTICITY



MODULE II: DEMAND, SUPPLY, EQUILIBRIUM and ELASTICITY

Topic Outline

- Demand
- Shifting of the market demand curve
- Supply
- Shifting of the market supply curve
- Equilibrium price and quantity
- Surplus and shortage
- Equilibrium when market demand and/or market supply shifts
- Government and price determination
- Price elasticity of demand
- Elasticity and total revenue
- Income elasticity of demand
- Cross price elasticity of demand
- Elasticity of supply
- Applications of elasticity



DEMAND: Individual demand and Market demand

Demand refers to the quantities of a good and service **a consumer or group of consumers** are willing and able to purchase at different or range of prices.

We can separate demand into two:

- Individual demand for a commodity, and
- Market demand for a commodity

Individual demand:

demand of **one individual** consumer in the market for a good or service

Market demand:

the *total combined demand of all consumers* in the market for a good or service; it reflects the collective wants of people in a market area.

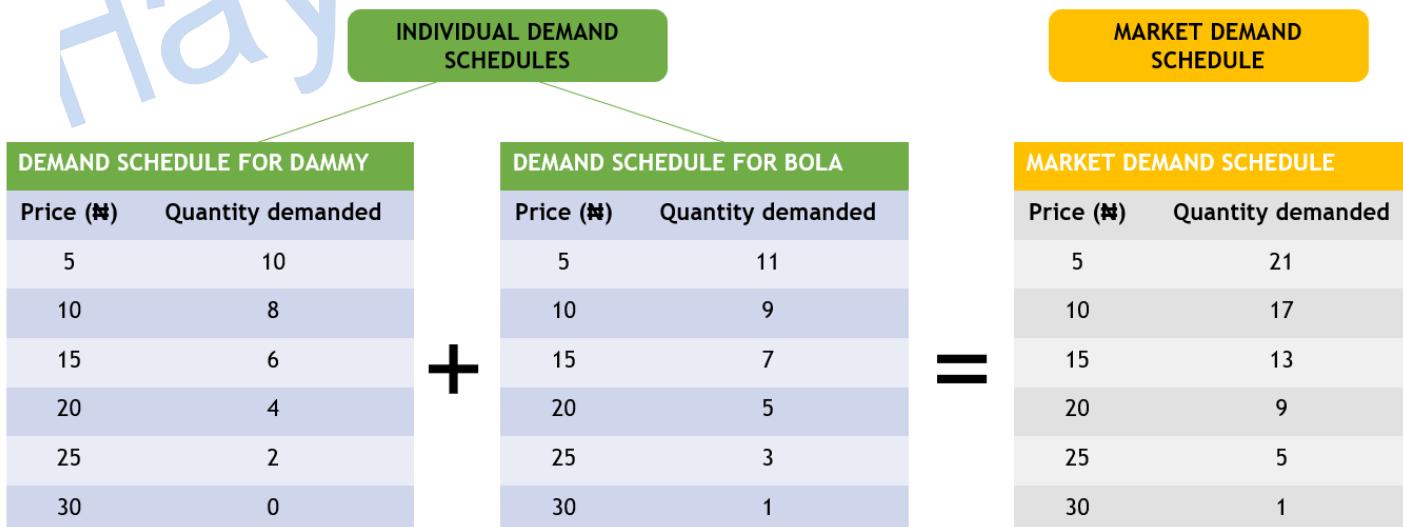


Demand Schedule: Individual & Market Demand Schedule

Demand Schedule is a table that shows the quantity demanded of a good or service at different price levels.

Individual Demand Schedule is a list of the various units of a good or service that a consumer/an individual is willing and able to purchase at different prices at one point of time.

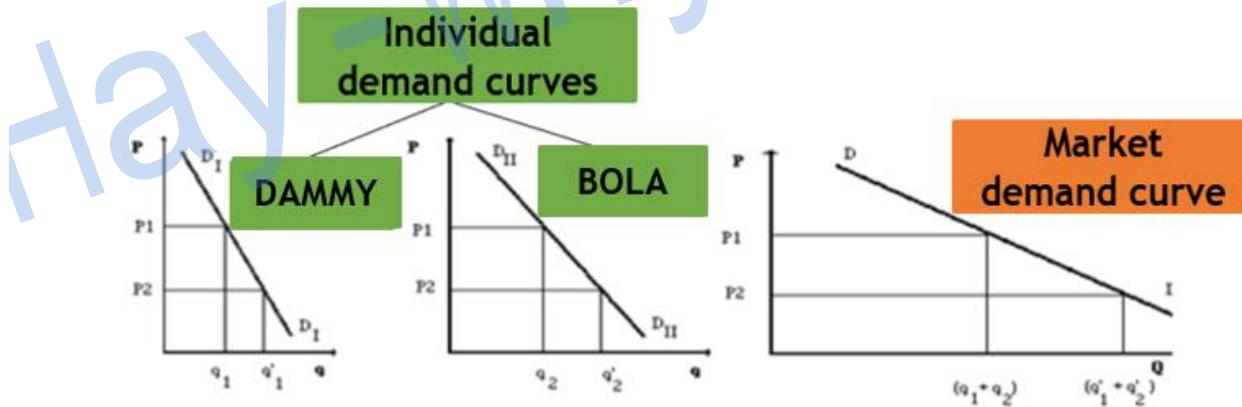
Market Demand Schedule is a list of the total quantity of a good or service demanded at different prices by all the consumers in a market at a particular point of time.



Demand Curve: Individual & Market Demand Curve

The demand curve:

- the graph depicting the relationship between the price of a certain commodity and the amount of it that consumers are willing and able to purchase at that given price.
- It is a graphical representation of a demand schedule (note that the price is on the vertical, Y axis and the corresponding quantities are on the horizontal, X-axis).
- The market demand curve is found by taking the horizontal summation of all individual demand curves.



The demand curve is usually downward sloping (negatively sloped), i.e. there is an inverse relationship between price and quantity demanded. More units are purchased at lower prices

Demand Versus Quantity Demanded

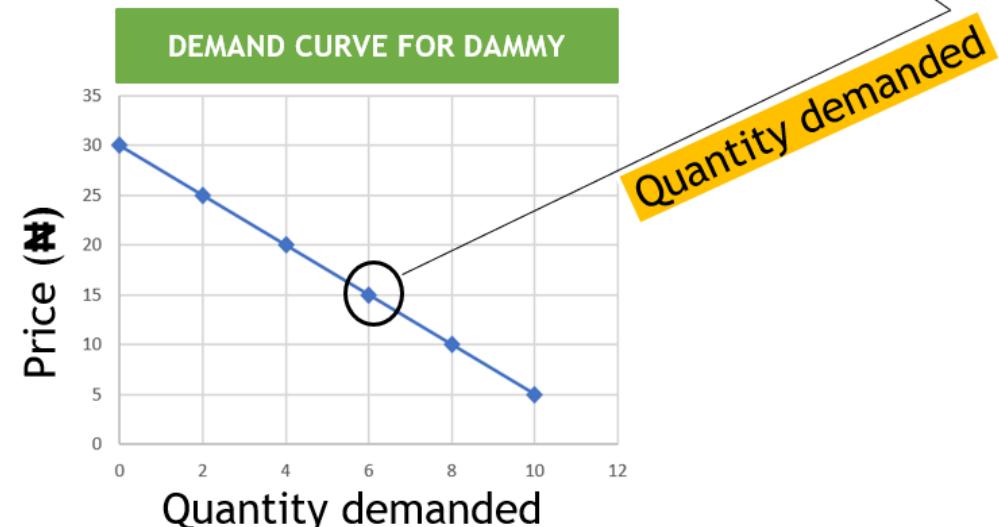
Demand:

- **quantities** of good and services a consumer or group of consumers are willing and able to purchase **at different or range of prices**.
- In short, demand refers to the demand schedule or demand curve.

Quantity Demanded:

- **amount** of a good or service that a consumer or group of consumers is willing and able to purchase **at a certain price** and period of time.
- It means only a certain point on the demand curve, or one quantity on the demand schedule.

DEMAND SCHEDULE FOR DAMMY	
Price (#)	Quantity demanded
5	10
10	8
15	6
20	4
25	2
30	0



Why does the Demand Curve slope downward?

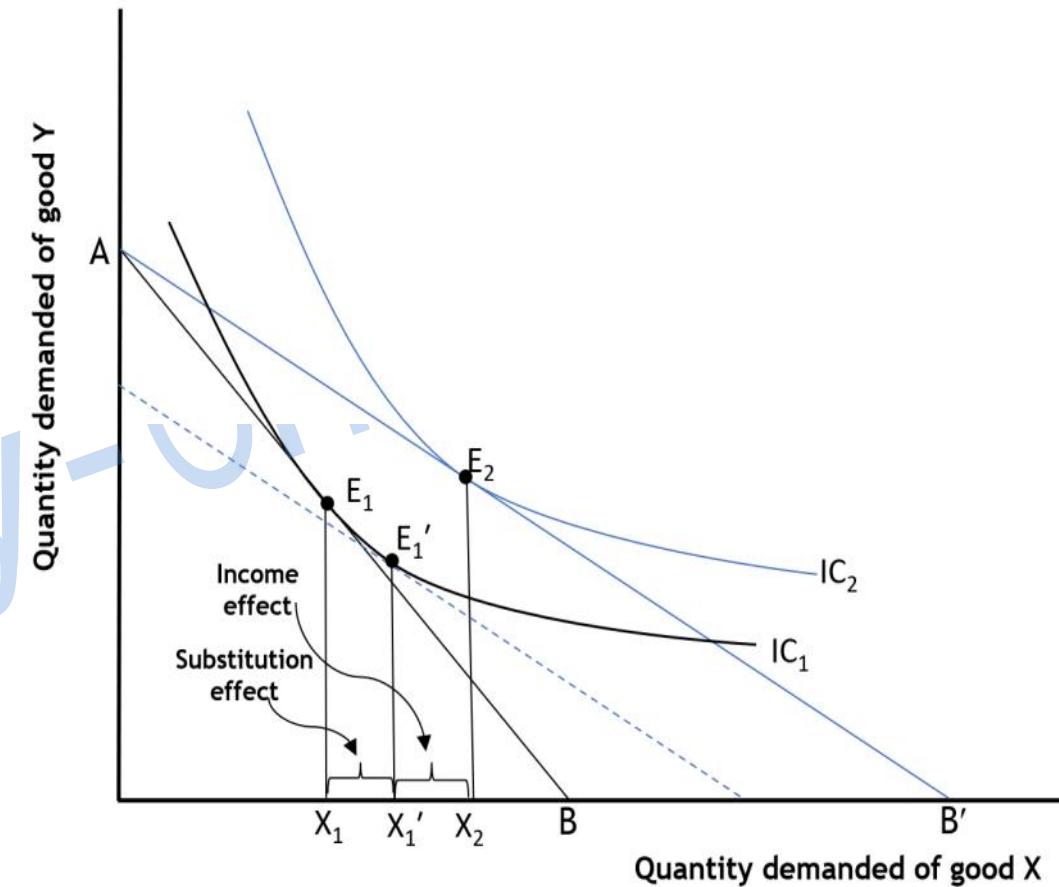
- Substitution effect:
- As a commodity's price falls, an individual normally purchases more of the good since he is likely to substitute it for other goods whose price has remained unchanged.
- Substitute goods are two alternative goods that could be used for the same purpose.
 - For example, when coffee price falls and price of tea is unchanged, more coffee and less tea will be purchased.
- Income effect:
 - When a commodity's price falls, the purchasing power of an individual with a given income increases, allowing for greater purchase of the commodity
 - This is called income effect.



Why does the Demand Curve slope downward?

Substitution and Income Effect of a Price Fall

- When the price of a good falls, more of it can be consumed with a given income
- This is illustrated by the shift of the demand curve from AB to AB'
- The initial equilibrium point moves from E₁ on indifference curve I to E₂ on a higher indifference curve II
- The difference between X₁ and X₂ is the total effect of price change
- This can be partitioned into substitution effect (X₁X'₁) and income effect (X'₁X₂) of the fall in price.
- SLUTSKY'S THEOREM arose from the substitution and income effects of price fall.



Why does the Demand Curve Slope Downward?

- Number of consumers:
 - Basically, when price of a commodity is relatively high, only few consumers can afford to buy it, and when its price falls, more numbers of consumers would start buying it.
- Various uses of a commodity
- Law of diminishing marginal utility: states that with each increasing quantity of the commodity, its marginal utility declines.
- When the quantity of goods is more, the marginal utility of the commodity is less. Thus, the consumer is not willing to pay more price for the commodity and its demand will decline.



Why would demand curve slope upward?

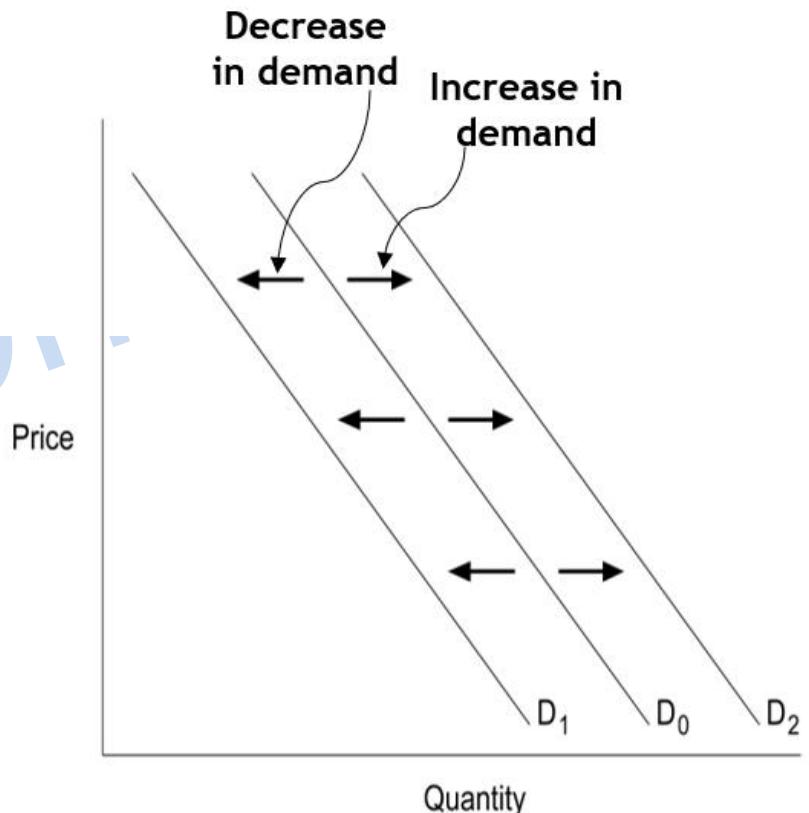
- A demand curve might slope upward in case of **Veblen** and **Giffen** goods.
- Veblen goods: luxury goods such as diamond jewelry and exotic cars, designer clothes people spend proportionally more on them as their income increases.
- Veblen goods are never necessary goods, considered a high-quality product and a status symbol.
- People of high social and economic standing increase their consumption of luxury goods as their prices increase.
- Giffen goods: Unlike Veblen goods, Giffen goods are **low-income, non-luxury and necessity** products, for which there are no close substitute as in the case of staple foods such as rice, bread
- They are special kinds of inferior goods and increase in their demand has to do with poverty.

Shifts in Demand Curve

- The demand for a good or service is influenced not only by the commodity's price but also by:
 - ✓ the price of other goods and services (P_0),
 - ✓ consumer preferences (C),
 - ✓ Income (Y),
 - ✓ Wealth (W) and,
 - ✓ size of the market (S)
- In presenting the demand for a good or service as a schedule relating price and quantity demanded, variables other than the commodity's price are held constant.
- The relationship is presented as :
- $Q_d = f(P/P_0, C, Y, W, S..)$, *ceteris paribus*
- *Ceteris paribus indicates that variables other than the price of the commodity are kept constant/unchanged*

Shifts in Demand Curve

- A change in demand refers to a shift of the demand curve because a variable other than price of the commodity has changed.
- A shift in demand curve outward (to the right of the original demand curve) from D_0 to D_2 represents an increase in demand
- A shift in demand curve inward (to the left of the original demand curve) from D_0 to D_1 represents a decrease in demand
- A change in quantity demanded occurs when there is change in the commodity's price, resulting in a movement along an existing demand curve.
- Movement along D_0 represents change in quantity demanded



Rightward Shift of the Demand Curve

The market demand curve shifts up to the right when:

- ✓ the number of individuals in the market increases
- ✓ there is an increase in preference for the commodity,
- ✓ income increases
- ✓ the price of substitute commodity (Substitute goods are goods that serve essentially the same purpose and thus consumer can easily replace one with another) rises
- ✓ the price of a complementary good (complementary goods are goods whose consumption are tied to each other) declines

Leftward Shift of the Demand Curve

The market demand curve shifts down to the left when:

- ✓ the number of individuals in the market decreases,
- ✓ there is a decrease in preference for the commodity,
- ✓ income decreases,
- ✓ the price of substitute commodity falls,
- ✓ the price of a complementary good rises.



Determinants of Demand

Therefore, factors that determine the quantities of goods and services demanded include:

- ✓ Price of the commodity,
- ✓ Price of other goods and services,
- ✓ Average household disposable income,
- ✓ Wealth,
- ✓ Taste and preferences,
- ✓ Size of the population e.t.c.

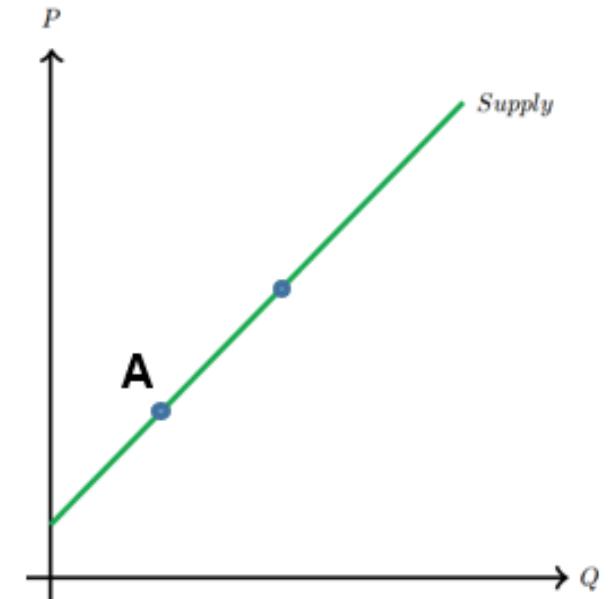
SUPPLY

- Supply refers to all the possible quantities of a product that a seller/sellers are willing and able to produce at all possible prices during a particular period of time.
- A supply schedule is a table that shows the relationship between the price of a good and the quantity supplied.
- A supply curve is a graph that illustrates that relationship. Supply is represented in a graphical model as the entire supply curve.
- A market supply curve is derived from each producers supply curve, by summing the units each producer is willing to supply at alternative prices



SUPPLY

- Quantity supplied (Q_s) is defined as the amount or quantity of a product that a producer / producers are willing and able to supply onto the market at a **given/specific price** in a given time period.
- It represents a point along the supply curve or one quantity on the supply schedule.
- In short, supply refers to the curve and quantity supplied refers to the (specific) point on the curve.
- The law of supply states that there is a positive relationship between price and quantity supplied, leading to an upward-sloping supply curve, indicating that supplier must have a higher price to increase supply.

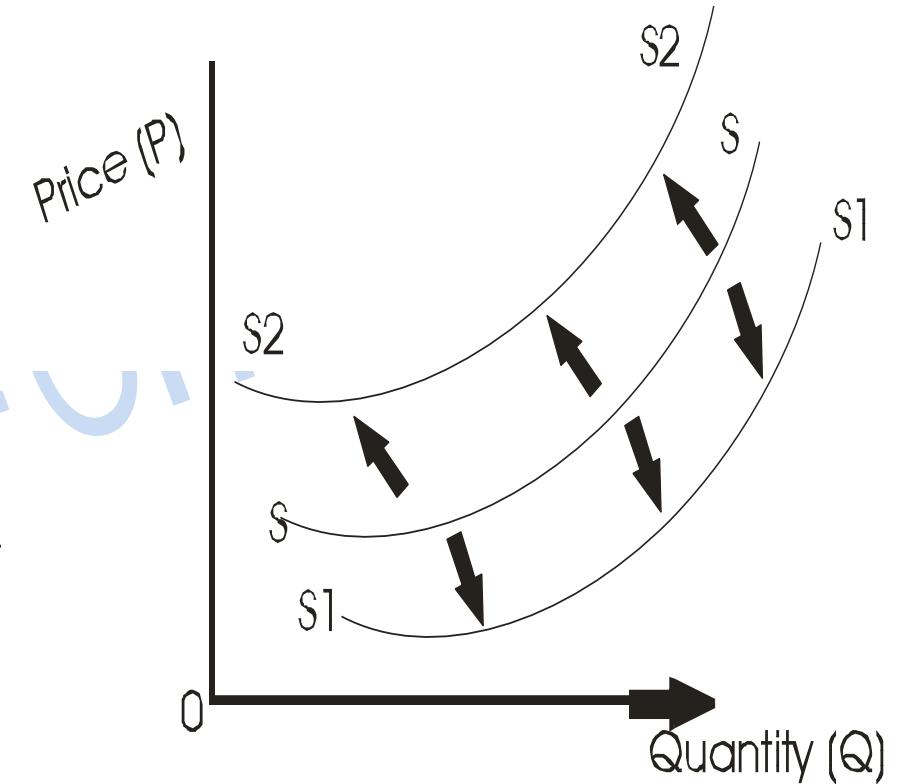


Why Is the Supply Curve Upward Sloping?

- There are three main reasons why supply curves for most products slope upwards from left to right giving a positive relationship between the market price and quantity supplied:
 1. The profit motive: When the market price rises, it becomes more profitable for businesses to increase their output. Higher prices send signals to firms that they can increase their profits by satisfying demand in the market.
 2. Production and costs: When output expands, a firm's production costs rise, therefore a higher price is needed to justify the extra output and cover these extra costs of production.
That is, supply curves slope upward because the **marginal cost of producing goods/services rises as you produce more of them with your given fixed costs in the short-run**.
 3. New entrants coming into the market: Higher prices may create an incentive for other businesses to enter the market leading to an increase in supply

Determinants of Supply

- A change in price of the commodity will change the quantity supplied (i.e. a movement along the upward sloping supply curve), not the supply.
- Any other factors other than price of the commodity change will change the supply (i.e. a shift in the supply curve to either the right (downward shift) or left (upward shift) of the original supply curve).
Why
- a shift in the supply curve downward indicate increase in supply
- a shift in the supply curve upward indicate decrease in supply



Determinants of Supply

Non-price factors:

- ✓ Factor prices (rent paid , wages ,interest on economic resources),
- ✓ Number and /or size of producers in a market,
- ✓ Cost of factors of production,
- ✓ Technological progress,
- ✓ Government subsidy/or taxes on output



Rightward Shift of the Supply Curve

The market supply curve shifts down and to the right when:

- ✓ more producers enter the market and a greater quantity of the commodity is available at each price
- ✓ There is a decrease in factor or material prices,
- ✓ Improvement in technology
- ✓ Government subsidization

Leftward Shift of the Supply Curve

- Supply curve can also shift up to the left.
- What factors will cause the supply curve to shift up to the left?

Hay-Why-U-



Principles of Economics

AEM102: Equilibrium & Elasticity of Demand

Dr Shakirat Ibrahim
AE&FM Department



Equilibrium Price And Quantity

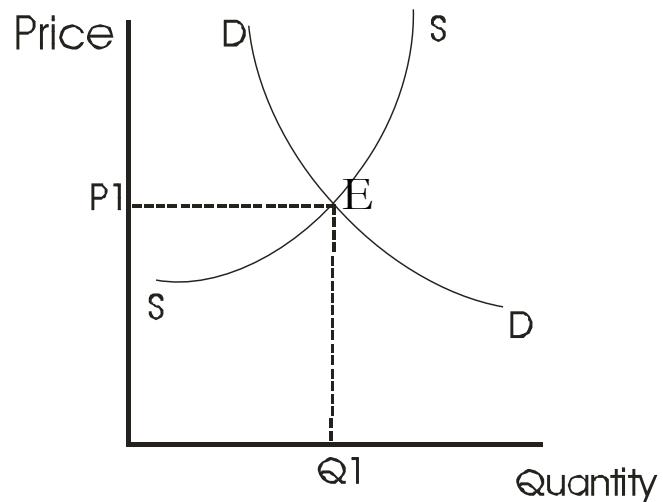


Figure 1: DEMAND , SUPPLY AND EQUILIBRIUM

- **Equilibrium:**

- It occurs at the intersection of the market demand and market supply curves, at point E (fig. 1 above)
- is a situation in which there is no tendency for price or quantity to change.
- At point E, quantity demanded equals quantity supplied

- At point E, the quantity that individuals are willing to purchase exactly equals the quantity producers are willing to supply

- P_1 and Q_1 are equilibrium price and equilibrium quantity

- **Equilibrium price:**

- price at which quantity demanded equals quantity supplied.

Surplus and Shortage

- A **surplus** exists at prices higher than the equilibrium price; at P₃
- At P₃, the quantity demanded falls short of the quantity supplied, $Q_d < Q_s$
- At prices lower than the equilibrium price, P₂, there is **shortage** of output since quantity demanded exceeds quantity supplied, $Q_d > Q_s$

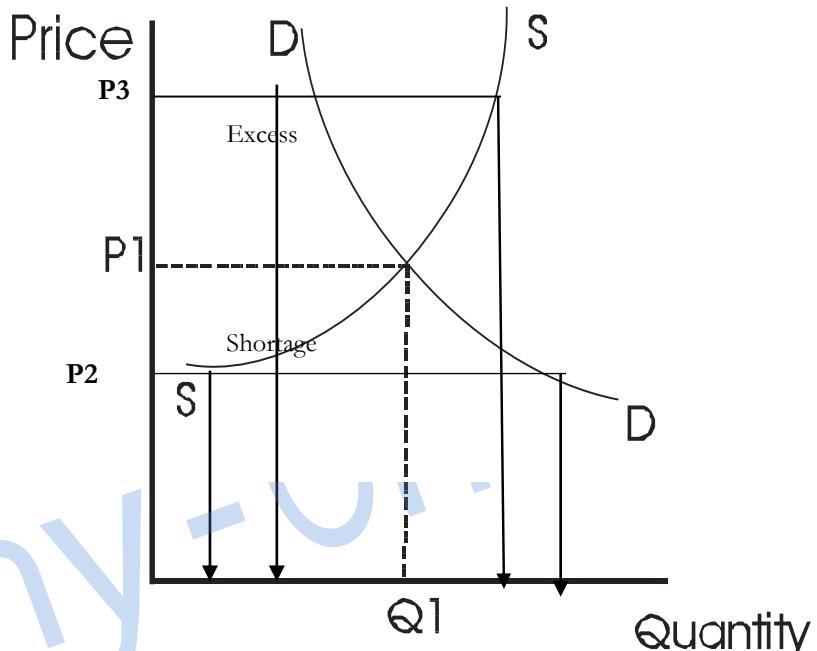


Figure 2: DEMAND SUPPLY AND EQUILIBRIUM

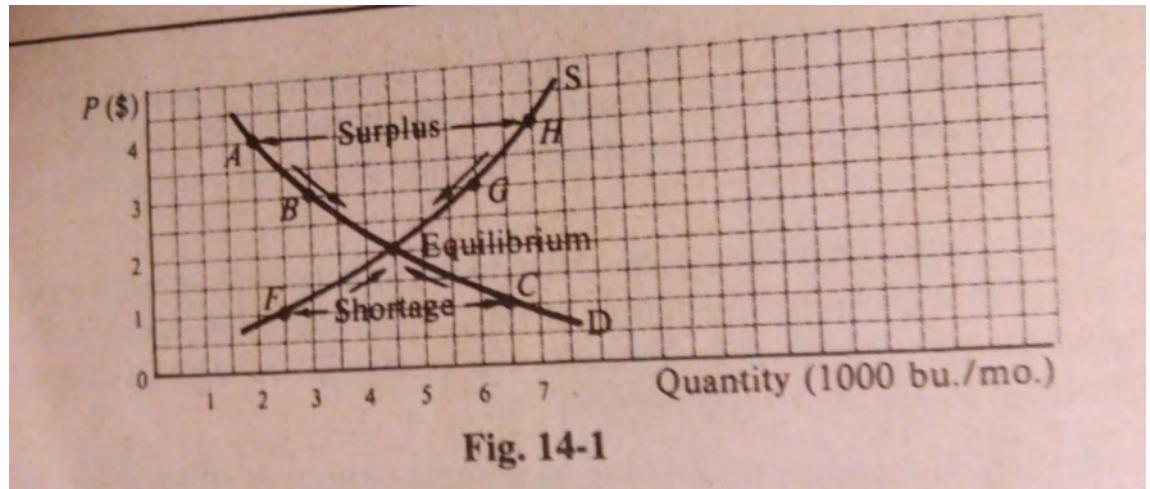
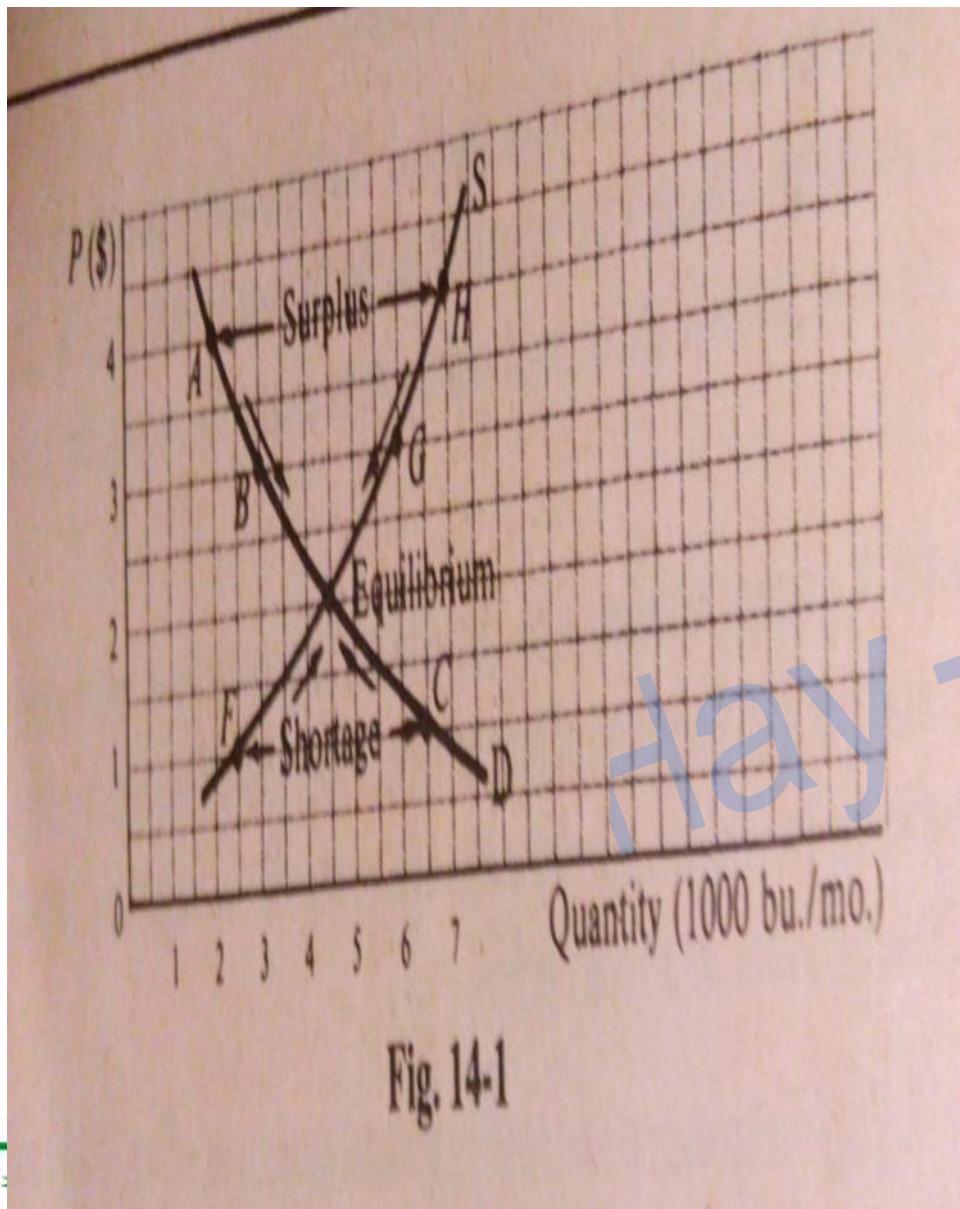


Fig. 14-1

Figure 3: Given DD curve AD and SS curve FS



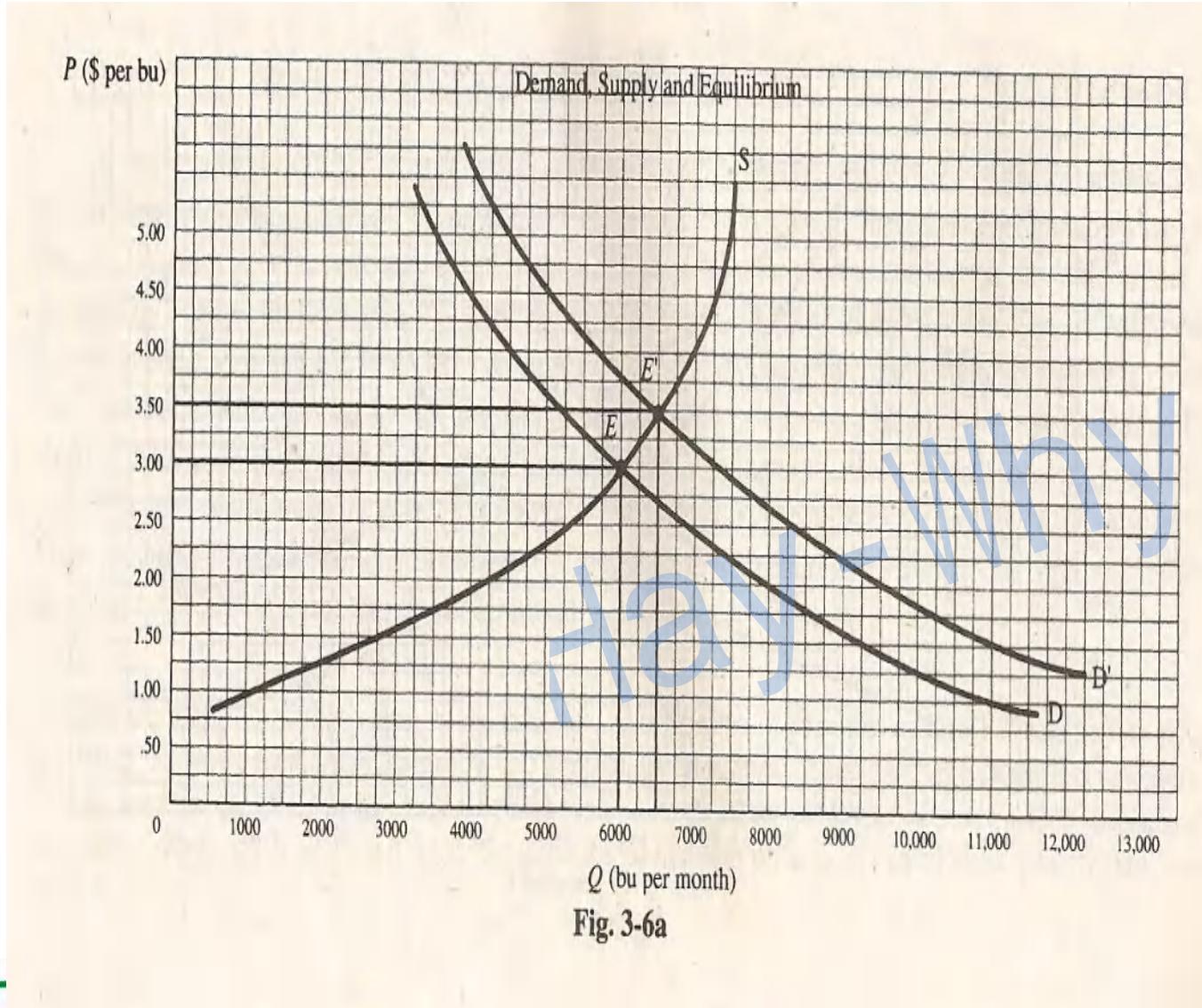
Price	Quantity Demanded	Quantity Supplied	Surplus (+)or Shortage(-)	Pressure on price
4	2 A	7 H	+5	Downward
3	3 B	6 G	+3	Downward
2	4.5 E	4.5 E	0	Equilibrium
1	6.5 C	2.5 F	-4	upward

Calculating Market Equilibrium from Demand Supply Equations

- Given:
 - Market demand equation:
 - $Q_d = 100 - 10P$;
 - Market supply equation:
 - $Q_s = 40 + 20P$
 - NOTE THE SLOPES OF DEMAND AND SUPPLY CURVES**
 - Equilibrium price is then found by equating Q_d and Q_s
 - $Q_d = Q_s$
- Hay-Why*
- $$100 - 10P = 40 + 20P$$
- $$30P = 60$$
- $$\text{Therefore, } P = \text{N}2$$
- Equilibrium demand and supply is found by substituting equilibrium price in either demand or supply equation
 - To get Equilibrium supply
$$Q_d = 100 - 10P$$
$$= 100 - (10 * 2)$$
$$Q_d = 100 - 20$$
$$\text{Thus, } Q_d = 80$$
 - To get Equilibrium supply
$$Q_s = 40 + 20P$$
$$= 40 + (20 * 2)$$
$$Q_s = 40 + 40$$
$$\text{Thus, } Q_s = 80$$

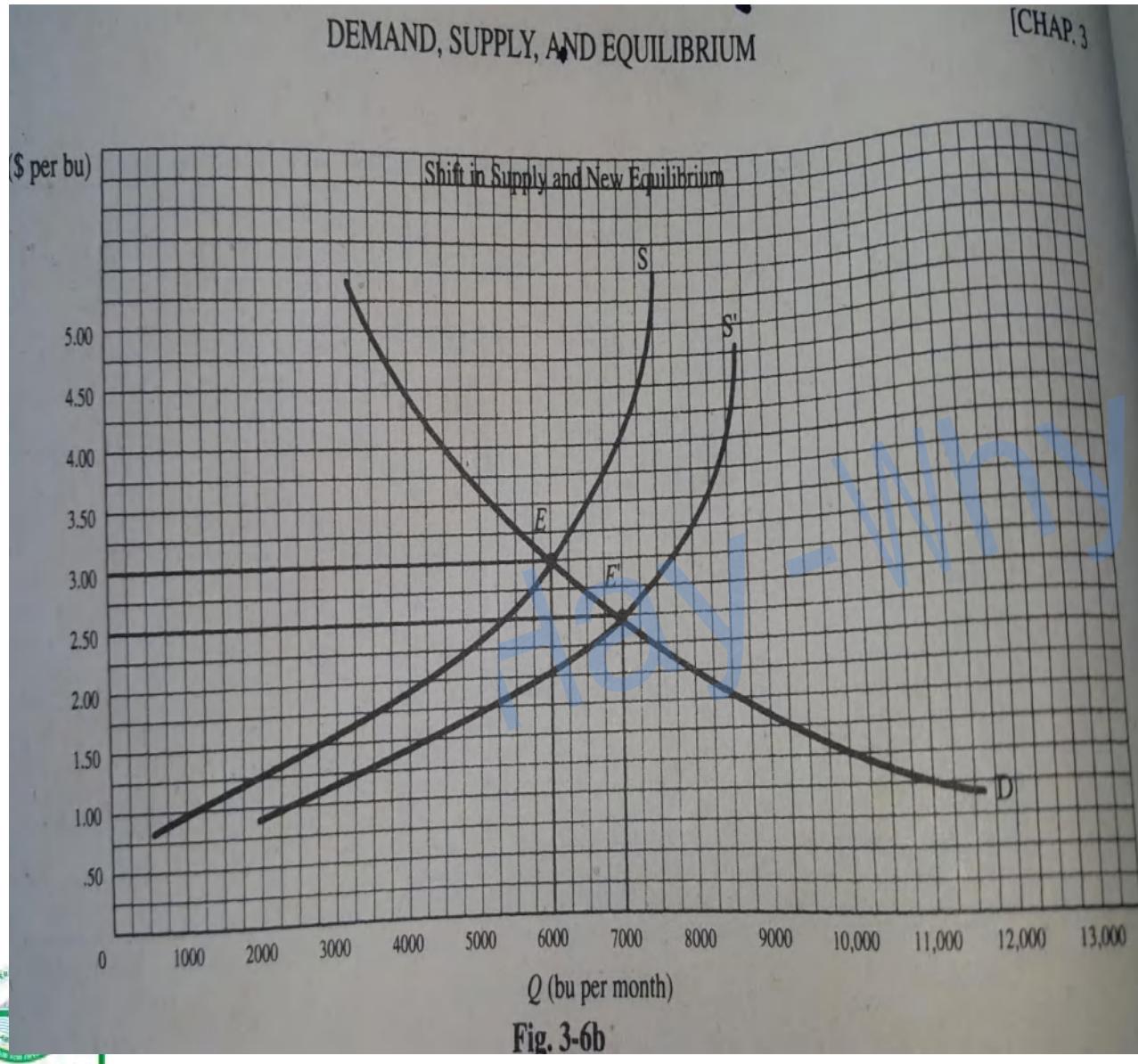


Figure 4: Equilibrium When Demand Changes



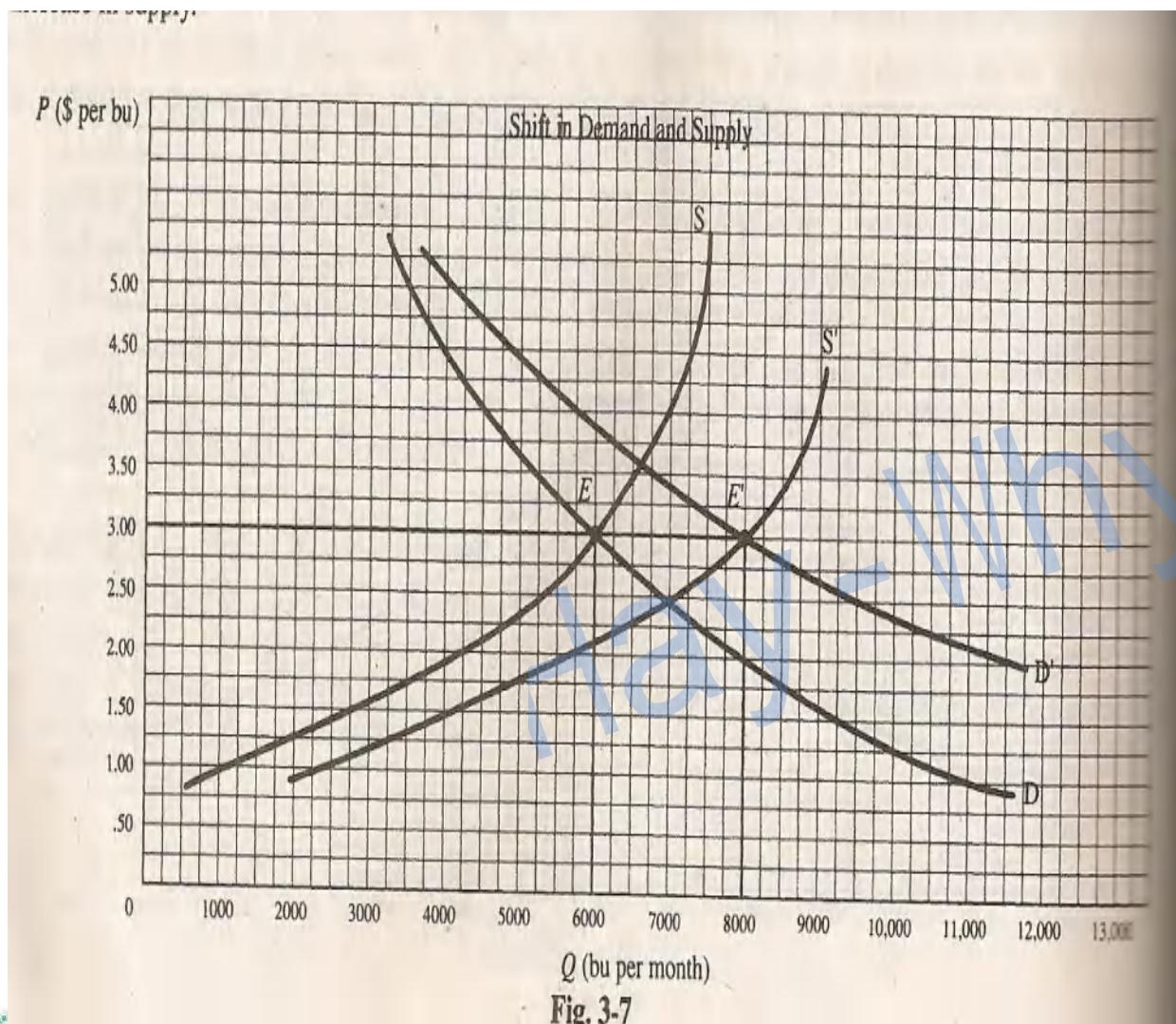
- When:
 - there is an increase in market demand ie market demand curve shifts up to the right (from D to D'),
 - with no change in location of the market supply curve
 - Equilibrium price rises
 - Equilibrium quantity also rises

Figure 5: Equilibrium When Supply Changes



- When:
 - there is an increase in market supply ie market supply curve shifts down to the right (from S to S'),
 - the market demand curve remains unchanged
- Equilibrium price falls
- Equilibrium quantity increases

Figure 6: Equilibrium with shift in Demand and Supply



- An increase in both market demand and market supply
- shifts to the right by both supply (S to S') and demand curves (D to D')
- **results in a higher equilibrium quantity;**
- Change in equilibrium price is however indeterminate when the magnitude of the demand and supply shift is unspecified

Elasticity of Demand

- **Elasticity of demand:**

- measurement of the magnitude of responsiveness of quantity demanded of a product to the change in one of the determinant's factors (such as price and income) of the product

- $$\text{Elasticity} = \frac{\% \text{ change in Quantity Demanded}}{\% \text{ change in Determinant}}$$

- Therefore:

- **Price Elasticity of demand (E_d):** measures the percentage change in the quantity demanded of a commodity as a result of a given percentage change in its price

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

- The price elasticity of demand is the relative responsiveness of the quantity demanded to small changes in the commodity's price.

- $E_d = \frac{\Delta \text{ in quantity demanded} / \text{original quantity demanded}}{\text{Change in price} / \text{original price}}$

- $E_d = \frac{\Delta Q/Q}{\Delta P/P} = \left(\frac{\Delta Q}{\Delta P} * \frac{P}{Q} \right) \dots \dots \dots \text{Point Price elasticity of demand}$

- The coefficient of E_d computed is valid only for very small movements in price and quantity demanded.

- **Point Price Elasticity Of Demand:**

- is the price elasticity of demand computed when we have small (infinitesimal) changes in price and quantity demanded of a commodity.

- Example:
- Given the information below on price and quantity demanded for a product at 2 points, A and B, calculate E_d

	Price(P)	Quantity Demanded(Q)
• Point A:	29.001 (P_1)	2,999 (Q_1)
• Point B:	29.000 (P_2)	3,000 (Q_2)

- Solution:

- Recall: $E_d = \frac{\Delta \text{ in quantity demanded} / \text{original quantity demanded}}{\Delta \text{ in price} / \text{original price}} = \left(\frac{\Delta Q}{\Delta P} * \frac{P}{Q} \right)$

- Between points A and B:
 - Change in quantity demanded (ΔQ) = 1; and change in price (ΔP) = -0.001
 - These are small changes in quantity demanded and price

- In the formula for point price elasticity of demand, one must also use the quantities of P and Q.
The question then arises,
- Should one use P_1 or P_2 ? OR Should one use Q_1 or Q_2 ?

For very small changes as above, either P_1 or P_2 , Q_1 or Q_2 may be used

Using P_1 and Q_1 :

$$E_d = \frac{\Delta Q}{\Delta P} * \frac{P_1}{Q_1} = \frac{1}{-0.001} * \frac{29.001}{2999}$$

$$E_d = -9.67022$$

Using P_2 and Q_2 :

$$E_d = \frac{\Delta Q}{\Delta P} * \frac{P_2}{Q_2} = \frac{1}{-0.001} * \frac{29.000}{3000}$$

$$E_d = -9.66667$$



- The difference in the two computed values of E_d elasticity of demand is very small

E_d computation when Changes in Q and P are large

Suppose at points A and B we have coordinates:

	Price	Quantity Demanded
Point A:	$(P_1) = 0.60$	$(Q_1) = 400,000$
Point B:	$(P_2) = 0.50$	$(Q_2) = 800,000$

$$\Delta P = -0.10, \quad \Delta Q = +400,000,$$

Lets compute price elasticity of demand using original price and quantity

$$E_d = \frac{\Delta Q}{\Delta P} * \frac{P_1}{Q_1} = \frac{400000}{-0.10} * \frac{0.6}{400000}$$

$$E_d = -6$$

E_d computation using new price - quantity figures gives

$$\bullet E_d = \frac{\Delta Q}{\Delta P} * \frac{P_2}{Q_2} = \frac{400000}{-0.10} * \frac{0.5}{800000}$$

$$\bullet E_d = -2.5$$

- In this case, the 2 calculations do not yield similar results , so we need to establish a convention to avoid this problem
- Economists generally measure E_d in terms of the average quantity and the average price if changes in price and quantity are large, as follows:

$$E_d = \frac{\Delta \text{ in quantity demanded} / \frac{1}{2} \text{ sum of quantities demanded}}{\text{Change in price} / \frac{1}{2} \text{ sum of prices}}$$

- This is because what we have now is **NO LONGER** point elasticity but elasticity over a range.

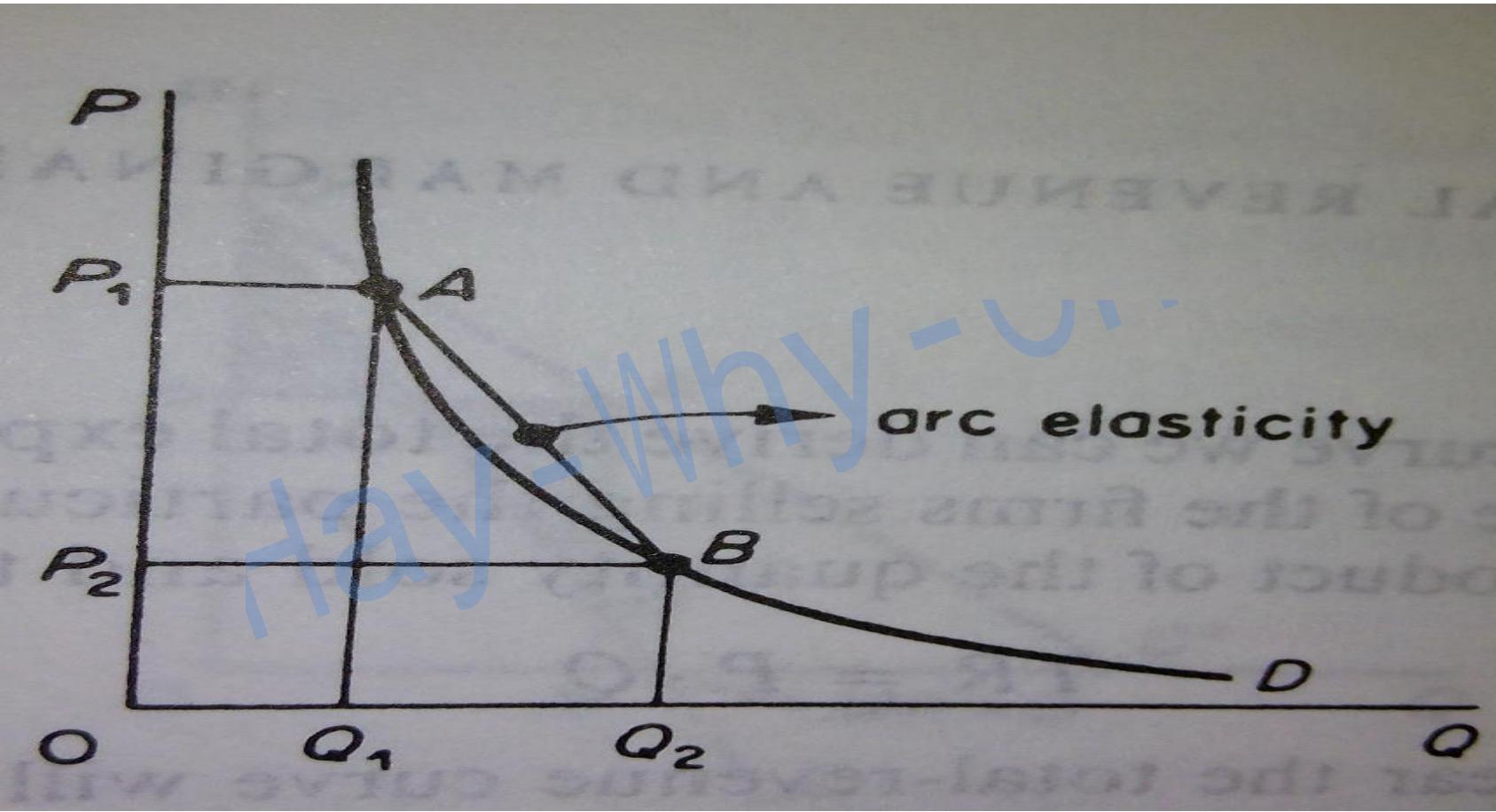


- We call this ARC elasticity of demand

Arc Elasticity of Demand

- Economists generally measure arc E_d in terms of the average quantity and average price to avoid the problem of obtaining different results:
- Arc Elasticity of demand $E_d = \frac{\Delta \text{ in quantity demanded} / (\text{sum of quantity demanded})}{\Delta \text{ in price} / (\text{sum of price})}$

Arc Elasticity of Demand

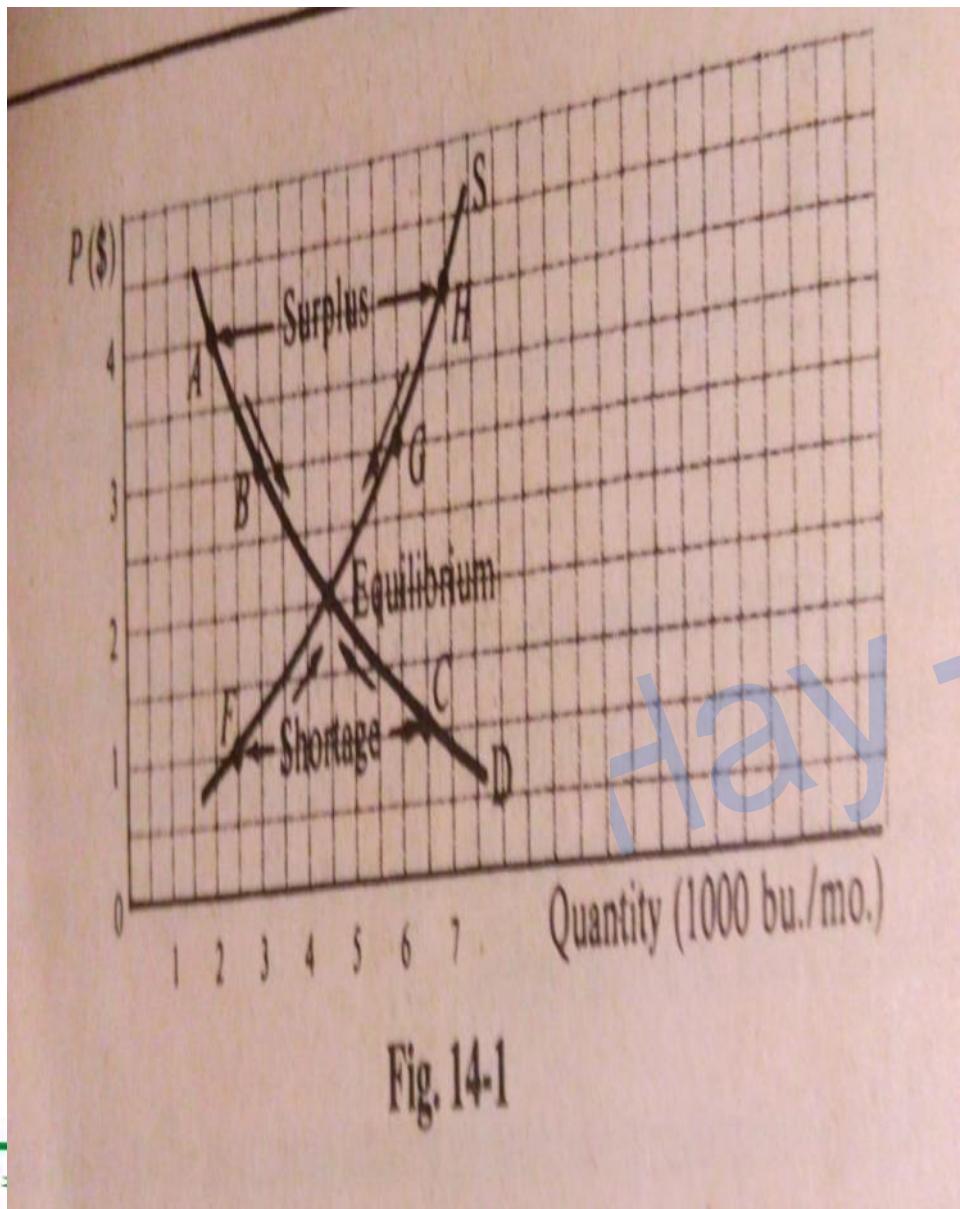


Elasticity Between Points A And B: another illustration

- The elasticity between points A and B along the demand curve is calculated using the original, new and average price and quantity
- The price elasticities may differ in different parts of the demand curves
- They thus have to be evaluated there to know the correct elasticity of demand

Hay - Why

Figure 6: Given DD curve AD and SS curve FS



Price	Quantity Demanded	Quantity Supplied	Surplus (+)or Shortage(-)	Pressure on price
4	2 A	7 H	+5	Downward
3	3 B	6 G	+3	Downward
2	4.5 E	4.5 E	0	Equilibrium
1	6.5 C	2.5 F	-4	upward

Calculation of Elasticity Between Points A & B using Figure 6

- $E_d = \frac{\text{(change in quantity/original)}}{\text{(change in price/original price)}}$
- $E_d = \frac{1/2}{1/4} = 2, \text{ using original values}$
- $E_d = \frac{\text{(change in quantity/new quantity)}}{\text{(change in price/ new price)}}$
- $E_d = \frac{1/3}{1/3} = 1, \text{ using new values}$
- $E_d = \frac{\text{(change in quantity/sum of quantity/2)}}{\text{(change in price/sum price/2)}}$
- $E_d = \frac{1/\{(2+3)/2\}}{1/\{(4+3)/2\}}$
- $E_d = (1/2.5)(3.5) = 1.4, \text{ using average values}$

Elasticity Between Points A and B

- We note that different values are also obtained
- Thus by convention, we use the last result of averages of quantities and prices .
- We thus say that the price elasticity of demand (on the average) between points A and B is 1.4.
- This is because we have an **ARC** and not a **POINT**

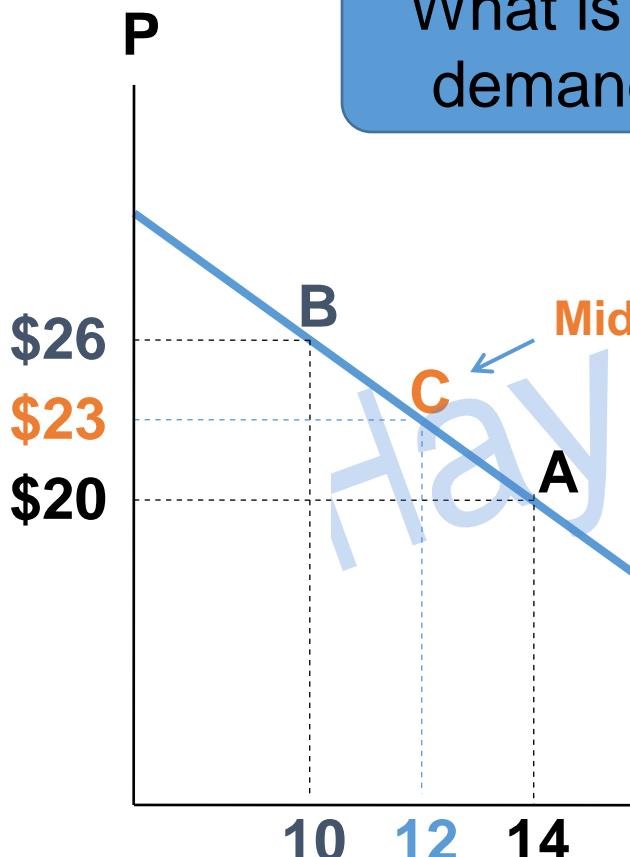


The End-Point Problem

- Economists use the average of the end points to calculate the percentage change.

$$\text{Elasticity} = \frac{\frac{(Q_2 - Q_1)}{1/2(Q_2 + Q_1)}}{\frac{(P_2 - P_1)}{1/2(P_1 + P_2)}}$$

Calculating Arc Price elasticity of Demand



What is the price elasticity of demand between A and B?

$$E_D = \frac{\frac{\% \Delta Q}{\% \Delta P}}{=} = \frac{\frac{Q_2 - Q_1}{\frac{1}{2}(Q_2 + Q_1)}}{\frac{P_2 - P_1}{\frac{1}{2}(P_2 + P_1)}} = \frac{\frac{10 - 14}{\frac{1}{2}(10 + 14)}}{\frac{26 - 20}{\frac{1}{2}(26 + 20)}} = \left| \frac{-0.33}{0.26} \right| = 1.27$$

Elasticity of demand E_d

- Elasticity of demand, (E_d) is a pure number
- As such, it is a better measurement tool than the slope which is expressed in terms of the units of measurement.
- The value of the price elasticity of demand is **negative** because the slope of the demand curve is negative, that is, the demand curve is downward sloping
- **However,**
- E_d is always expressed as a positive number, even though price and quantity demanded move in opposite direction.
- The demand is said to be:
 - Elastic, if $E_d > 1$,**
 - Unitary, if $E_d = 1$, and**
 - Inelastic, if $E_d < 1$.**



Demand Elasticity Categories	Notation	Interpretation
Elastic	$E_d > 1$	The percentage increase in quantity demanded of the commodity exceeds the percentage decline in price
Inelastic	$E_d < 1$	The percentage increase in quantity demanded of the commodity is less than the percentage decline in price
Unitary	$E_d = 1$	The percentage increase in quantity demanded of the commodity equals the percentage decline in price

Total Revenue & Elasticity of Demand

- **Total revenue:**
 - the income or the amount of money suppliers earn from the sale of goods and services.
 - **Total Revenue (TR) = price of commodity x quantity of commodity sold**
- Changes in the price of a commodity will either lead to:
 - an increase TR
 - decrease in the TR, depending on the value of elasticity of demand for the commodity
- **Illustration:** When the price of a commodity falls:
 - If $E_d > 1$, the Total Revenue (TR) of producers increases
 - If $E_d = 1$, Producers Total Revenue remains unchanged
 - If $E_d < 1$, Producers Total Revenue decreases or falls

When demand is inelastic i.e when elasticity is less than 1, a fall in price will cause a decrease in consumers' total expenditure on the commodity and consequently a fall in total revenue.

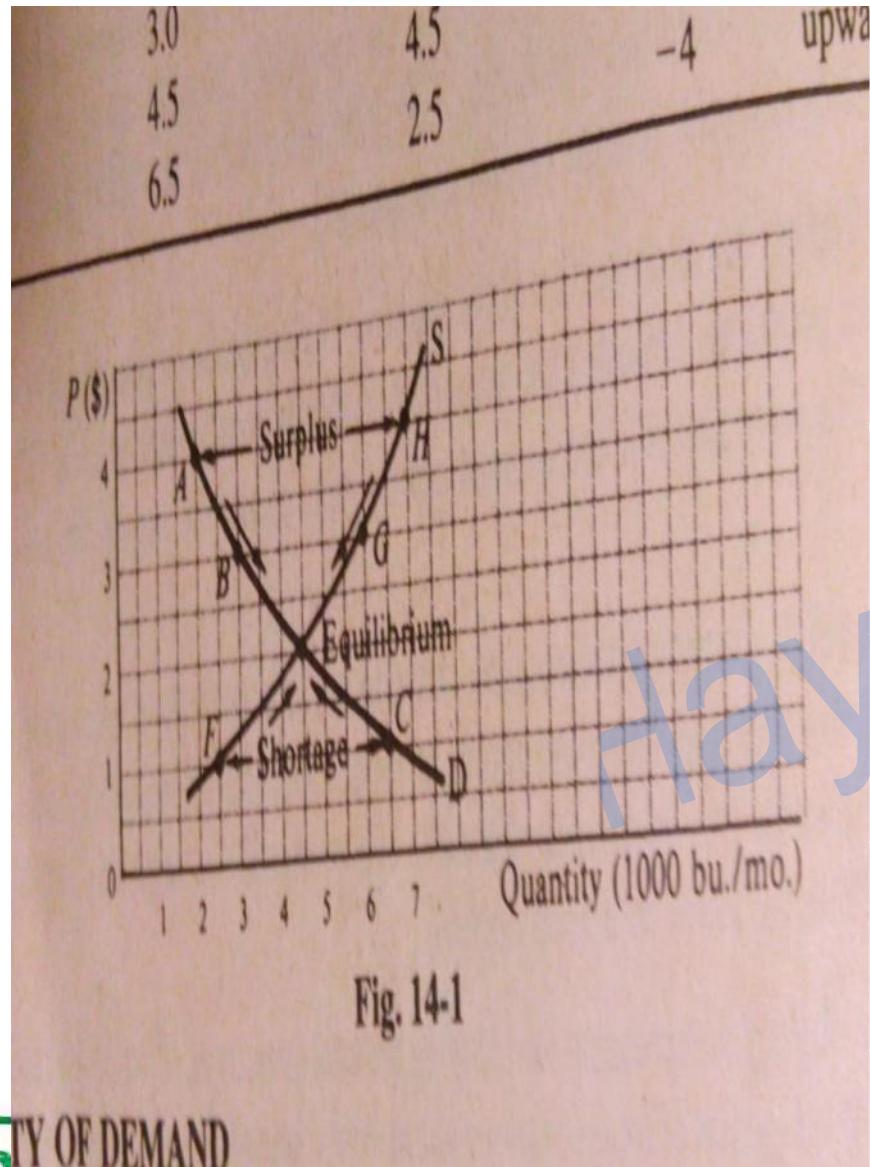
- But when demand is elastic, an decrease in the price of the commodity will increase consumers' total expenditure on the commodity and total revenue.



Value of elasticity	Price of Commodity	Commodity's Total Revenue
Greater than one	Fall	Increase
Greater than one	Rise	Decrease
Less than one	Fall	Decrease
Less than one	Rise	Increase
Equal to one	Rise or Fall	Unchanged



Given fig 7: DD and SS curve AD and FS with their coordinates



Points	Price N/KG	Demand in market	Points	Quantity supplied in market	Surplus + Shortage -	Pressure on price
A	4	2	H	7	+5	downward
B	3	3	G	6	+3	downward
C	2	4.5	E	4.5	0	Equilibrium
D	1	6.5	F	2.5	-4	upward

Illustration of Figure 7

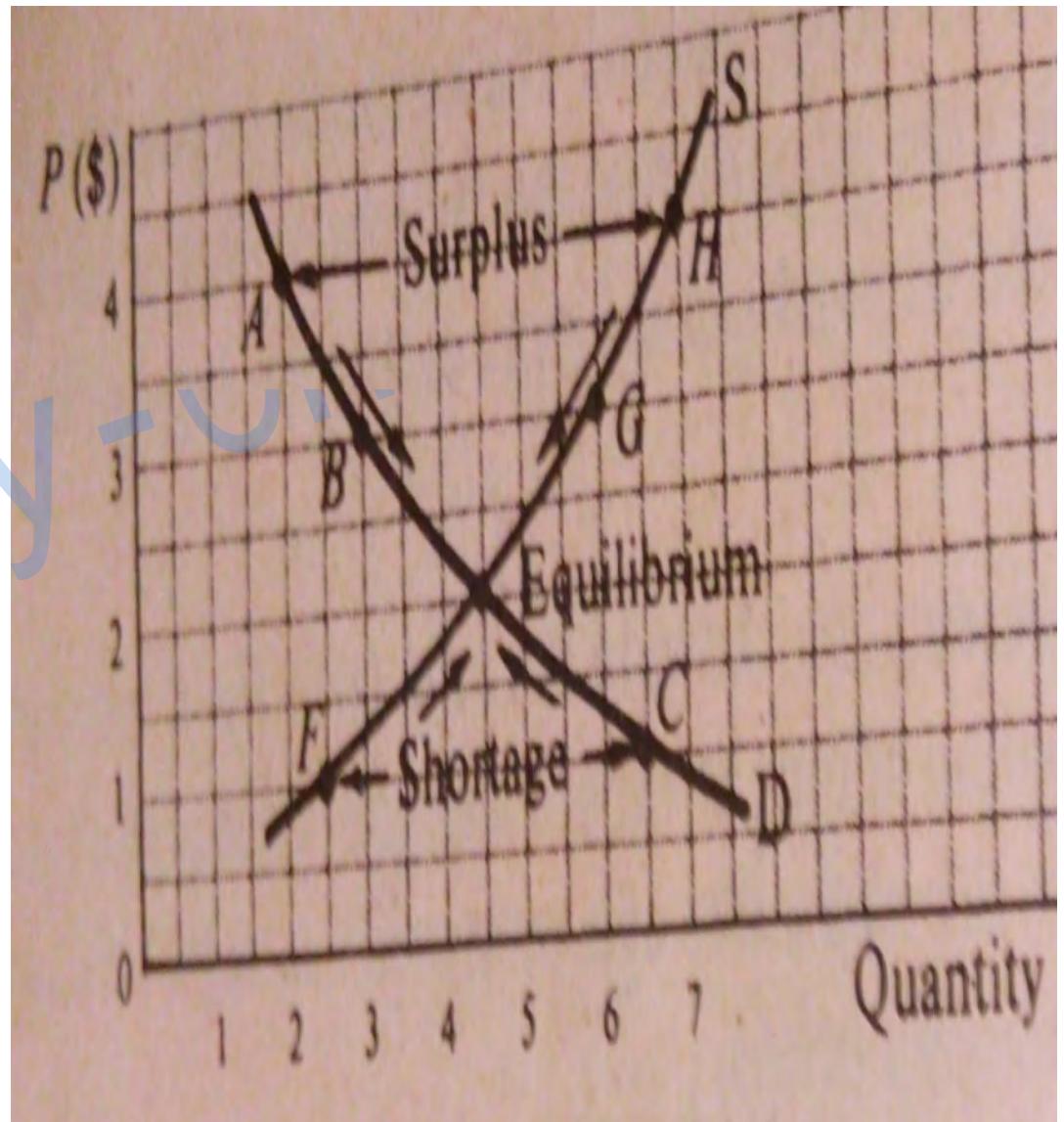
- Recall: Elasticity between two points (e.g A and B) along the demand curve can be calculated using:
 - Original quantity and price
 - New quantity and price
 - Average quantities and prices
- Required:
- Use the information on figure 7 to calculate the elasticity of demand between points C and D using the above three methods

Using Total Revenue Rule to Determine Elasticity Of Demand

Points	Price	Quantity Demanded	Total revenue	Ed
A	4	2	8	Elastic
B	3	3	9	Unitary
C	2	4.5	9	inelastic
D	1	6.5	6.5	

Using Total Revenue rule

- Using the TR rule, the market demand curve is:
 - Elastic between points A and B because $TR_2 > TR_1$
 - Market demand curve has Unitary elasticity between points B and E, because $TR_2 = TR_1$
 - Market demand curve is Inelastic between points E and C, because $TR_2 < TR_1$



Another Example

Given:

- At ₦25 / bottle, 100 bottles of coca-cola are sold.
- If the price drops to ₦20 / bottle, the week's sales increased to 110 bottles.

Is the demand elastic or inelastic?

Solution:

$$P_1 = ₦25;$$

$$P_2 = ₦20;$$

$$\begin{aligned}Q_1 &= 100; \\Q_2 &= 110\end{aligned}$$

$$TR_1 = P_1 \times Q_1 = 25 \times 100 = ₦2500.$$

$$TR_2 = P_2 \times Q_2 = 20 \times 110 = ₦2200.$$



- Since $TR_2 < TR_1$, the price elasticity of demand is inelastic.

Factors affecting price elasticity of demand

- **Availability of substitute goods:**

- The more and better the substitutes for a good, the greater its price elasticity
- Goods with few and poor substitutes- eg. wheat and salt, tend to have low price elasticities
- Goods with many substitutes (e.g wool, for which cotton and man made fibres can be substituted) have high elasticities

- **The number of uses to which a good may be put:**

- The greater the number of possible uses of a commodity, the greater its price elasticity
- A commodity such as wool, which can be used in producing clothing, carpeting, upholstery, draperies and tapestries will tend to have a higher price elasticity of demand than a commodity with only one or few uses, e g butter



Factors affecting price elasticity of demand

- The period of time considered:
 - The longer the period of time considered, the more the price elasticity of demand for the good
- The nature of the need that the commodity satisfies.
- The proportion of income spent on the particular commodity

Income Elasticity of Demand (E_y)

- Income elasticity of demand:
 - the percentage change in quantity demanded of a commodity due to a percentage change in income.
 - Proportional change in the demand for a good divided by the proportional change in income.
 - $$E_Y = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in income}} = \frac{\Delta Q}{Q} * \frac{\Delta Y}{Y} = \frac{\Delta Q}{\Delta Y} * \frac{Y}{Q}$$
- Where:**

- Y is income; Q is quantity demanded
- ΔY is the change in income; ΔQ is the change in quantity demanded

Income Elasticity of Demand (E_Y)

- If $E_Y < 1$, it implies that:
 - The commodity is income inelastic
 - The commodity is a necessity good; as such,
 - The quantity demanded is not very responsive to changes in income.
 - Consumption remains about same irrespective of income level
- $E_Y > 1$, it implies that:
 - The commodity is income elastic
 - The commodity is a luxury good
 - The quantity demanded is highly responsive to changes in income.



Income Elasticity of Demand (E_Y)

- $E_Y = 1$, it implies that:
 - The commodity has unitary income elasticity
 - The quantity demanded responds in the same manner to changes in income.
- If $E_Y < 0$ (negative), it implies that:
 - The commodity in question is an **inferior good**
- According to **Christian Lorenz Ernst Engel**:
 - The income elasticity of demand for food is low,
 - Those for clothing and shelter are about unity
 - While the income elasticities of demand for recreation, medical care and other luxury goods are in excess of one

AEM102: Principles of Economics

Price Determination & Elasticity of Supply

Dr Shakirat Ibrahim
AE&FM Department



Determinants of Income Elasticity of Demand

- **The nature of the need that the commodity covers:**
 - The percentage of income spent on food declines as income increases (this is known as Engel's Law and has sometimes been used as a measure of welfare and of the development stage of an economy)
- **The initial level of income of a country:**
 - For example, a TV set is a luxury in an underdeveloped, poor country while it is a necessity with high per capita income nation
- **The time period:**
 - because consumption patterns adjust with a time-lag to changes in income



Cross Price Elasticity Of Demand

- The cross price elasticity of demand $\varepsilon_{B,A}$, is the responsiveness of the quantity demanded of good B to a change in the price of another good A.

$$\varepsilon_{BA} = \frac{\Delta Q_B / Q_B}{\Delta P_A / P_A}$$

ε_{AB} indicates the change in quantity of A demanded with respect to change in the price of commodity B. If ε_{AB} is positive, it implies that as price of good B increases, the quantity of commodity A demanded increases.

- Therefore, commodities A&B are substitutes e g tea and coffee
- If on the other hand, ε_{AB} is negative, it shows that as the price of commodity B increases the quantity of commodity A demanded decreases.
- Therefore, commodities A and B are complements. Example is bread and butter, cars and fuel.

- The sign of the cross-elasticity is **Negative if X and Y are complementary goods**
- The sign of the cross-elasticity is **Positive if X and Y are substitutes goods**
- **The higher the value of the cross-elasticity, the stronger the degree of substitutability or complementarity of X and Y**

The main determinant of cross price-elasticity is:

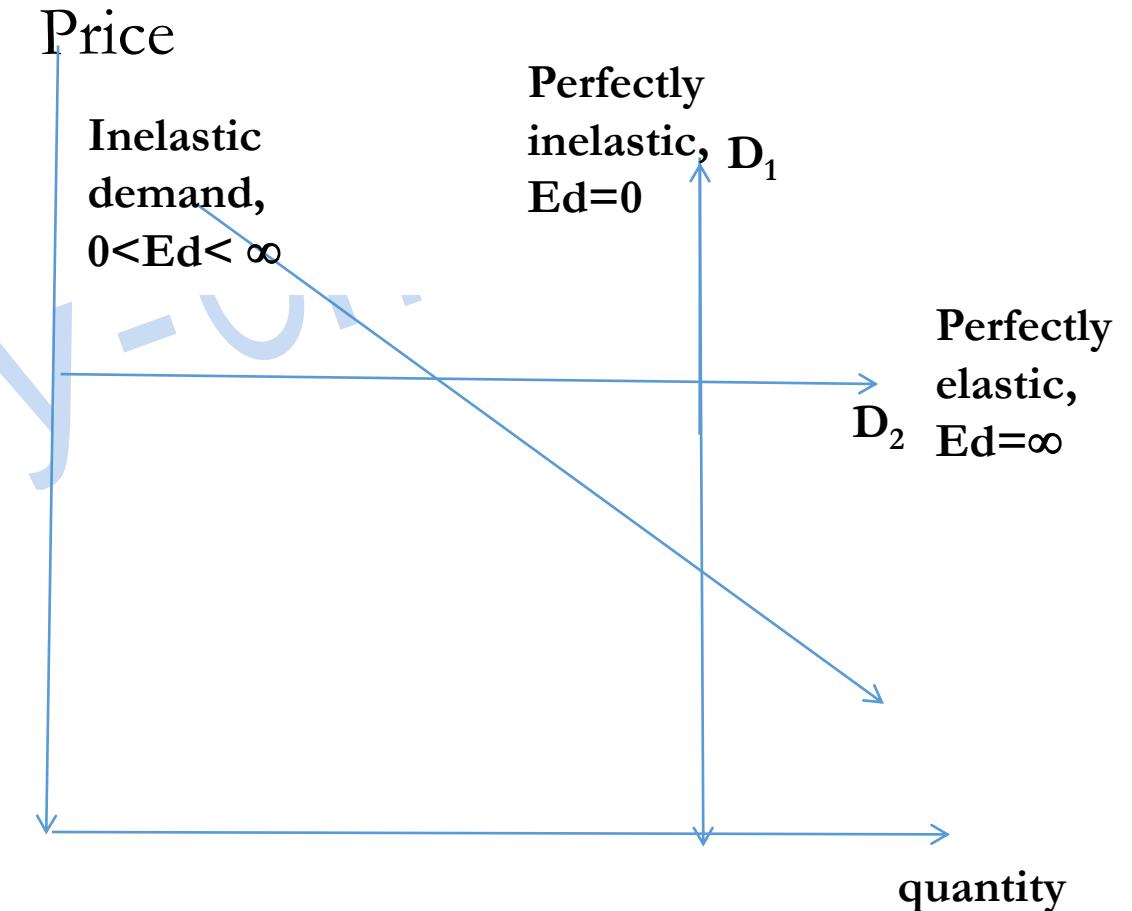
- **The nature of the commodities relative to their uses:**
 - If two commodities can satisfy equally well the same need, the cross-elasticity is high, and vice versa, if they can not satisfy the same need equally.
- The cross-elasticity can be used for the definition of firms which form an industry

Value of Elasticity And Total Revenue

- Recall:
 - A fall in price will generally lead to an increase in total quantity demanded
 - Total revenue will decrease with inelastic demand curve but increase with elastic demand curve.
- The availability of close substitute (e.g fish & beef and margarine & butter) for a product is the most important determinant of elasticity.
- Substitution between substitute products is possible only if the prices of the substitutes remain constant.
- We expect little decrease in quantity demanded when the price of such commodities go up.

Application of Elasticity: Perfectly elastic or perfectly inelastic demand

- Note that when the demand curve is perfectly inelastic, its elasticity of demand is zero
- E_d of D_1 is equal to zero because there is no percentage change in quantity demanded, regardless of the change in price.
- When the demand curve is perfectly elastic, its elasticity is infinity (the case of the horizontal demand curve in graph).
- E_d of D_2 is infinity because the percentage change in quantity is very large for an infinitesimal small percentage change in price



Government Intervention and Price Determination

Price ceiling:

- The government can set a legally imposed maximum price that suppliers can not exceed in an attempt to prevent the market price from rising above a certain level. To be effective, a maximum price has to be set below the market price.

Price floor:

- A minimum price is a legally imposed price floor, below which the market price cannot fall. To be effective, the minimum price has to be set above the market equilibrium price.

Example of Price Ceiling:

- Government can legislate on the maximum price landlords can charge a tenant for rent.
- Such rent control policy result in a disequilibrium in the housing market since at the government mandated price ceiling, the quantity supplied falls short of the quantity demanded
- Another example of price ceiling is the price of petrol. It is fixed in Nigeria at about N160/litre

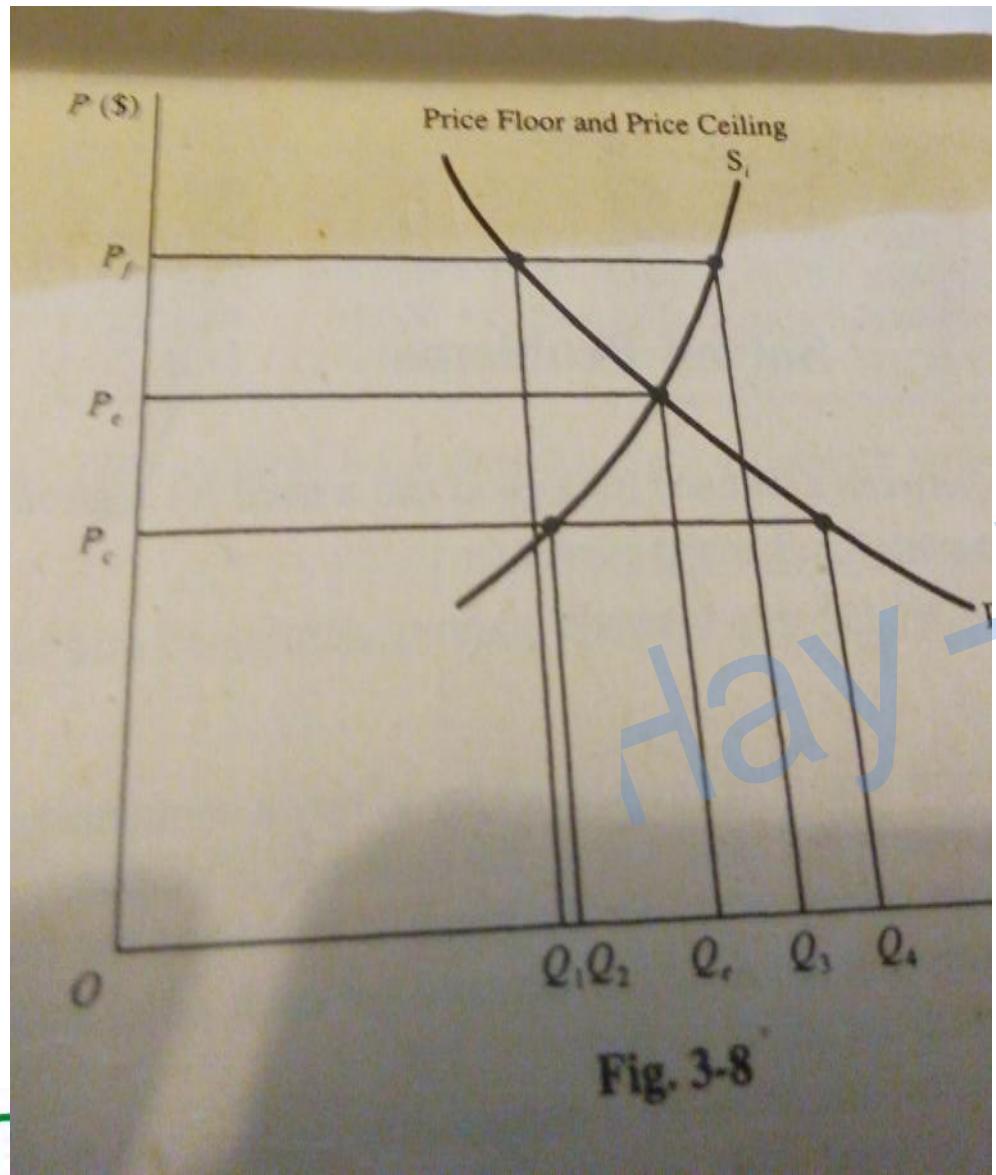


Price Floor

- An example of minimum price (price floor) is the government minimum wage which specifies the lowest wage an employer can pay an employee.
- Minimum wage rate in Nigeria is N30,000/month
- Price floor result in market disequilibrium as the quantity supplied at the mandated price exceeds quantity demanded



Graphical Illustration: Price Floor & Price Ceiling

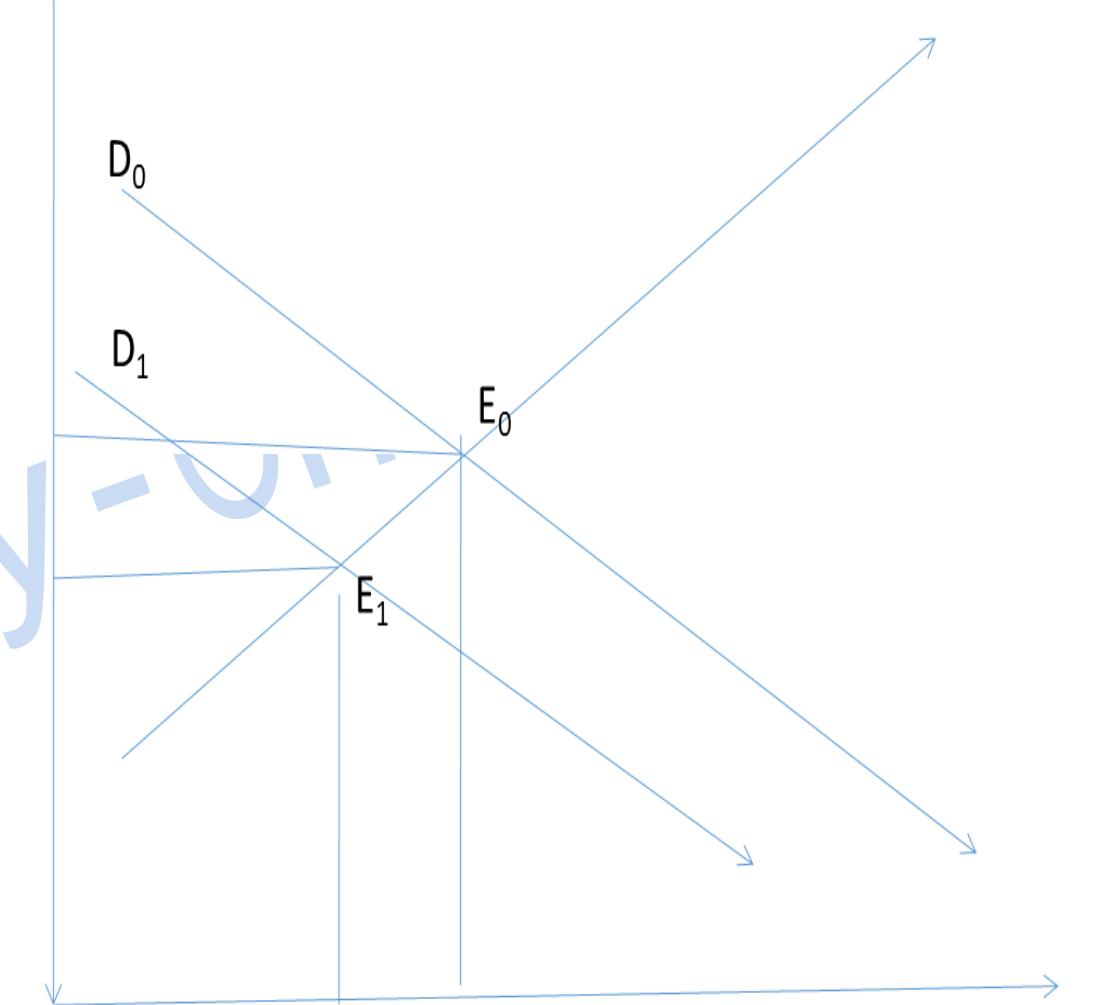


- Suppose the market equilibrium price is at P_e .
- If the government mandates a price floor at P_f , which is **above equilibrium price P_e** ,
quantity supplied will be Q_3 , which is greater than the Q_1 demanded at the P_f price.
- A mandated price ceiling of P_c , which is **below equilibrium price P_e** on the other hand, causes quantity demanded Q_4 to exceed the Q_2 quantity supplied.
- This is what is shown diagrammatically

Rationing:

- The government can alter an equilibrium price by changing market demand
- The government can restrict demand by rationing a good that is, by shifting the demand schedule down and to the left
- When a good is rationed, an individual not only must be willing and financially able to buy a commodity but also must possess a government issued coupon which permits purchase

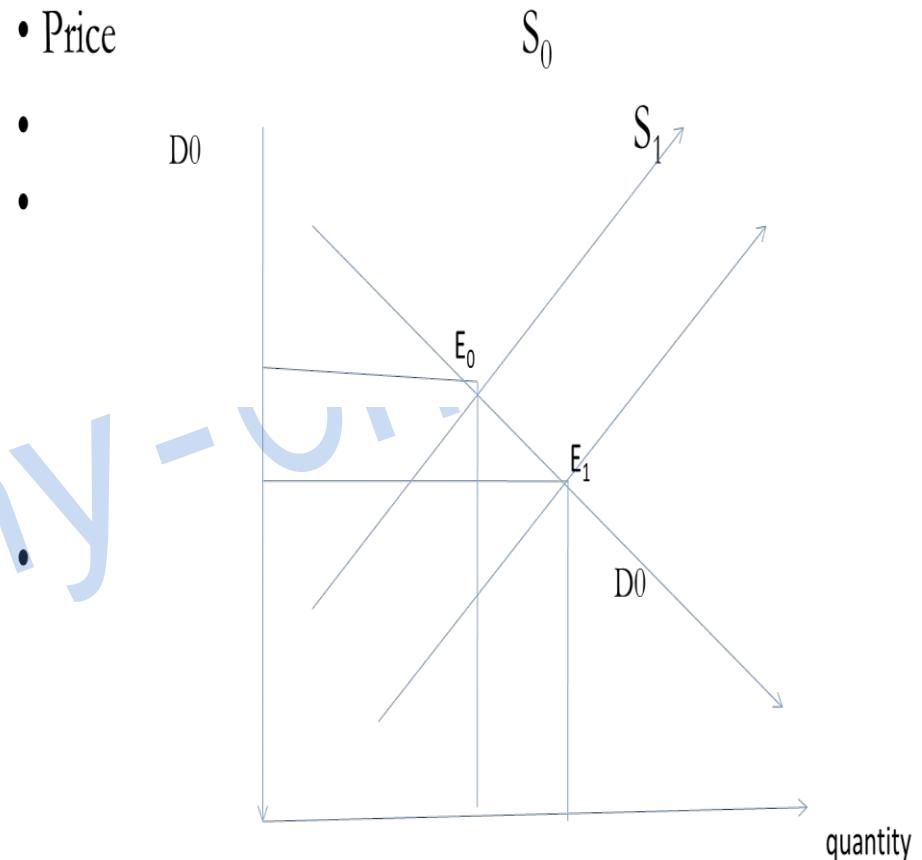
Why - How



Rationing shifts Demand curve down to the left, that is, from D_0 to D_1

Subsidy:

- A subsidy to the producer lowers the commodity's supply price
- Subsidy shifts market supply down and to the right
- Subsidy results in a lower equilibrium price and larger equilibrium quantity.



Subsidy Shifts down the Supply Curve to the right from S₀ to S₁

Price Elasticity of Supply, Es

- E_s measures the percentage change in quantity supplied of a commodity as a result of a given percentage change in its price
 - As in elasticity of demand (E_d), we get different values for elasticity of supply if we use the original or the new price and quantity.
 - To avoid this, we also use average price and quantity FOR ARC ELASTICITY OF SUPPLY.

$E_s = \frac{\text{change in quantity supplied}/(\text{sum of quantity supplied}/2)}{\text{change in price}/(\text{sum of price}/2)}$

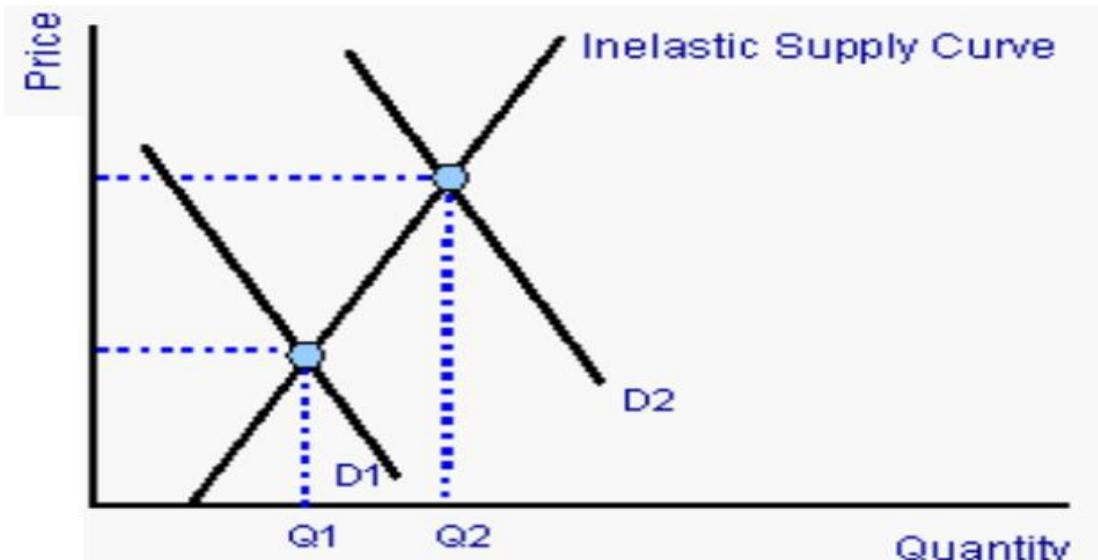
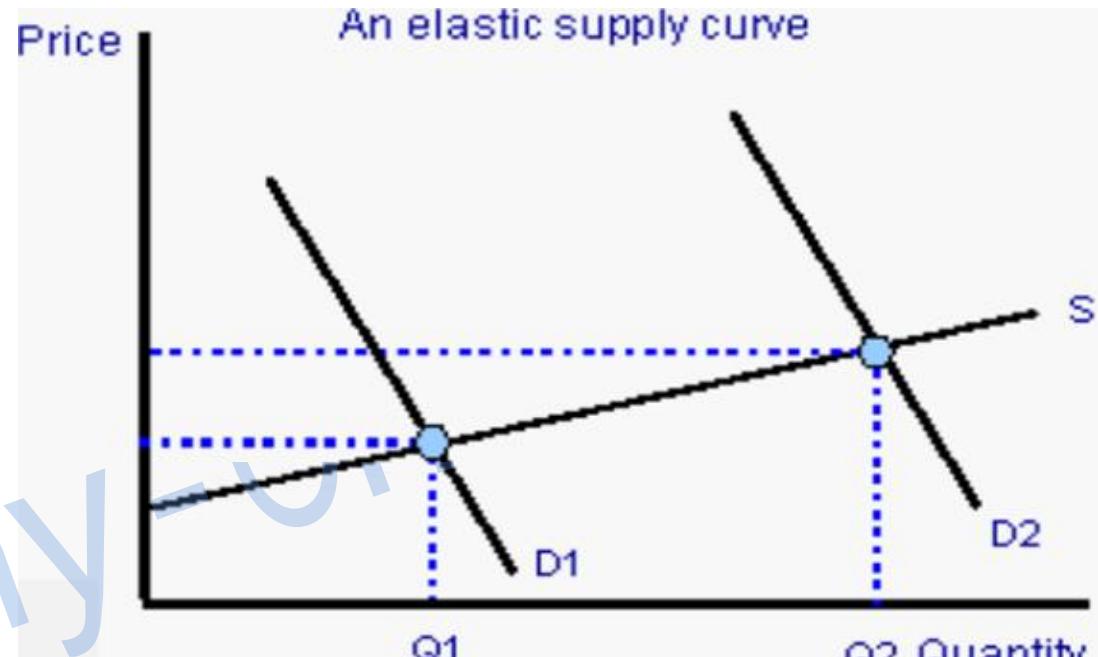
 - E_s is a pure number and it is positive because price and quantity move in the same direction
 - Supply is price elastic, if $E_s > 1$,
Supply is price unitary elastic, if $E_s = 1$



- And Supply is price inelastic, if $E_s < 1$

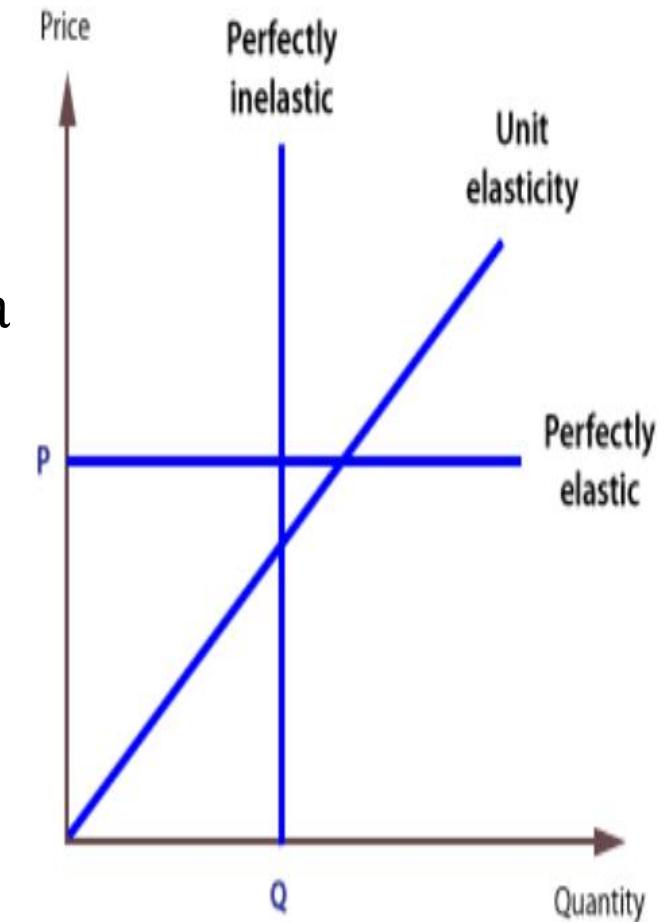
Types of Elasticity of Supply

- Types of Elasticity of Supply
- **Elastic Supply ($E_s > 1$):** a given percentage change in price leads to a larger change in quantity supplied.
- **Inelastic Supply ($E_s < 1$):** a given percentage change in price causes a smaller change in quantity supplied.



Categories of Elasticity of Supply

- **Unitary elasticity of supply:** the change in quantity supplied of a commodity is exactly equal to the change in its price ($E_S = 1$)
- **Zero elasticity /perfectly Inelasticity of Supply:** a given quantity of a commodity can be supplied whatever might be the price ($E_S = 0$)
- **Infinite elasticity/perfect elasticity of supply:** suppliers are willing to supply any quantity of a commodity at a higher price ($E_S = \infty$). That is, quantity supplied is unlimited at a given price, but no quantity can be supplied at any other price.



Example: Elasticity of Supply

- Suppose at points G and H on supply curve, the price and supply are given as coordinates (4,5.5) and (5,5.7),
- The price elasticity of supply between points G and H is:

$$E_s = \frac{\text{change in quantity supplied}/(\text{sum of quantity supplied}/2)}{\text{change in price}/(\text{sum of price}/2)}$$

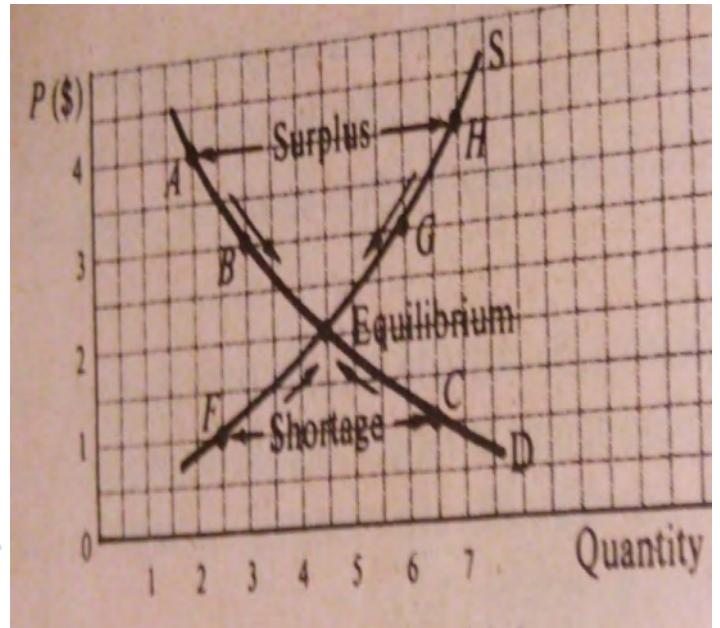
$$= \{0.2/(5.5+5.7)/2\} \div 1/(5+4)/2$$

$$= \{0.2/5.6\} \div 1/4.5 = 0.16; \text{ supply is price inelastic}$$

- The(average) elasticity between points F and E along the supply curve is:

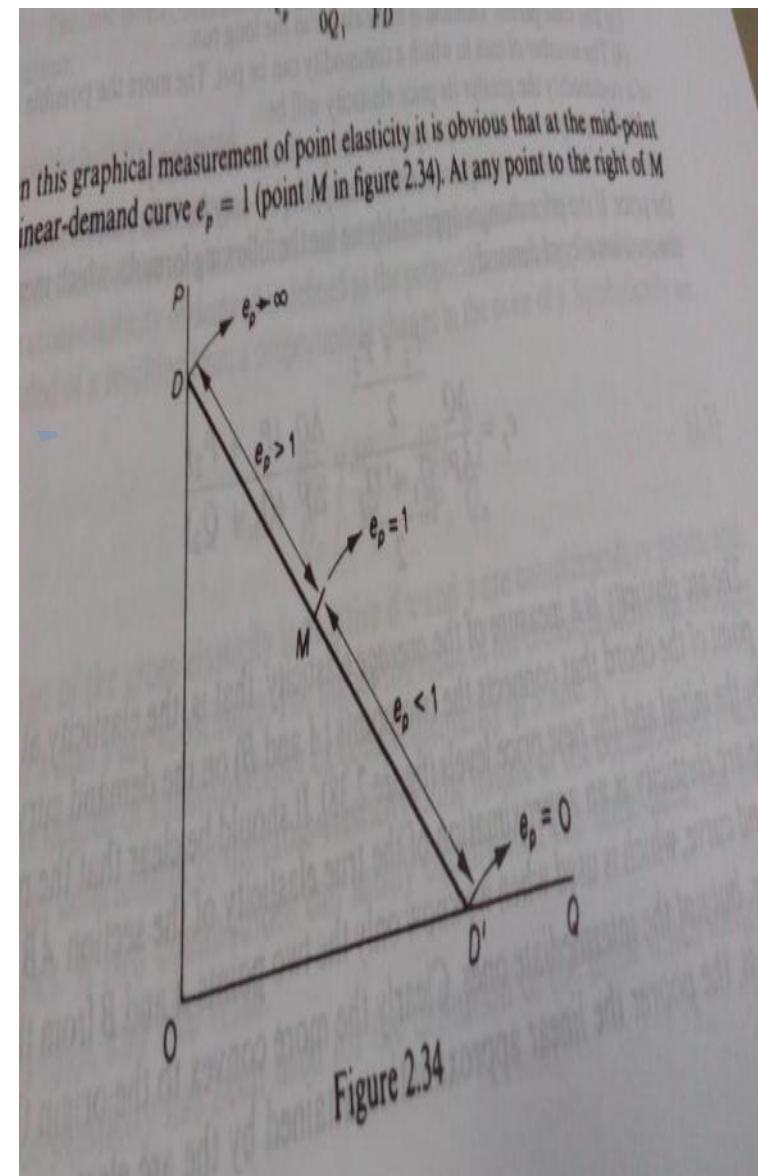
$$E_s = \frac{2/\{(2.5+4.5)/2\}}{2(1+2)/2} = 1/3.5 * 1.5 = 0.43$$

- $E_s = 0.43$, indicating that supply is price inelastic



Elasticity on Linear Demand Function

- The graphical measurement of point elasticity of linear demand function is the ratio of the segment to the right of the point to the segment to the left.
- Thus at the mid-point of a linear-demand curve, $e_p = 1$,
- That is point M in the figure.
- At any point to the right of M, the point elasticity is less than unity, $e_p < 1$**
- At any point to the left of M, $e_p > 1$
- At point D, $e_p = DD'/0$, $e_p \rightarrow \infty$**
- At point D', $e_p = 0/DD'$, thus $e_p = 0$



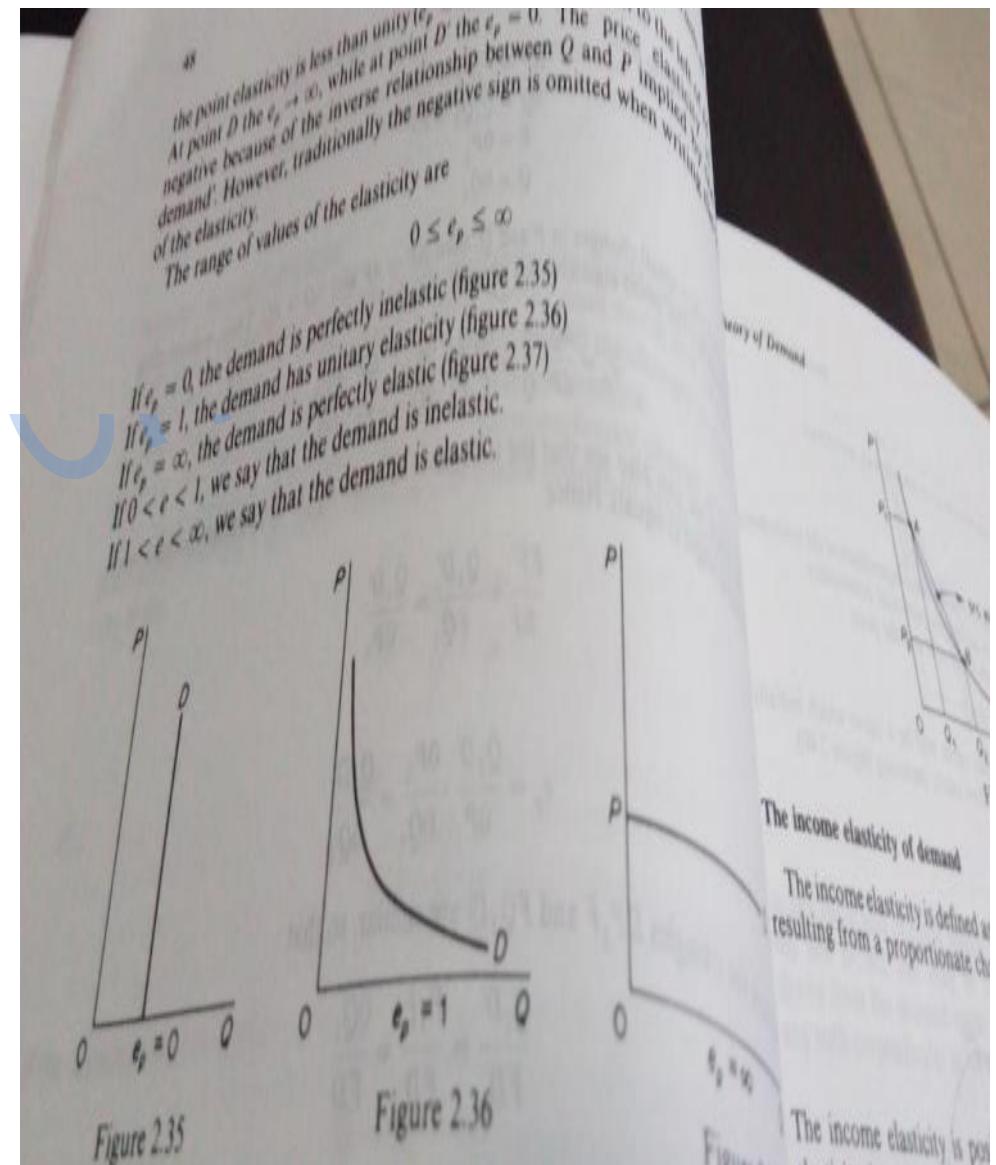
Range Of Elasticity Values

The range of values of the elasticity are

$$0 \leq e_p \leq \infty$$

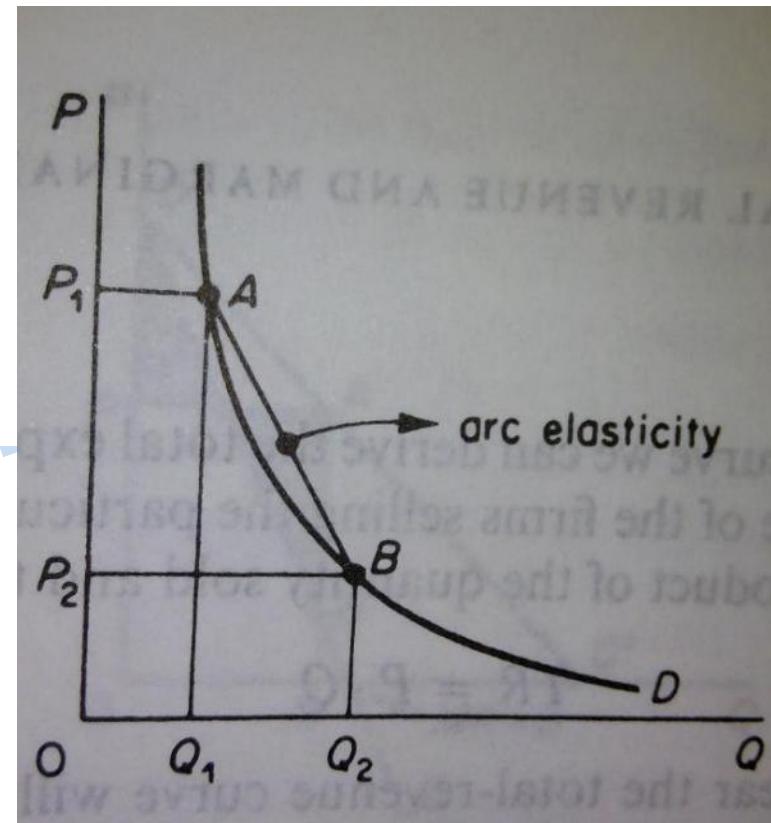
- If $e_p = 0$, the demand is perfectly inelastic, (figure 2.35)
- If $e_p = 1$, the demand has unitary elasticity, (figure 2.36)
- If $e_p = \infty$, the demand is perfectly elastic, (figure 2.37)
- If $0 < e_p < 1$, we say that the demand is **inelastic**
- If $1 < e_p < \infty$, we say that the demand is **elastic**

Why



Arc Elasticity of Demand

- The formula for the price elasticity discussed is applicable only for **infinitesimal changes in the price**
- If the **price changes appreciably** we use another formula which measures the,
- **ARC ELASTICITY of demand which is:**
- $$e_p = \frac{\Delta Q}{\Delta P} \frac{(P_1+P_2)/2}{(Q_1+Q_2)/2} = \frac{\Delta Q}{\Delta P} \frac{(P_1+P_2)}{(Q_1+Q_2)}$$
- The arc elasticity is a measure of the **AVERAGE ELASTICITY**,
- That is the elasticity at the mid-point of the chord that connects the 2 points A and B on the demand curve defined by the initial and the new price levels



Exercise:

An economist conducted a study on the consumption of eggs in Kebbi State, Nigeria. His report shows that the quantity of eggs demanded varies from time to time. He equally reported the demand function as:

$$q = 24 - 0.2p$$

Where q = quantity of eggs demanded
 p = price

Using the above information:

- i. If the price of egg falls from N70/crate to N50/crate, determine the price elasticity of demand
- ii. What conclusion can you draw from the result obtained in (i) ?

Solution:

$$q = 24 - 0.2p; \quad P_1 = 70; \quad P_2 = 50$$

$$q_1 = 24 - 0.2P_1$$

$$q_1 = 24 - 0.2(70) = 10$$

$$q_2 = 24 - 0.2P_2$$

$$q_2 = 24 - 0.2(50) = 14$$

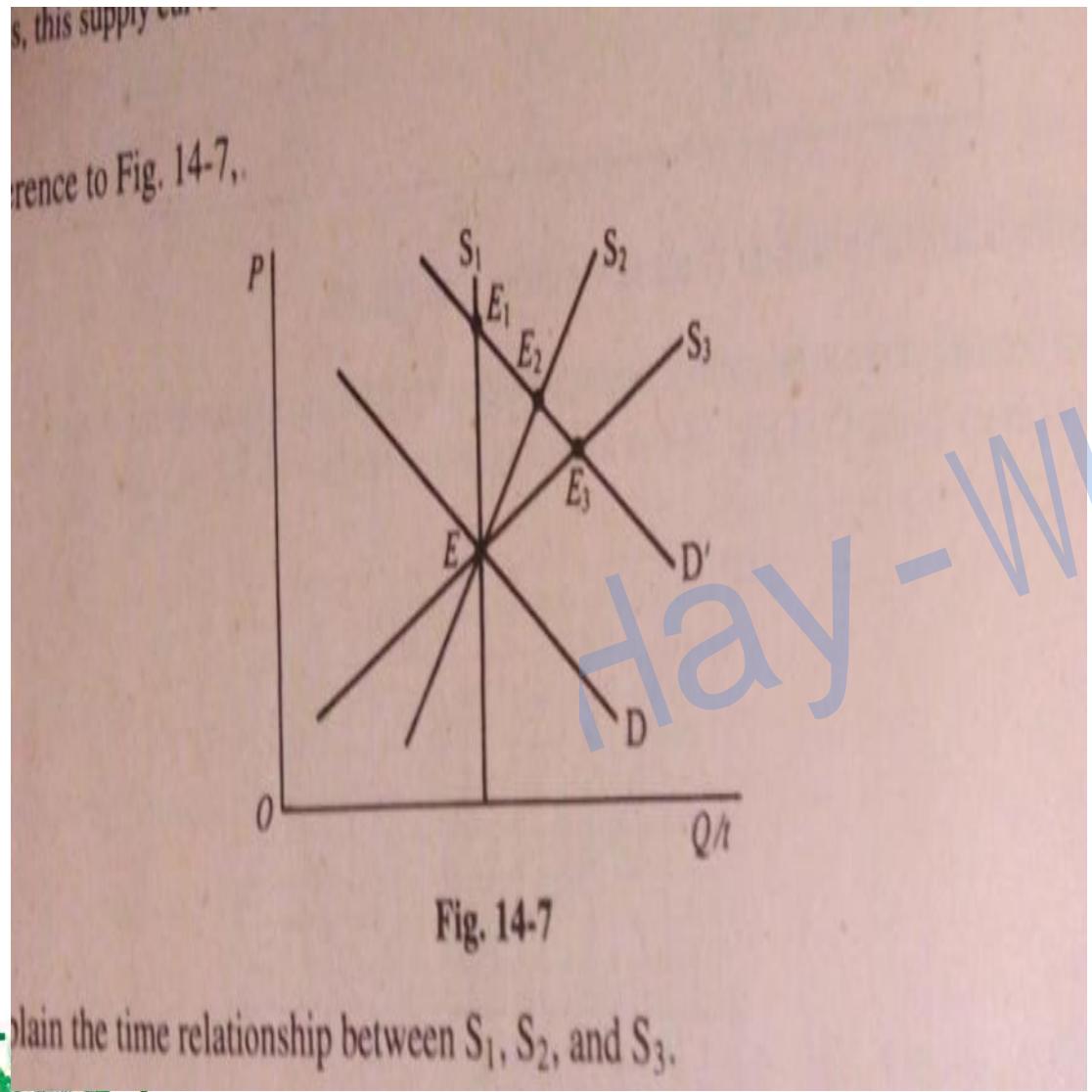
$$E_p = \{(q_2 - q_1) / (P_1 - P_2)\} * (P_1 / P_2)$$

$$E_p = \{(14 - 10) / (70 - 50)\} * (70 / 10) = 1.4$$

ii. Conclusion:

- Since the price elasticity of demand is greater than one i.e $E_p > 1$, it shows that the demand is elastic.
- Therefore, a small increase in the price of egg will significantly affect the quantity of egg demanded.

Application of Elasticity: Market period, short-run and long-run



- Given the diagram of demand curves D , D' and supply curves S_1 , S_2 and S_3 ,
- What happens to equilibrium price and quantity,
- if D increases to D'
- and S_1 , S_2 and S_3 respectively become the relevant supply curves?.

Application of Elasticity: Elasticity of Supply & Time Period

- S_1 , S_2 and S_3 illustrate supply curve in different periods. Given the difference in elasticity of the supply curves:
- S_1 is **Market period supply**.
- At **market period supply** there is no change in quantity supplied; this is otherwise called – the **Very short-run supply**.
- S_2 is a case of **Short-run**, and
- S_3 is a case of **Long-run**

We would explain what happens to equilibrium price and quantity,

- if D increases to D'

- and S_1, S_2 or S_3 respectively become the supply curves

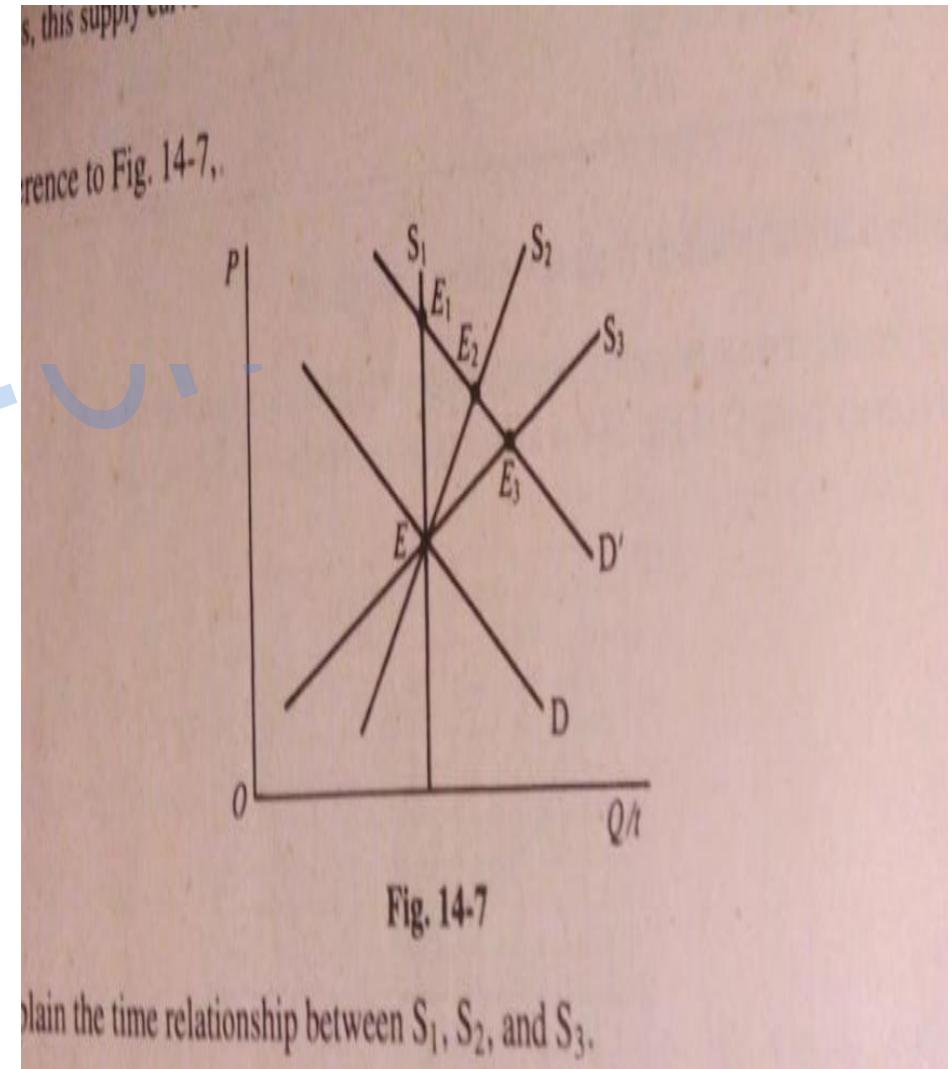
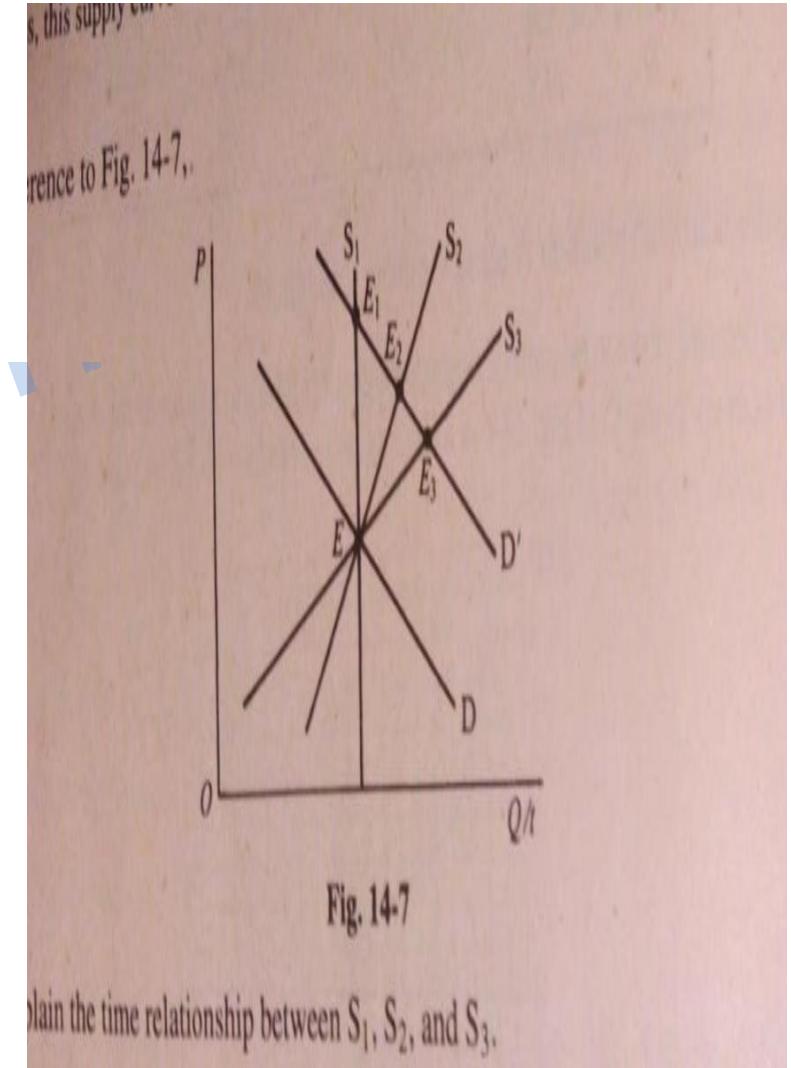


Fig. 14-7

Application of Elasticity: Elasticity of Supply & Time Period

- S_1 is vertical, it means no matter what value P assumes, Q remains unchanged.
- Thus the elasticity of S_1 is zero since Q does not change. Supply is said to be **perfectly inelastic**
- This is said to be **the market period** or the very short run, there is no change in quantity supplied in the very short-run
- S_2 is positively sloped and shows that producers are willing to supply more of the commodity at higher price
- The elasticity of supply at S_2 is greater than zero, thus, this is a short run case



Long-run Elasticity Of Supply, S_3

- S_3 is the supply curve over a longer time period say a year or more.
- The **longer period is referred to as long run**
- In the long run, the quantity response for a given increase in price is even greater
- That is the supply curve is more elastic because over a period of one or more years output would increase.

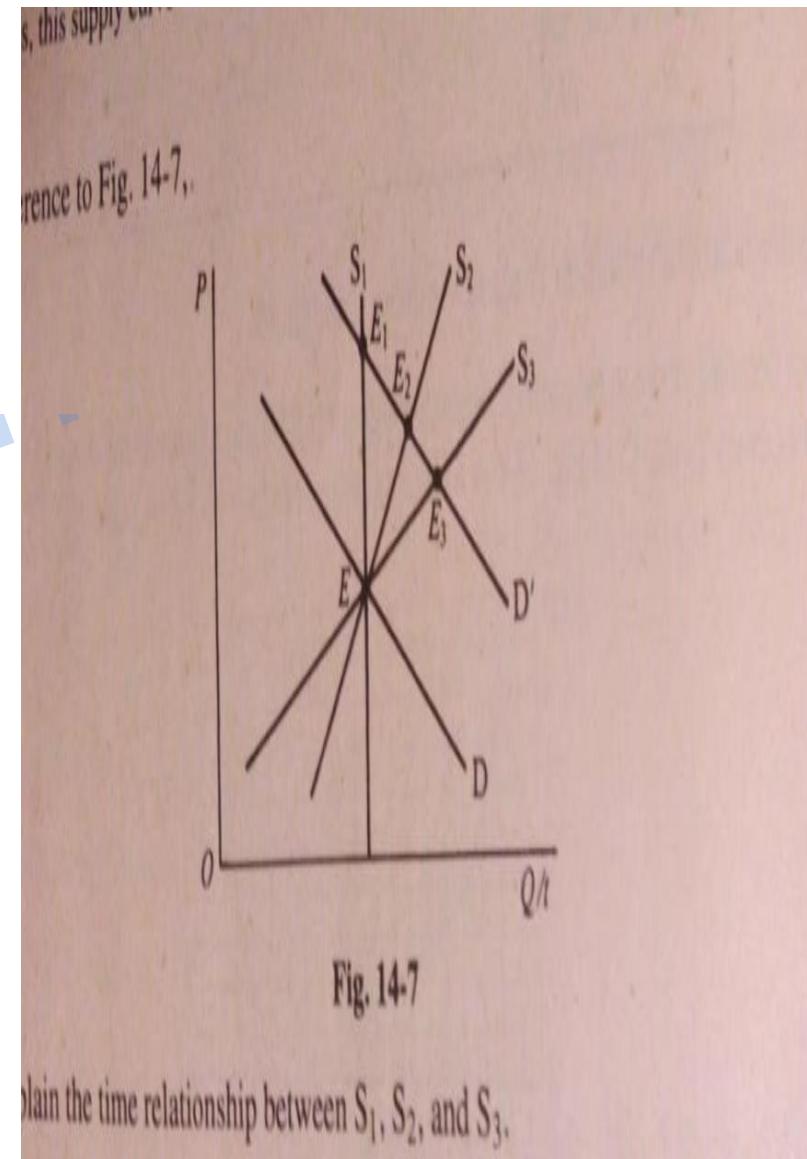
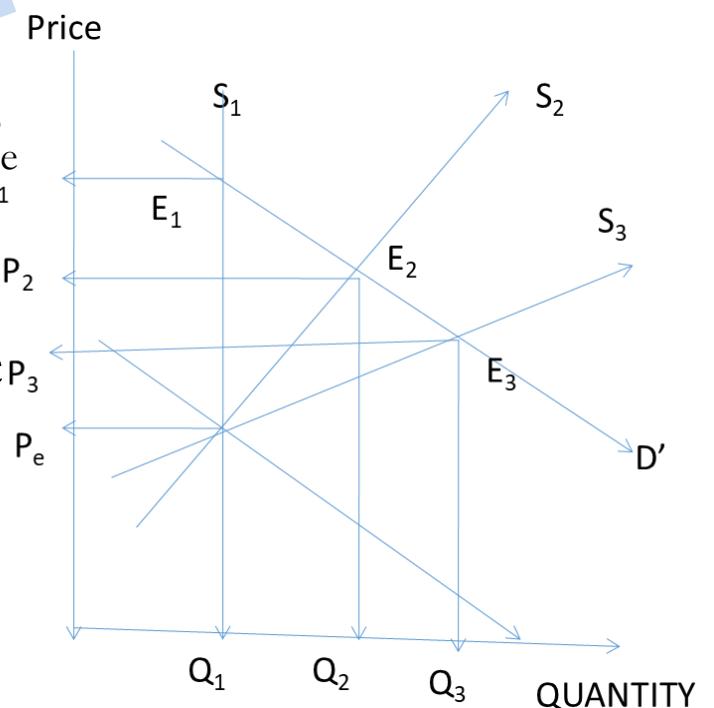
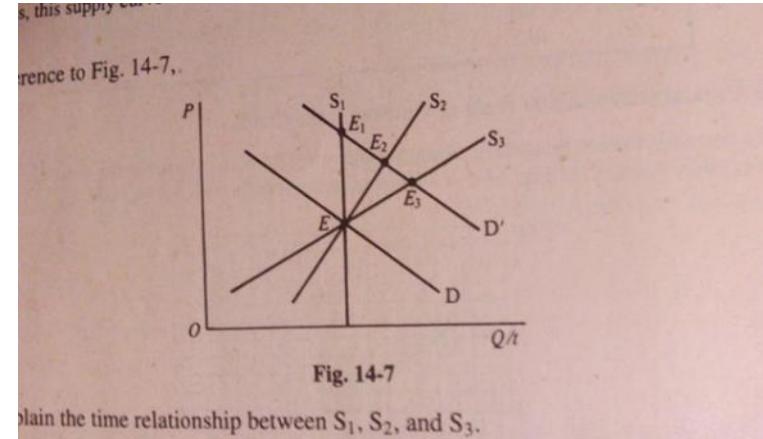


Fig. 14-7

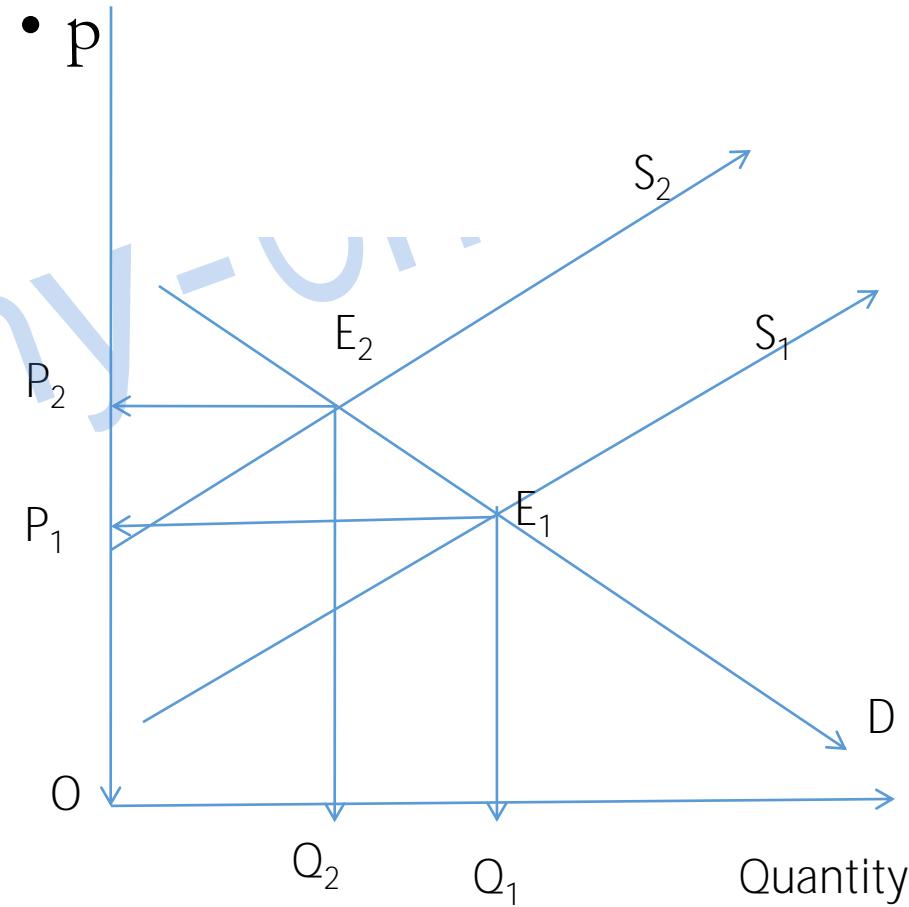
Application Of Elasticity

- With D and S_1 or S_2 or S_3 ,
 - the equilibrium price and quantity is given by point E.
- If D shifts up to D' (increase in demand)
 - only P rises in the market period (point E_1 on S_1), no change in quantity.
- In the short run, equilibrium is at E_2 . Price rose to P_2 from P_e and Q_1 rose to Q_2
- In the long run, equilibrium is at E_3 . Price rose to P_3 from P_e and Q_1 rose to Q_3
- In the short run and the long run, both price and quantity increase, but equilibrium output rises more and price less in the long run than in the short run
- Compare E_3 on S_3 in the long run with E_2 on S_2 in the short run.**



Application of Elasticity: Bad Agricultural Harvest

- Why do farmers' income often rise when harvests are bad, and farmers' income often fall when harvests are good?
- A bad harvest is reflected by a decrease in supply
- That is an upward shift in the market supply curve of the good S_1 to S_2
- Given that the market demand remains constant, the decrease in supply causes the equilibrium to shift from E_1 to E_2 with
 - Price rising to P_2 from P_1 and
 - Q_1 falling to Q_2



Application of Elasticity: Bad Agricultural Harvest

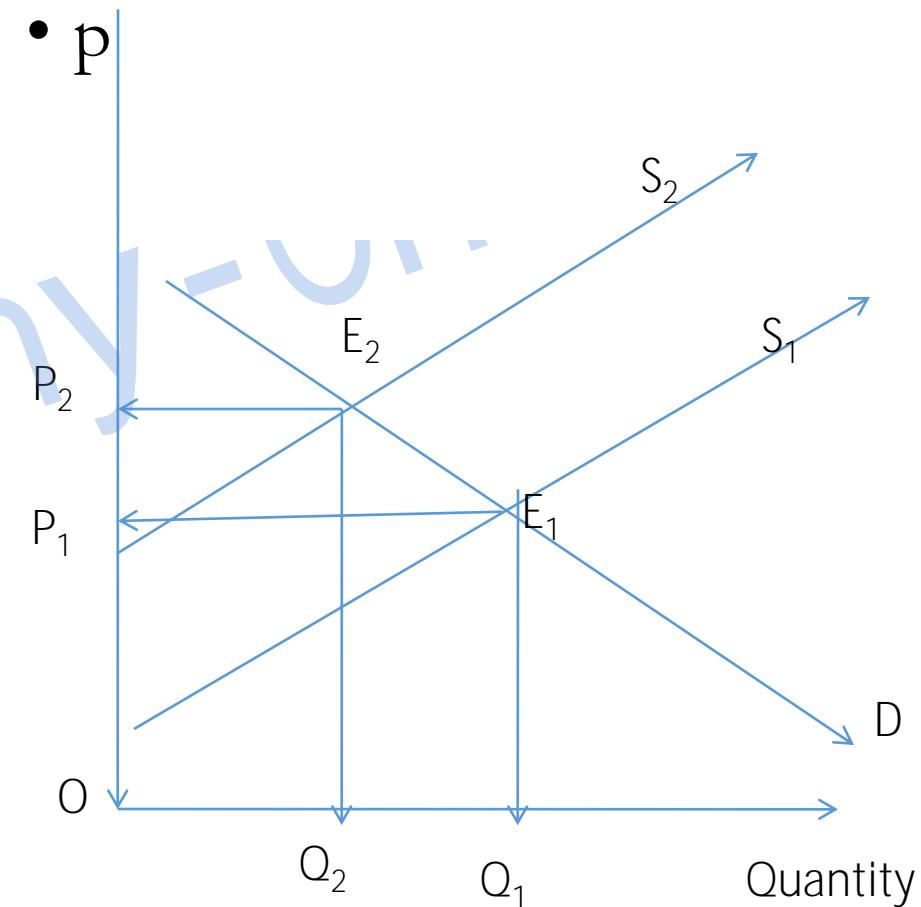
- Since the demand for agricultural commodities is usually price inelastic,

The total receipts of farmers as a group increase,

This means that area

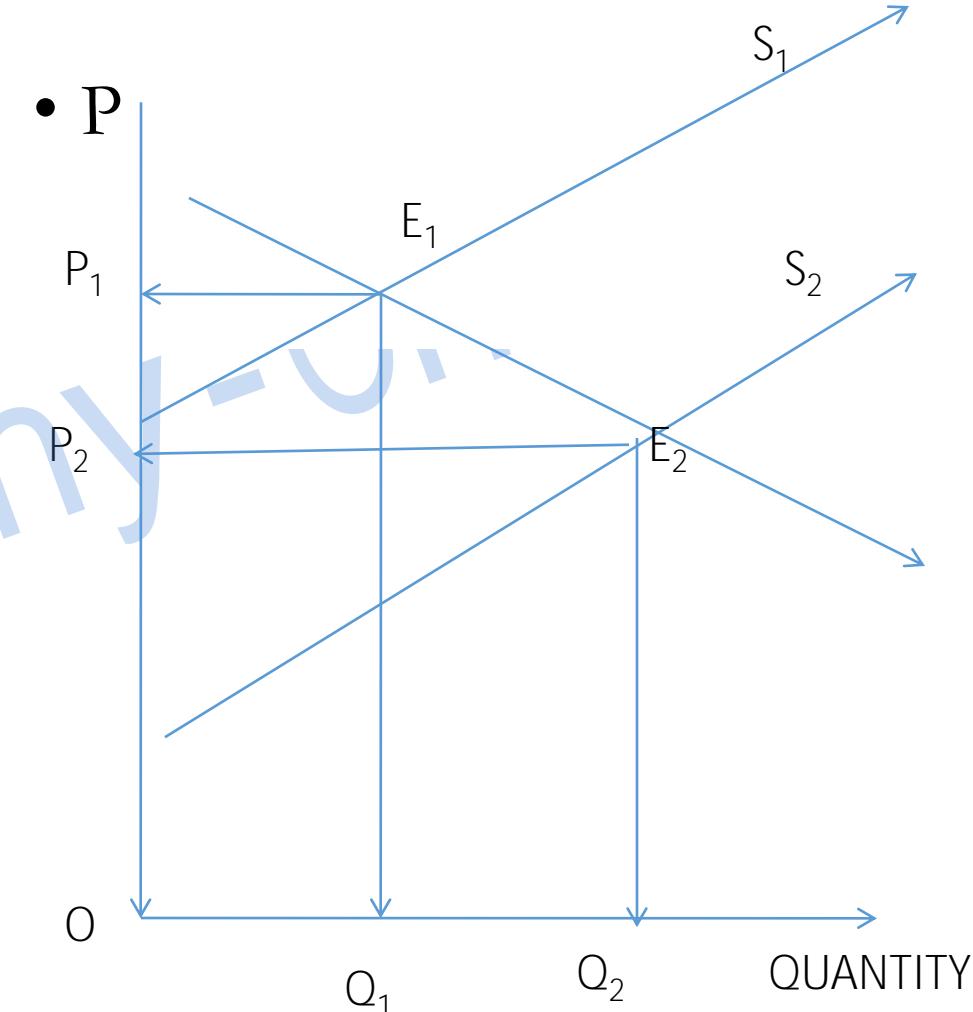
$$OQ_2E_2P_2 > OQ_1E_1P_1$$

- When the demand for an agricultural commodity is price inelastic, the same result can be achieved by reducing the amount of land under the cultivation of the commodity.

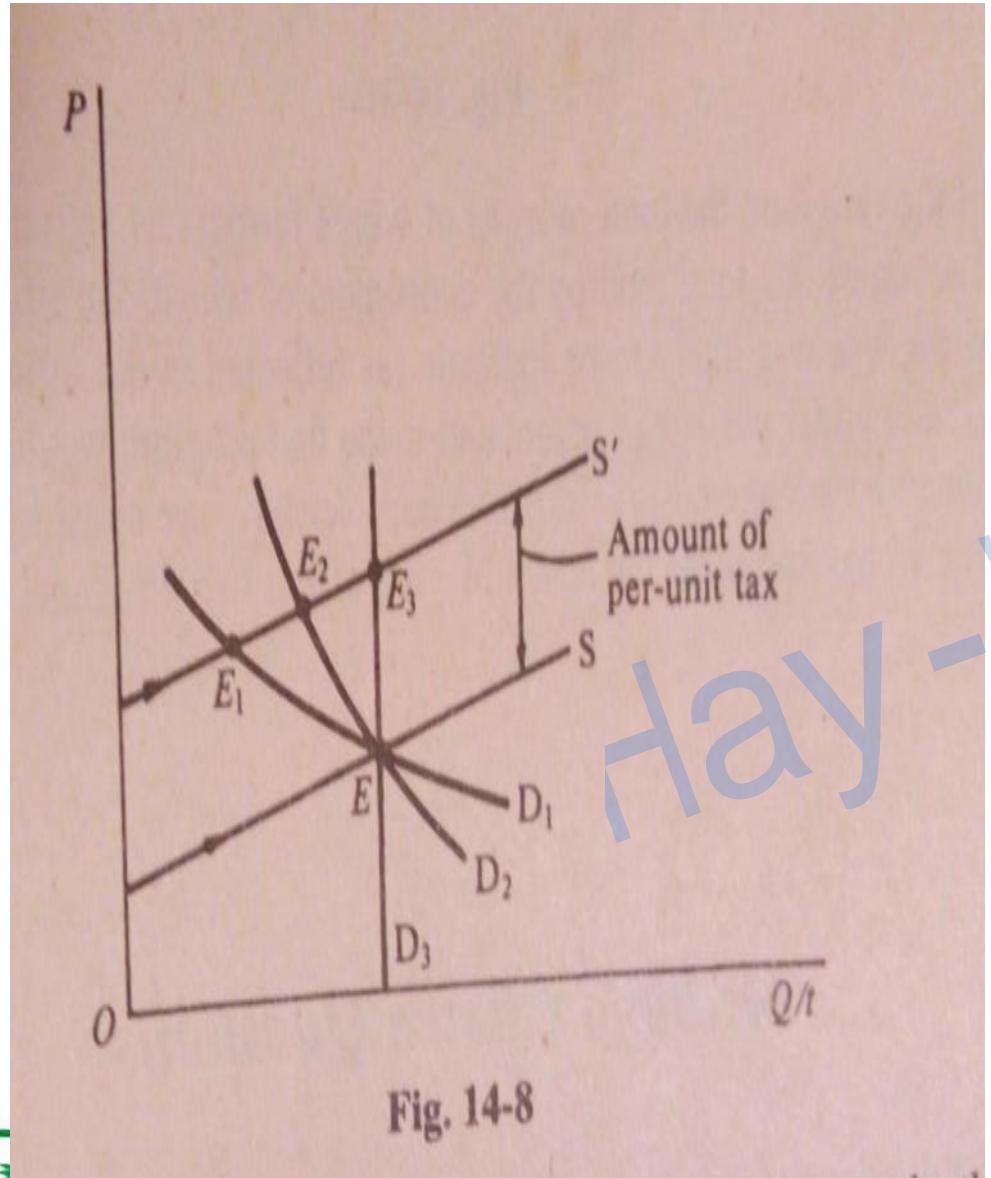


Application of Elasticity: Good Agricultural Harvest

- When harvests are good, the supply increases.
- Supply curve shifts rightwards, S_1 to S_2 ,
- The commodity price falls from P_1 to P_2 .
- The farmers' income which is the product of price and quantity thus usually falls with good harvest which shift S_1 to S_2
- Initial Area(income), $OQ_1E_1P_1 > OP_2E_2Q_2$, the new revenue.



Application of Elasticity: The case of Tax Incidence



- In the Fig, market demand D_1 is more elastic than the alternatives D_2 and D_3 , while the supply curve S' is parallel and above S by the amount of per unit tax collected by the government from the producers
- The supply curves shifts up by the amount of per unit tax in order to leave producers with the same net per unit price for each quantity sold that they received before the imposition of the tax

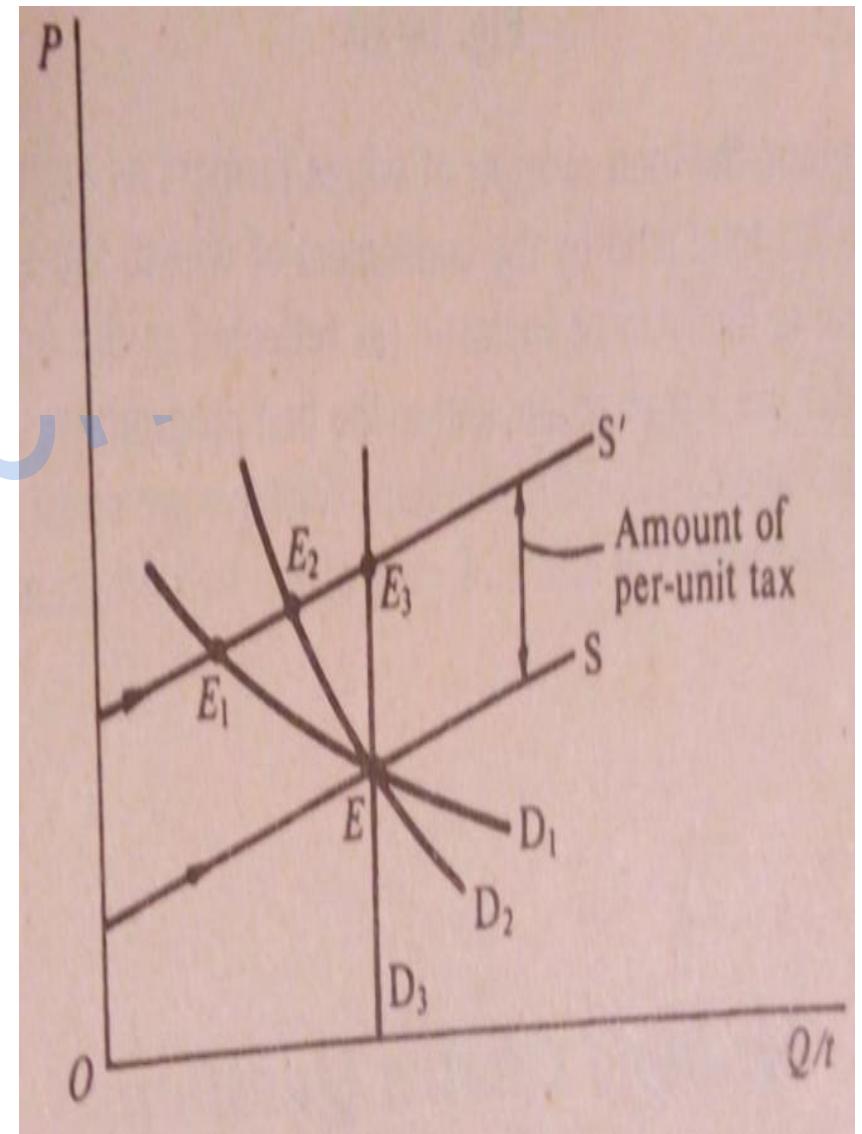
Application of Elasticity: The case of Tax Incidence

- The figure shows that the **more inelastic the demand** curve for a commodity,
- the greater the burden or incidence of tax on the **consumers** for a per unit tax collected from producers.

- **Explanation:**

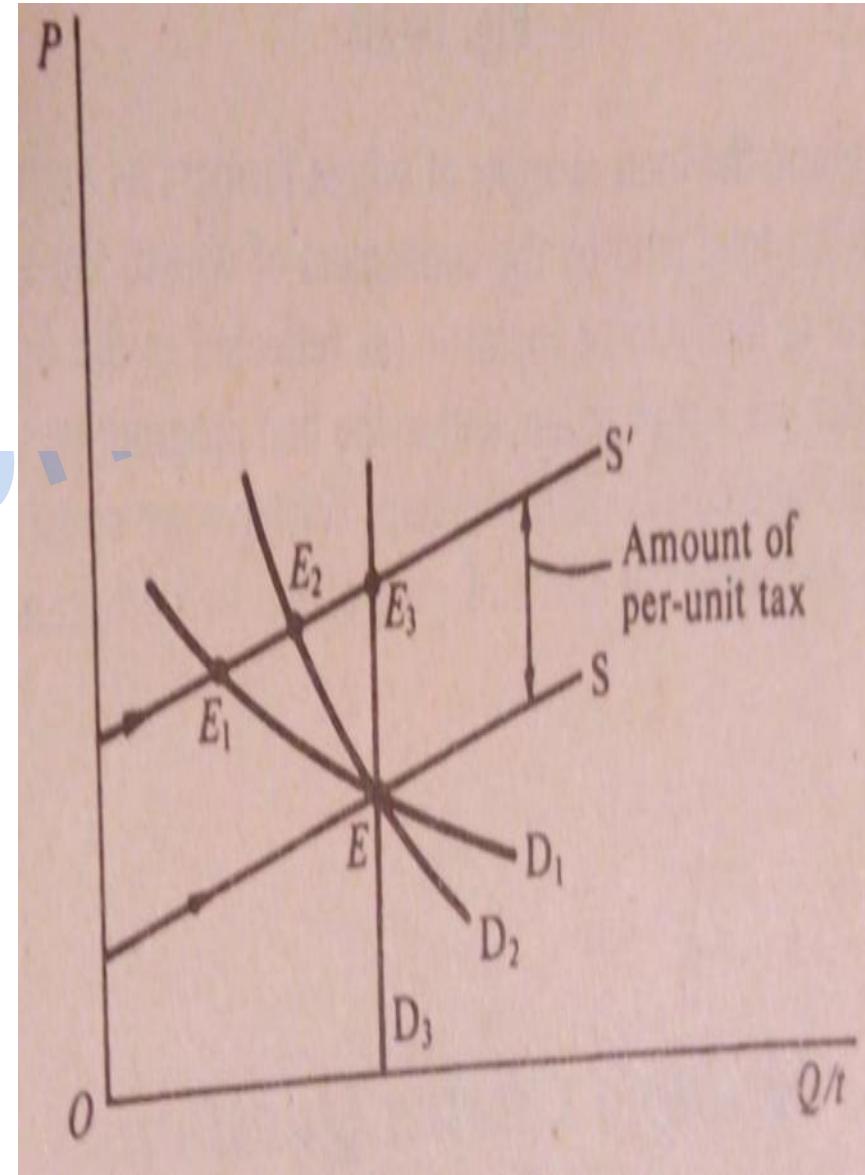
- Tax shifts supply curve from S to S' by amount of per unit tax collected by government from producers. Demand curves D_1, D_2 and D_3 show different elasticities of demand.

- D_1 being most elastic demand,
- D_3 is the most inelastic
- D_2 has elasticity between D_3 and D_1



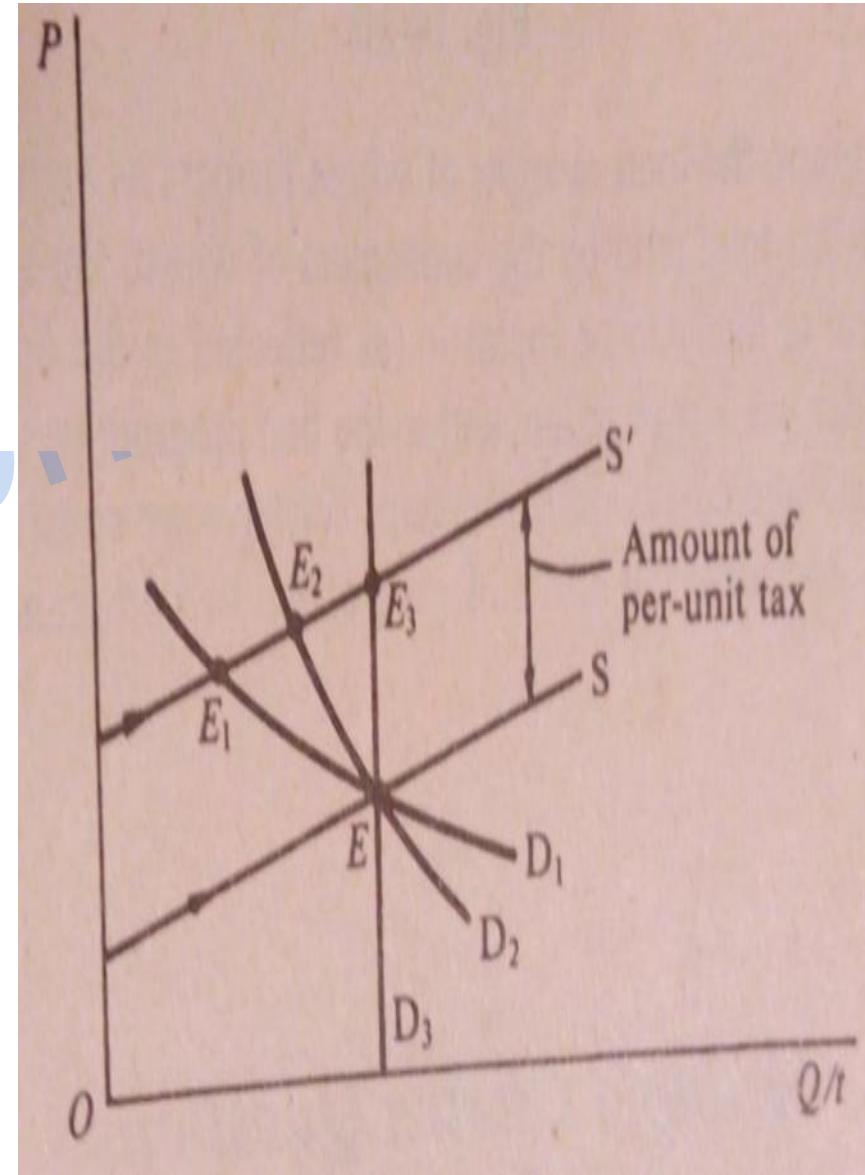
Application of Elasticity: The case of Tax Incidence

- With either D_1 , D_2 or D_3 and S (in the absence of the per unit tax),
- We have equilibrium at point E .
- When government imposes the per unit tax on producers, (i e with supply S'),
- The equilibrium point rises to E_1 with D_1 (the most elastic demand),
- The equilibrium point rises to E_2 with D_2 , and
- The equilibrium point rises E_3 with D_3 (i e by full amount of the vertical shift in S' or per unit tax) by the inelastic demand curve.

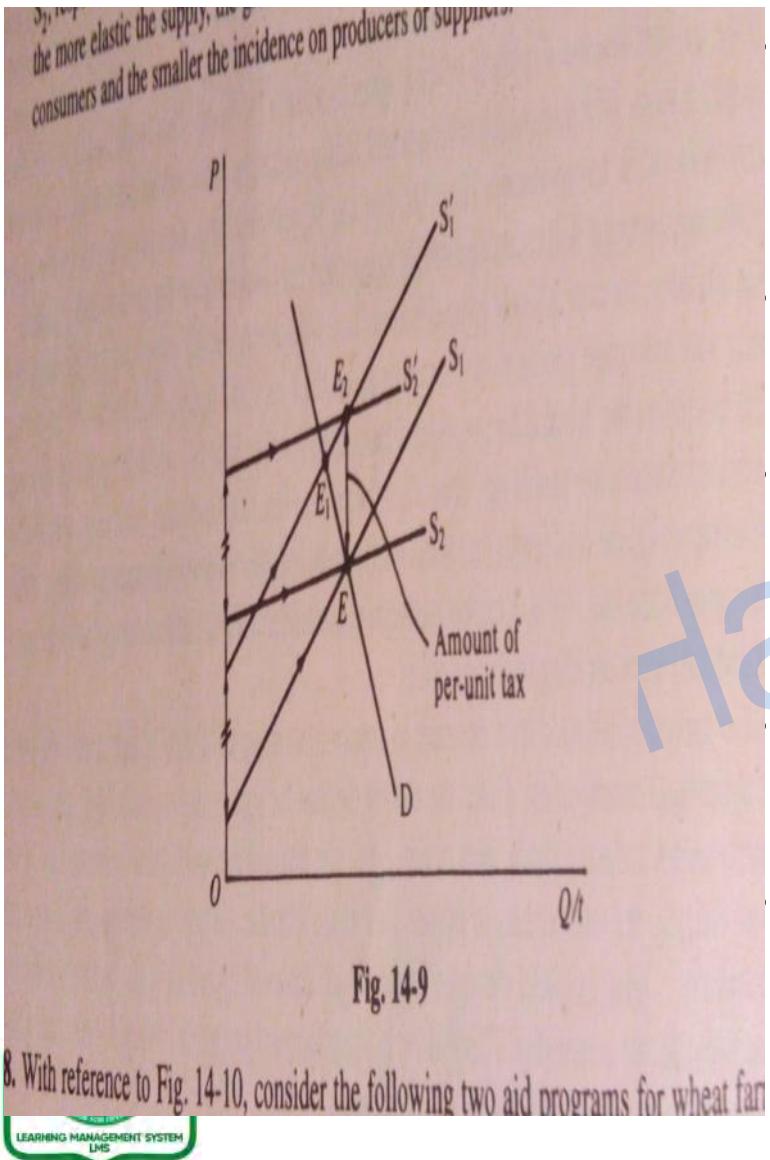


Application of Demand Elasticity: The case of Tax Incidence

- Thus, the more inelastic the market demand curve for a commodity, the more the equilibrium price will rise for a given per unit tax collected from producers.
- In other words, the more inelastic the demand, the more producers are able to shift the burden or incidence of tax to consumers in the form of higher prices



The Case of More Elastic Supply Curves S'_2 , Equilibrium at E_2 Compared with S'_1 Equilibrium at E_1



The figure shows that for a given demand D , the more elastic the supply curve, the greater the incidence of the tax on consumers

S_2 is more elastic than S_1 and equilibrium is at E without tax.

When a given per unit tax is collected from producers, both S_1 and S_2 shift up vertically by the amount of the per unit tax to S'_1 and S'_2

With S'_1 , the new equilibrium point E_1 is lower than E_2 with S'_2 . Thus, for a given market demand:

the more elastic the supply,

- **the greater the incidence of the tax on consumers and the smaller the incidence on producers or suppliers**

Applications of Elasticity

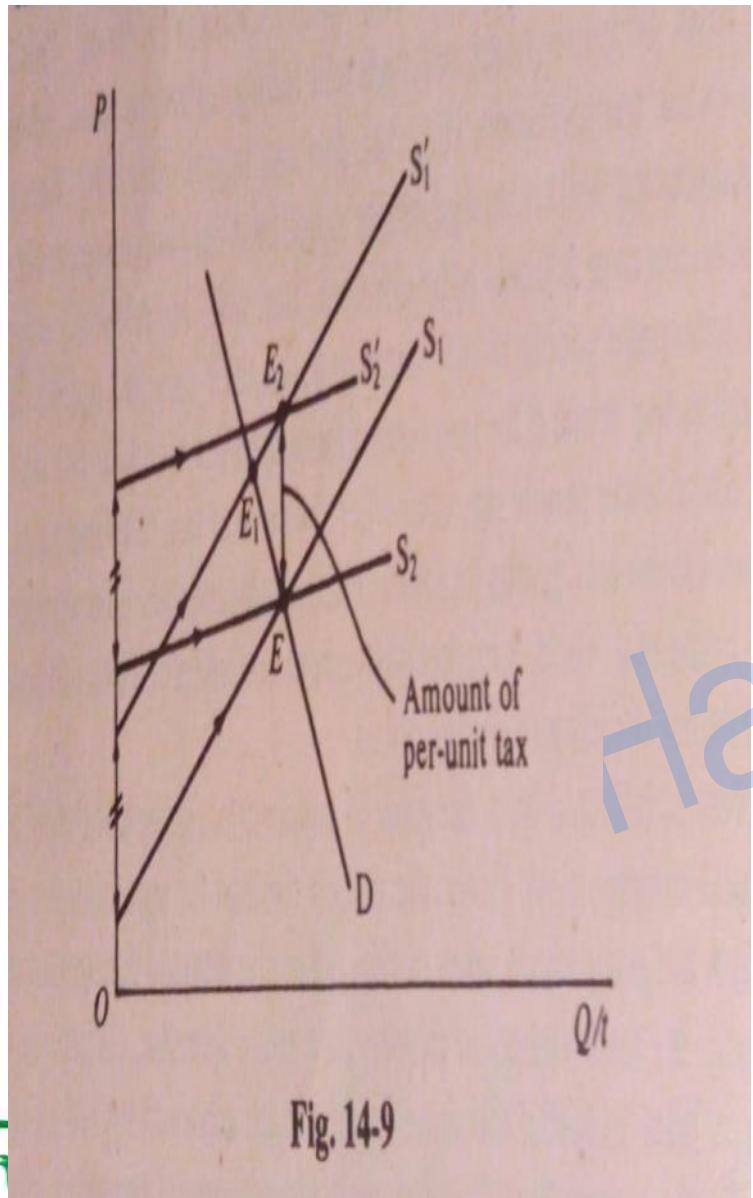
- The concept of elasticity has many applications
- It tells whether the price of taxi ride should increase or decrease in order to increase total revenue
- It explains why farmers income often rises in times of bad harvest
- It shows that the more inelastic the demand for a good, the greater the burden (incidence) on consumers of a per unit tax collected from producers
- On the other hand, for a given demand,
- the more elastic the supply, the greater the incidence of the tax on consumers
- Elasticity can also help the government determine the relative cost of various alternative farm-aid programs



- With either D_1 , D_2 or D_3 and S in the absence of per unit tax, we have equilibrium at point E.
- When the government imposes the per unit tax on producers, that is with S' , the equilibrium point rises to E_1 with D_1 (the more elastic demand) to E_2 with D_2 and to E_3 (ie by the full amount of the vertical shift in S' or the per unit tax with D_3 .
- Thus the more inelastic the market demand curve for a commodity, the more the equilibrium price will rise for a given per unit tax collected from producers.
- In other words the more inelastic the demand, the more producers are able to shift the burden or incidence of the tax to consumers in the form of higher prices

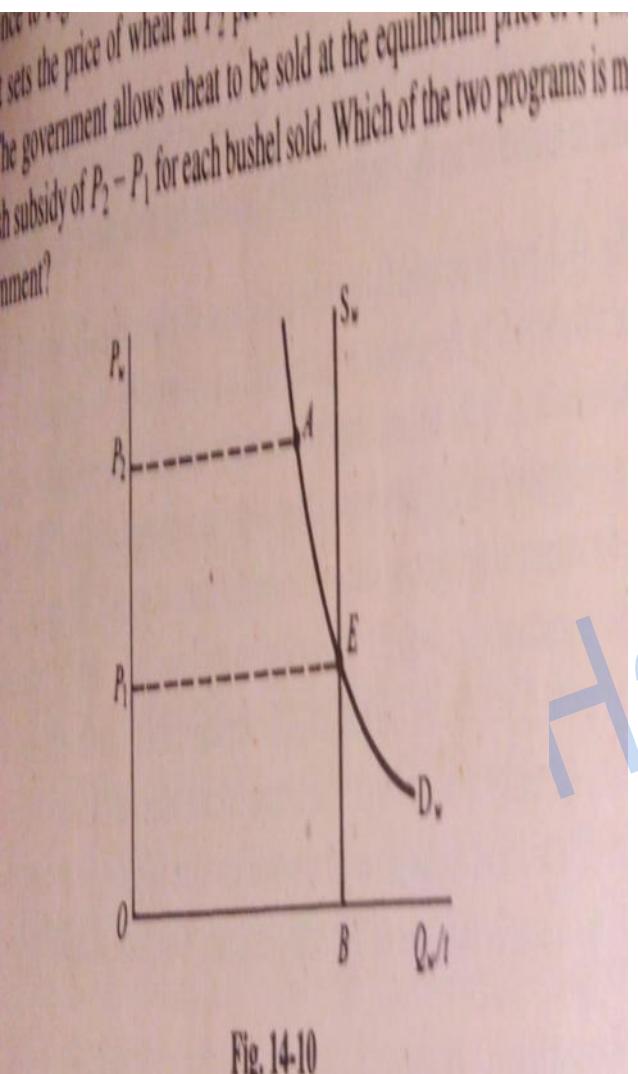


Application of Supply Elasticity



- In the figure S_2 is more elastic than S_1 and equilibrium is at E without the tax
- Whether a given per unit tax is collected from producers, both S_1 and S_2 shift up vertically by the amount of per unit tax to S_1' and S_2' respectively.
- With S_1' , the new equilibrium point E_1 is lower than E_2 with S_2'
- Thus for a given demand, the more elastic the supply, the greater the incidence of tax on, ie the greater the increase in price for consumers and the smaller the incidence on the producers or suppliers

Aid Program on Wheat



- With reference to the figure, consider the 2 aid programs for wheat.
- 1. The government sets the price of wheat at P_2 per bushel and purchased the resulting surplus of wheat at P_2 .
- 2. The government allows wheat to be sold at the equilibrium price P_1 and grants each farmer a cash subsidy of $(P_2 - P_1)$ for each bushel sold
- Which of the 2 aid programs is more expensive to the government?

Aid Program Evaluation

- Regardless of the programs the total receipt of wheat farmers as a group is the same, $OP_2 \times OB$
- The greater the fraction of this total, paid by the consumers of wheat, the smaller the cost to the government
- Since the demand for wheat is likely to be inelastic, consumers expenditures on wheat would be greater under the first program, and thus the first program will cost the government less (ie set price at P_2 and purchase the surplus)
- Note, we have assumed no storage cost in the problem nor have we considered what the government would do with the surplus wheat and what the effect of each of the 2 programs would be on the welfare of the consumers



Assignment

- Given the diagram in the slide in which government has 2 programs for wheat production,
- 1. The government set wheat price at P_2 / tonne and purchases the resulting surplus at P_2
- 2. The government allows wheat to be sold at the equilibrium price P_1 and grants each farmer a cash subsidy of $(P_2 - P_1)$ for each tonne of wheat sold.
- Which of the two programs is more expensive to government?

Hay WNYU

Solution

- Regardless of the program, the total receipts of wheat farmers as a group are the same ie ($OP_2 X OB$).
- The greater the fraction of this total paid by the consumers of wheat, the smaller the cost to government
- Since demand for wheat is likely to be inelastic, consumers' expenditure on wheat would be greater under the first program(ie, where government set price at P_2 and purchase the resulting surplus)and so the first program would cost the government less.
- **Note that we assumed no storage cost and have not considered what government will do with surplus and what the effect of each of the 2 programs would be on welfare.**

- You can use programs, projects and policies to achieve the goals of interest to you.

Government use these interventions to achieve its goals and objectives, which can be:

- welfare promotion
- Increased income to producers
- Increased output from producers, etc



Objective Practice Questions

The intersection of the demand and supply curves for a commodity determines

- a) the equilibrium price
- b) the equilibrium quantity
- c) the price at which there is neither a surplus nor a shortage of the commodity
- d) all of the above
- e) none of a, b, and c

The elasticity of demand is measured by:

- a. the slope of the demand curve
- b. the inverse of the slope of the demand curve
- c. the percentage change in price for a given percentage change in quantity
- d. the percentage change in supply for a given percentage change in price
- e. the percentage change in quantity for a given percentage change in price



The demand curve for a commodity is more elastic

- a. the greater the number of good substitutes available
- b. the greater the proportion of income spent on the commodity
- c. the longer the period of time considered
- d. all of the above
- e. none of a, b, and c

When harvests are bad:

- a. the supply of farm produce decreases
- b. farm prices rise
- c. farmers incomes usually rise
- d. all of the above
- e. none of a, b and c

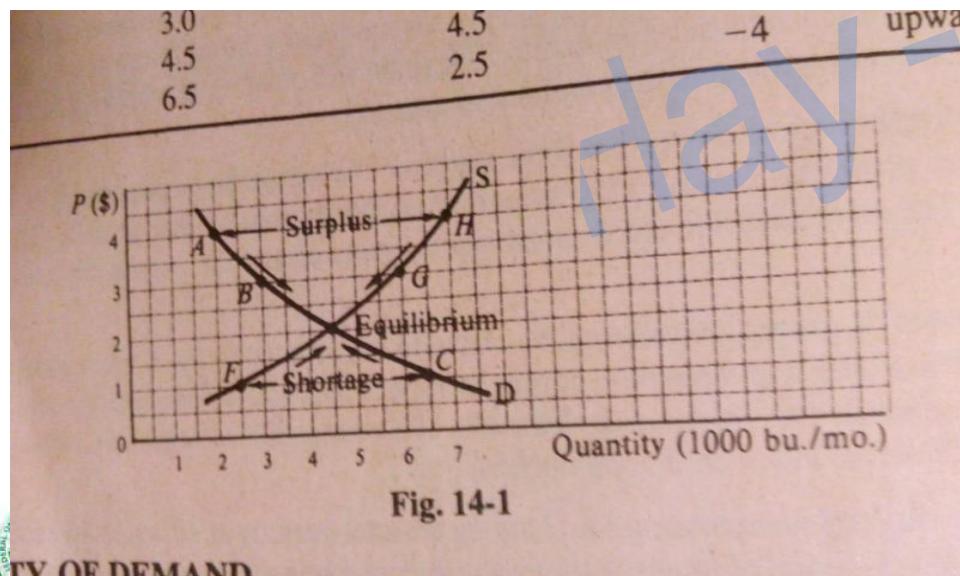
The burden on consumers of a per-unit tax collected from producers is greater:

- a. the more elastic the demand curve
- b .the more inelastic the demand curve
- c. the more inelastic the supply curve
- d. all of the above



Essay Practice Questions on elasticity application

- Draw a figure showing that the more inelastic the market demand curve for a commodity, the greater the burden or incidence on the consumers of a per unit tax collected from producers
- Draw a figure showing that for a given demand, the more elastic the supply, the greater the incidence of a tax on consumers
- Given the graph and schedule, find E_d between A and B; and between B and E. Find E_s between GE and between EF



Price	Qd	P	Qs
A. 4	2	H.	4
B. 3	3	G.	3
E. 2	4.5	E.	2
C. 1	6.5	F.	1

Find:

- The elasticity between points E and C along the demand curve using the original quantity and price is:
- The elasticity between points E and C along the demand curve using the new quantity and price is:
- The average elasticity between points E and C along the demand curve .
- The average elasticity between points G and H along the supply curve

- Assume equilibrium price initially for petrol is P_0 while equilibrium quantity is Q_0 .
- Suppose government seeks to reduce consumption that is decrease the quantity demanded.
- An imposed tax of N0.50 on a litter sold would decrease market supply, that is:
- Shift the market supply curve to the left to S' , and raise the equilibrium price to P_1 ;
- equilibrium quantity would fall from Q_0 to Q_1 litres .
- Give the graphical illustration of the phenomenon



Given The Individual Demand and Supply Schedule, What is the equilibrium price?

Price ₦	Quantity Demanded	Quantity Supplied
20.00	110	5
40.00	90	46
60.00	77	77
80.00	67	100
100.00	62	115
120.00	60	122

At $P = 60.00$; $Q_s = Q_d$



Using the schedule below,

i) Draw the market demand curve for the good

ii) Draw the individual A's demand curve for the commodity.

Price (Naira)	Quantity Demanded by A(Kg)	Quantity Demanded by B(Kg)	Quantity Demanded by C(Kg)	Market Quantity Demanded(Kg)
10	2	0	0	2
9	5	1	0	6
8	8	5	0	13
7	12	10	5	27
6	16	14	12	42
5	21	18	14	53
4	27	22	12	61
3	35	25	11	71
2	45	27	14	86
1	60	29	16	105

Assignment a: Check for the nature of E_d between B & E and E & C on the average in the schedule given.

Price	Quantity Demanded	Quantity Supplied	Surplus (+) or Shortage(-)	Pressure on price
4	2 A	7 H	+5	Downward
3	3 B	6 G	+3	Downward
2	4.5 E	4.5 E	0	Equilibrium
1	6.5 C	2.5 F	-4	upward

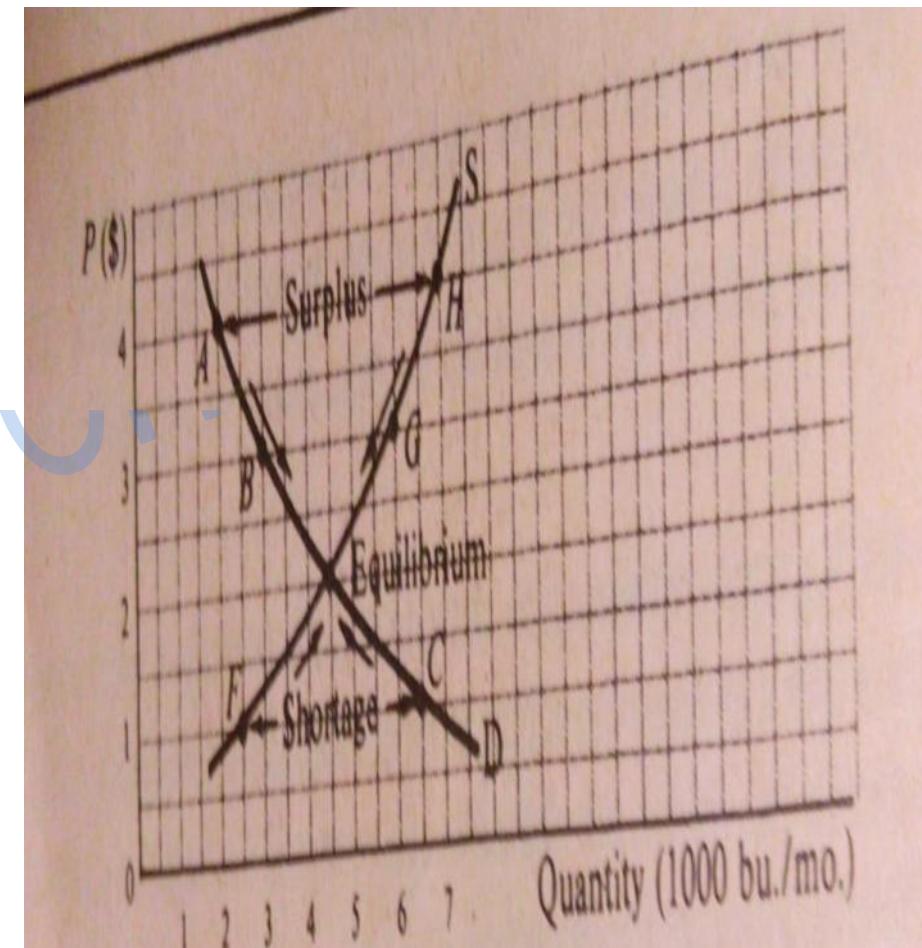
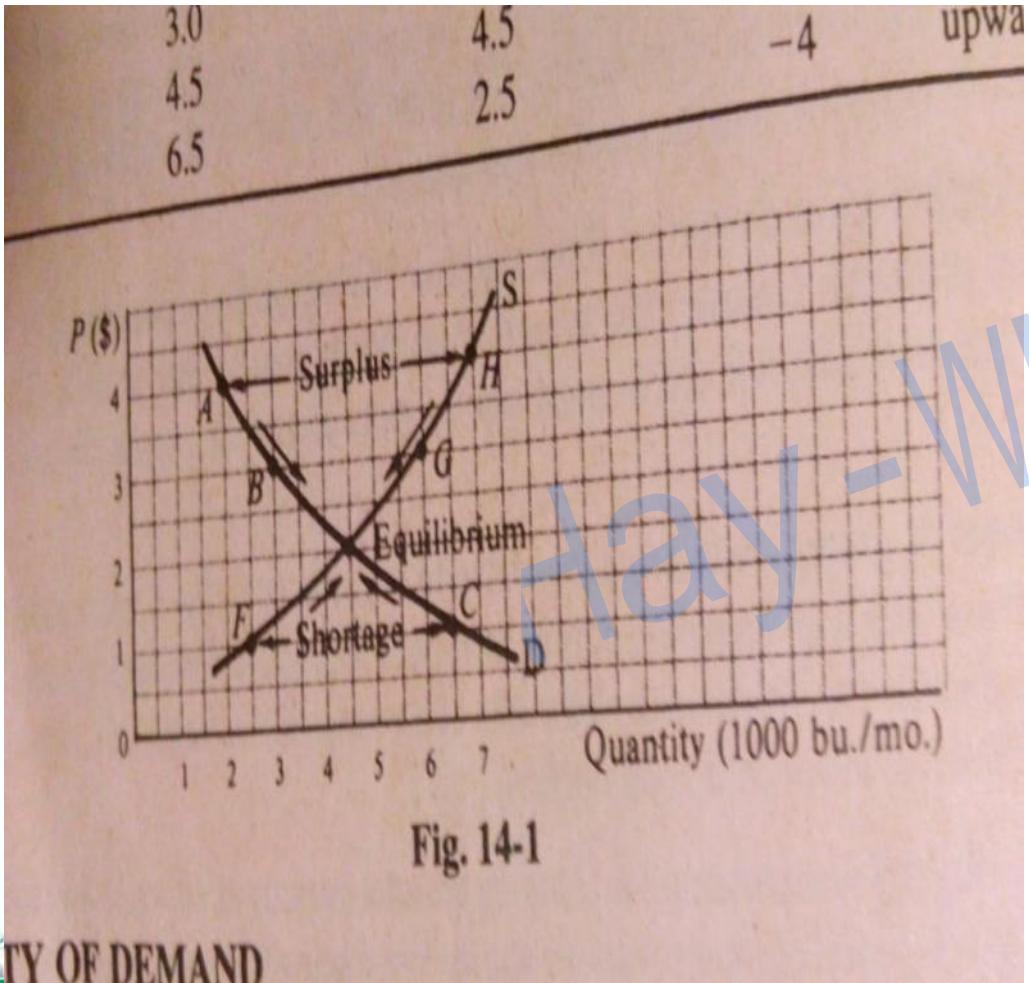


Fig. 14.1

Assignment b: Given the graph



- 1. Find Es between E and G
- 2. Also find Es between F and G
- 3. Define the following terms giving appropriate equations:
 - (i) Price elasticity of demand
 - (ii) Income elasticity of demand
 - (iii) Price Cross elasticity of demand

UNEMPLOYMENT AND NATIONAL INCOME

- DEMAND FOR LABOUR
- CONCEPT OF UNEMPLOYMENT
- CAUSES OF UNEMPLOYMENT AND CONSEQUENCES
- UNEMPLOYMENT
 - Types of unemployment
- Cost of unemployment
- MEASUREMENT OF NATIONAL OUTPUTS
- MEASURING PERSONAL DISPOSABLE INCOME

ISSUES AND PROBLEMS OF NATIONAL ACCOUNTING
USES

UNEMPLOYMENT AND NATIONAL INCOME

LABOUR AND UNEMPLOYMENT

Labour Market may be defined as an organization in which buyers and sellers of labour are in close contact.

- It is where the wages and conditions of service are stated and agreed upon.
 - The Concept of Labour Force:
 - Labour refers to all human efforts used in the production of goods and services.
 - It is the total number of the employed, the self-employed and the unemployed.
 - That is, those who are working and those who are looking for work.
 - Labour force can also be described as the numbers of people allowed by law to work.
 - The Labour force falls into the age bracket of 18-65 years.

DEMAND FOR LABOUR.

- Demand for labour may be defined as the **total number of workers** that are engaged by **employers at a particular time**.
- **Factors that determine the Demand for Labour.**
- Demand for good and services. Demand for labour can be stimulated by an increase in the demand for good and services.
- Expansion of purchasing power. When the purchasing power expands as a result of increase in wages, the demand for labour increases and vice versa.
- The market size: The size of the market for the goods and services produced determines the demand for labour.

FACTORS THAT DETERMINE THE DEMAND FOR LABOUR.

- **Rate of substitution.** Demand for labour is affected by the availability of possible substitutes, such as machines etc. that can actually do the job of labour.
- Labour efficiency. If labour efficiency is high, there would be high propensity for producers to hire more labour and vice versa.
- The price size of labour (wage rate).
- The tastes of consumer, which define their trade-off between leisure and work.
- The size of population.
- The labour force participation rate.
- The occupational, educational and geographical distribution of the labour force.

FACTORS THAT DETERMINE THE DEMAND FOR LABOUR.

- Efficiency of Labour.
- Efficiency of labour may be defined as the ability of labour to increase output without increasing the quantity of labour.
- Efficiency of labour is actually refers to an increase in the level of production per capital.
-
- **Factors that determine variation in wages.**
 - (i) Difference in hours of work:
 - (ii) Difference in the cost of training
 - (iii) Job demand, some jobs demand a very high sense of responsibility. People in such occupations are paid higher.
 - (iv). Government policies:
 - (v) **Scarcity of Labour Supply:**
 -
- **Types of Wages.**
- **Nominal wage:** This can be described as the total amount of money a labour is paid at a particular period of time.
- **Real wage:** This means the purchasing power of labour. It is the amount of goods and services the labour can use his money to buy.

SUPPLY OF LABOUR.

- Supply of labour may be defined as the total number of men, women and children of working age in a country.
 - Supply of labour can also be described as services of labour available for production or available in the labour market.
-
- Factors that Determine Supply of Labour.
 - Age distribution of population.
 - Population: The size of the population is directly related to the supply of labour.
 - The reward for labour
 - Number of hours worked

FACTORS AFFECTING THE SIZE OF LABOUR FORCE.

- The size of a country's population: The higher the size of the population the higher the amount of labour that would be available in the labour force.
- Total number of labour force willing to work
- Mandatory age of retirement
- The age distribution of the population.
- The number of disabled and sick persons of working age.
- School leaving age
- Number of those retiring before the retirement age
- The number of working women
- Number of working hours.

CONCEPT OF UNEMPLOYMENT

- **Unemployment** is **defined** as a situation where someone of working age is not able to get a job. It is a condition that occurs when a person who is willing and actively searching for employment is unable to find one.
- The inability of labour to move creates unemployment.
- This unemployment cannot be separated from labour
- **Types of unemployment**
- **(i) Cyclical Unemployment:** Cyclical unemployment is caused by declining demand. It is the main cause of high unemployment rates. Its caused by a downturn in the business cycle. This is the most serious of all types of unemployment because it affects nearly all the industries at the same time. It's part of the natural rise and fall of economic growth that occurs over time. Cyclical unemployment is temporary and depends on the length of economic contractions caused by a recession.
- Cyclical Unemployment Rate = Unemployment Rate at Peak minus Unemployment Rate at Trough
- Cyclical unemployment rate = aggregate unemployment rate minus structural, frictional, and seasonal unemployment rates
- compare the unemployment rate for recent college graduates with the unemployment rate overall. If the recent graduate rate is similar to the overall rate, then most of the nation's unemployment is cyclical

CONCEPT OF UNEMPLOYMENT

- (ii) **Frictional Unemployment:** Frictional unemployment is also known as search unemployment. Frictional unemployment is caused by temporary transitions in workers' lives, such as when a worker moves to a new city and has to find a new job. Frictional unemployment also includes people just entering the labor force, such as freshly graduated college students. It is the most common cause of unemployment, and it is always in effect in an economy.
- (iii) **Classical unemployment:** Classical unemployment occurs when real wages are kept above the market-clearing wage rate, leading to a surplus of labour supplied. Classical unemployment is sometimes known as real wage unemployment because it refers to real wages being too high.

CONCEPT OF UNEMPLOYMENT

- (iv) **Structural Unemployment:** This type of unemployment occurs due to technological progress. The immediate effect of labour saving machinery is to make some workers redundant, thereby causing unemployment. It is an unemployment that occurs when workers are not qualified for the jobs that are available. Workers in this case are often out of work for much longer periods of time and often require retraining.
- (v) **Seasonal Unemployment:** This type of unemployment occurs in some kinds of work. Industries where seasonal unemployment is common include farming, tourism, and construction. For instance, bad weather could cause a temporary suspension of work in the construction industries which at that time renders the worker redundant with a resultant effect of unemployment.
- (vi) **Residual Unemployment.** This occurs due to all other causes. This includes those people termed as unemployable due to ill health or disability.

CAUSES OF UNEMPLOYMENT

- (i) Lack of industrialization: when a country is not industrialized, it has limited employment opportunity; this makes it difficult for the available labour to be fully absorbed.- **corruption, negligence of agric sector** and other natural resources
- (ii) Over Population: This is one of the major causes of unemployment. It is an indication that supply is higher than demand.
- (iii) Lack of development plans: Some countries do not have a functional development plan and this creates a lot of problems, as the government does not know how to make provision for the labour force
- (iv) Geographical immobility of labour: In some cases, workers finds it very difficult to move from one geographical area to another and this may result in unemployment.
- (v) High Cost of Education: In most developing countries, the cost of acquiring education is very high, people can't afford it and be engaged in skilled job, hence unemployment
-

CONSEQUENCES OF UNEMPLOYMENT

- **i) Social problem:** Unemployment increases crime rate in a country
- **(ii) Migration:** When people are not engaged in meaningful employment in a particular area, they would be forced to move to other areas in search of jobs
- **(iii) Threat to Peace and stability:** If people are not employed, there is the tendency for them to engage in activities that will create instability/insecurity and a break down of law and order is very high.
- **(iv) Reduction in investment:** Unemployment reduces the propensity to invest in a country.
- **(v) High Rate of dependency:** Unemployment increases the rate of dependency.
-

NATIONAL INCOME, GROSS NATIONAL PRODUCT, GROSS DOMESTIC PRODUCT

- National Income: The total amount of goods and services (in value terms) available to the people over a given period of time which is usually a year. It is the total value of final output all new goods and services produced by a country in a given year.
- Gross National Product: The value of goods and services produced by the nationals of the country whether currently residing in the country or living abroad
- Gross Domestic Product: The value of goods and services produced by those residing in a country irrespective of their nationality.

DISPOSABLE INCOME, PERSONAL INCOME, TRANSFER PAYMENT

- Disposable income: This is calculated by deducting taxes from personal income.
- $\text{Disposable income} = \text{Personal income} - \text{Taxes}$
- Personal income: This is the current income of households or persons from all sources which include receipts such as transfer payments from which no productive services are made by recipients.
- Transfer payment: Money given by the government to its citizens. Examples include social security, unemployment compensation and welfare.

METHODS OF MEASUREMENT OF NATIONAL INCOME

- There are 3 methods of measurements namely:
- 1. **Output Method**- This is obtained by adding the value of all goods and services produced by all sectors of the economy during the year. Only final goods and services are included. Intermediate goods and services are excluded to avoid double counting.
- 2. **Expenditure Approach**-This is obtained by adding the spending on all final goods and services produced in the economy.
- 3. **Income Approach** : This is done by adding up all the income paid out to the owners of factors of production i.e rent for land, interest for capital, salaries and wages for labour and profit for management.

PROBLEMS OF MEASURING NATIONAL INCOME

- Products to be included
 - Excluded market **transactions**
 - Valuation of products
 - Stock appreciation
 - Depreciation
-
- **Uses of National Income Statistics**
 - Measuring the level of production in an economy at a point in time.
 - Measuring the standard of living of different countries using per capita income
Per capita income = National income/population size.
 - Planning and Policy formulation

Problem with National income measurement

- (i) Double Counting: For example, a peasant sells wheat worth 2000 Naira to a flour mill which sells wheat flour to the wholesaler and the wholesaler sells it to the retailer who, in turn, sells it to the customers. If each time, this wheat or its flour is taken into consideration, it will work out to 8000 Naira, whereas, in actuality, there is only an increase of 2000 Naira in the national income
- (ii) Marketability of Goods: A problem arises in connection with goods and services that are not exchanged through the market. Conventionally, items that do not enter the market are included.
 - (a) Rent is imputed to owner-occupied houses.
 - (b) Value is also imputed to food produced and consumed on the farm.
 - (c) Housewives' services are excluded but services of maidservants and washer-men are included.

Problem with National income measurement

- (iii) Price Level Changes: National income is measured in terms of money whose value changes from time to time. It is, therefore, difficult to make a stable valuation of national income. This problem is dealt with by expressing national income estimates in real terms in constant prices.
- (iv) National Income records Legal Incomes of Goods and Services: This means illegal incomes are excluded. This may pose a practical problem to the national income accountants since some illegal incomes may find their way into the national income.
- (v) Depreciation: Capital stock wears and tears when used to produce goods or to render services. We account for this as depreciation or capital allowance. To arrive at NNP, depreciation is subtracted from GNP. The problem here is how to accurately estimate depreciation. If the value of depreciation is overestimated or underestimated national income will be invariably affected.

Problem with National income measurement

- (vi) Inadequate Statistical Data: One basic problem of estimating national income is the lack of statistical data. This problem is more pronounced in developing countries like Ghana and Nigeria. Individuals, business firms and the government at times do not keep proper records of incomes, output, and expenditure.

CONSUMPTION, INVESTMENT AND NET EXPORTS

DISCUSSION CONTENTS

Consumption

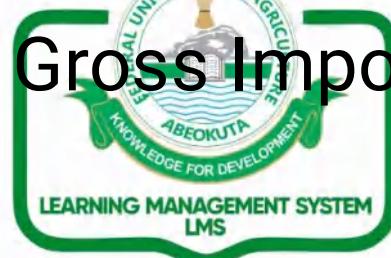
The Consumption Function

The Average and Marginal Propensity to Consume and Save.

Investment

The Investment Demand Curve

Gross Exports and Gross Imports



CONSUMPTION

Consumption is the amount a consumer spends on the purchase of goods and services.

- Consumer spending could be Autonomous (spending irrespective of receipt of income or not) or Induced (spending resulting from increase in income).



- Consumption is impossible without one earning income either through employment or transfers from businesses or government.
- Although, personal income is the most important variable of consumption, it is also affected by personal income taxes which actually reduces the actual amount available for spending (disposable income).
- The relationship between consumption and disposable income however is not a perfectly linear one thus showing that other variables influence the consumers decision to consume.



AUTONOMOUS CONSUMPTION

- . The consumption level, when the level of income is zero is referred to as
- . AUTONOMOUS CONSUMPTION
- . This is possible when the consumer borrows or relies on past savings.
- . The slope of the consumption function is the marginal propensity to consume.
- . When the consumption function is linear, the slope is constant, thus the marginal propensity to consume is constant



DETERMINANTS OF CONSUMPTION

- personal income
- income taxes
- consumer expectations
- consumer indebtedness
- wealth
- the price level

Hay-Why-U'



THE CONSUMPTION FUNCTION

- The consumption function depicts the relationship between Consumption(C) and Disposable Income(Yd) i.e: $C = f(Yd)$, *Ceteris paribus*.

It is usually expressed as a positive and linear relationship when all other non-income determinants of consumption are held constant.

- The consumption function shifts when the non-income determinants change.



TABLE 1: HYPOTHETICAL CONSUMPTION FUNCTION FOR AN ECONOMY.

Disposable Income (Y_d) (Billion Naira)	Consumption (C) (Billion Naira)	Savings ($S = Y_d - C$)
500	500	0
550	540	10
600	580	20
650	620	30
700	660	40
750	700	50
800	740	60



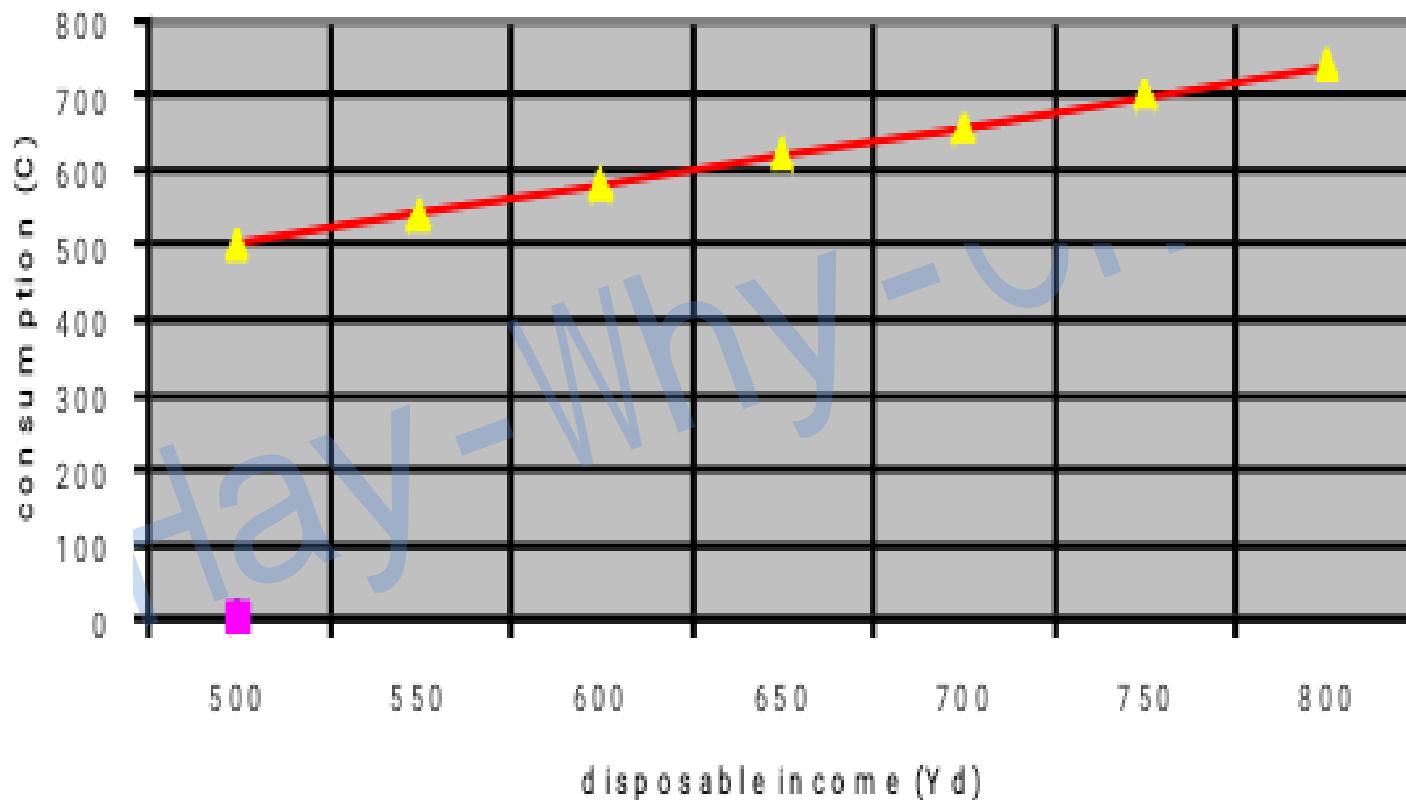
The table can also be presented in a graphical form with consumption on the vertical axis and disposable income on the horizontal axis.

The values of consumer saving (column 3) in table 1 is obtained by subtracting consumption from disposable income.

The table initially shows that the consumer spends all his disposable income and as his disposable income increases he saves more.



INCOME-CONSUMPTION RELATIONSHIP



THE AVERAGE AND MARGINAL PROPENSITY TO CONSUME AND SAVE

The ratios used to express the relationship between Consumption , Savings and Disposable income include:

Average Propensity to Consume (APC): this is the ratio of consumption to disposable income at a specific level of income.

$$APC = C/Y_d$$

Marginal Propensity to Consume (MPC): this is the ratio of the change in consumption relative to the change in disposable income.

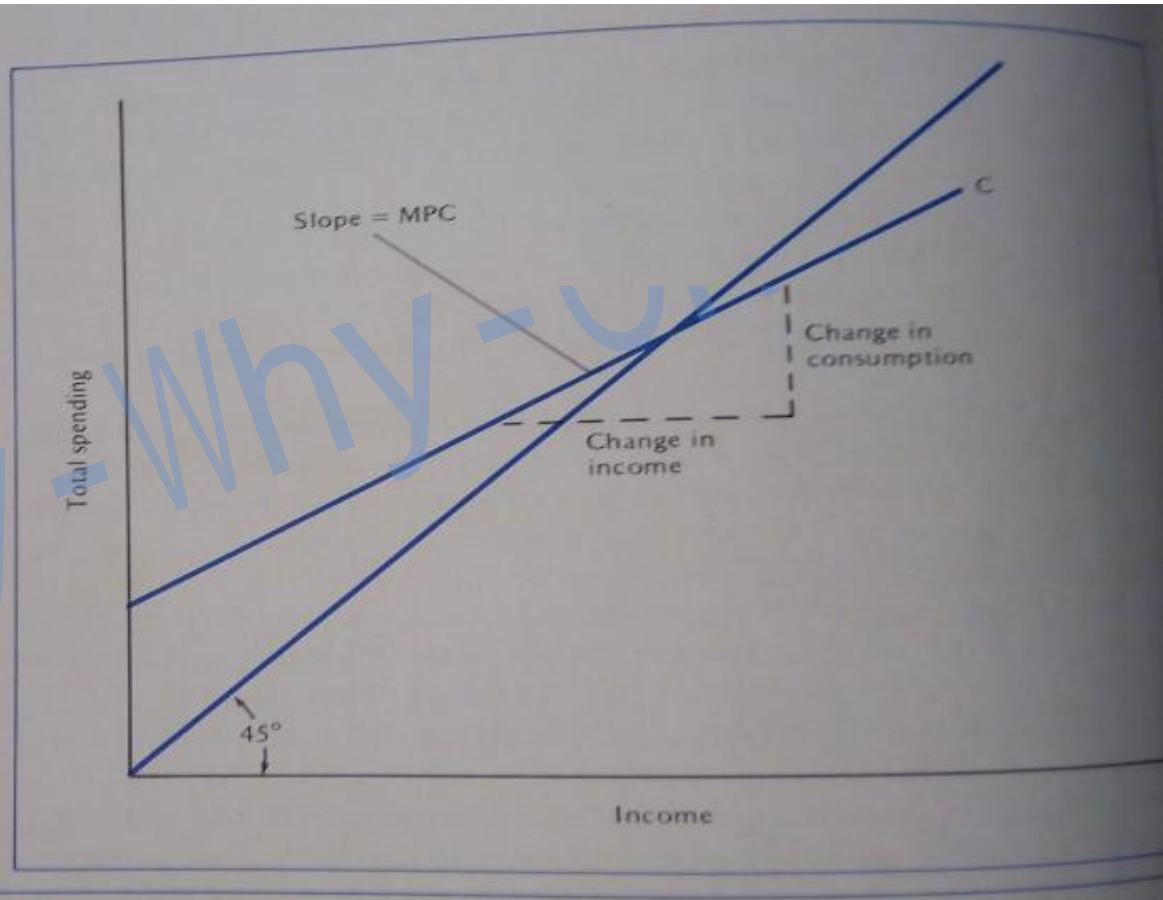
$$MPC = \Delta C / \Delta Y_d$$



THE CONSUMPTION FUNCTION AND 45⁰ LINE

FIGURE 6-8: THE CONSUMPTION FUNCTION

Consumption spending rises with income according to the relationship given by the marginal propensity to consume. A fixed proportion of any increase (or decrease) in income is allocated to consumption spending.



Average Propensity to Save (APC): this is the ratio of saving to disposable income.

$$APS = S/Y_d$$

Marginal Propensity to Save (MPS): this is the ratio of the change in saving relative to the change in disposable income.

$$MPS = \Delta S / \Delta Y_d$$

$$APC + APS = 1$$

$$MPC + MPS = 1$$



TABLE 2: RATIOS COMPUTED FROM THE HYPOTHETICAL EXAMPLE IN TABLE 1

APC (C/Y_d)	APS	Y_d	C	MPC ($\Delta C/\Delta Y_d$)	MPS
$500/500 = 1.0$	0	500	500	-	-
$540/550 = 0.98$	0.02	550	540	$40/50 = 0.80$	0.20
$580/600 = 0.97$	0.03	600	580	$40/50 = 0.80$	0.20
$620/650 = 0.95$	0.05	650	620	$40/50 = 0.80$	0.20
$660/700 = 0.94$	0.06	700	660	$40/50 = 0.80$	0.20
$700/750 = 0.93$	0.07	750	700	$40/50 = 0.80$	0.20
$740/800 = 0.92$	0.08	800	740	$40/50 = 0.80$	0.20



● From Table 2, the *APC* decreases from 1.0 to 0.90 as disposable income increases from N500b to N800b but savings is 8% of the income at N800b.

● The *MPC* is constant throughout at 0.8 while the *MPS* ($1 - MPC$) is 0.2.

● Note also from Table that $APC + APS = 1$ and $MPC + MPS = 1$



The data are plotted and the consumption function is labelled C'

- . A change in non-income determinants of consumption alters the relationship of consumption to disposable income
- . Such changes are depicted graphically by upward or downward shifts of the consumption function
- . **THEY ARE CONSUMPTION FUNCTION SHIFTERS**
- . Shifts of the consumption function affect the level of consumption and saving



CONSUMPTION

- . Should consumers expect an increase in the price level, they are likely to spend more in the current period before prices rise
- . An upward shift of consumption function from C' to C'' results in more consumption
- . and less saving at each income level

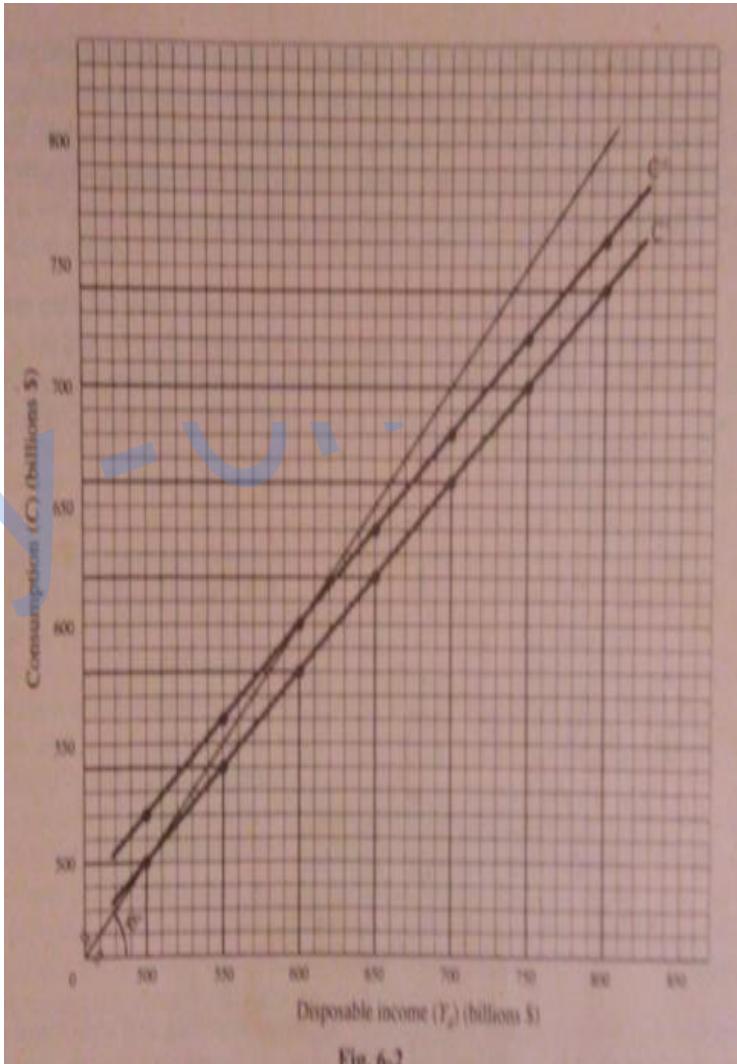


Fig. 6-2

Y_d , C and S, in billions of dollars

Disposable Income (Y_d) (1)	Consumption C (2)	Saving , $S=Y_d - C$ (3)
500	500	0
550	540	10
600	580	20
650	620	30
700	660	40
750	700	50
800	740	60

- Table indicates that consumers spend their entire disposable income when Y_d is \$500 B and spend less than Y_d at income levels greater than \$500B
- Since disposable income is either consumed or saved, consumer saving (column 3) is found by deducting consumption from disposable income
- Consumption and disposable income are plotted and the resulting line is labelled C'.
- The 45° line is equidistant from both the consumption and disposable income axes
- As drawn $C=Y_d$ at each point on the 45° line



- . For linear consumption C' , there is only one level of disposable income at which consumer spending equals disposable income.
- . That is the point of intersection of the consumption line and the 45^0 line

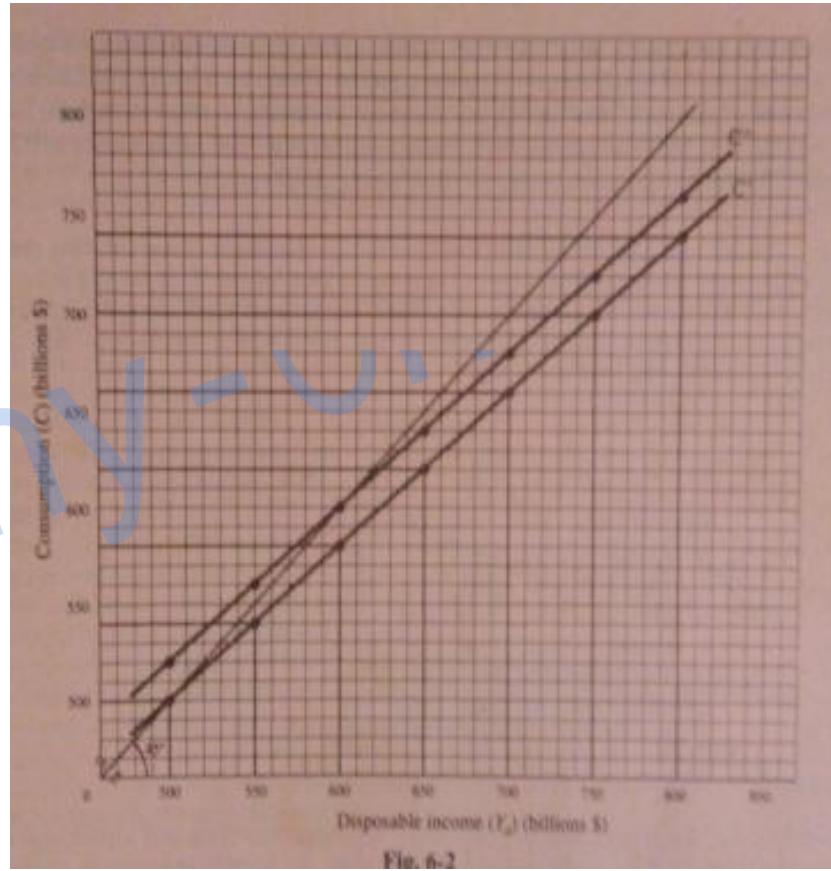


Fig. 6-2

- Since the consumption line is below the 45^0 line at disposable income levels above \$500B, it follows that consumers are not consuming their entire income and are therefore saving
- Thus, consumers saving is the distance between
 - the consumption line
 - and the 45^0 line at each level of disposable income

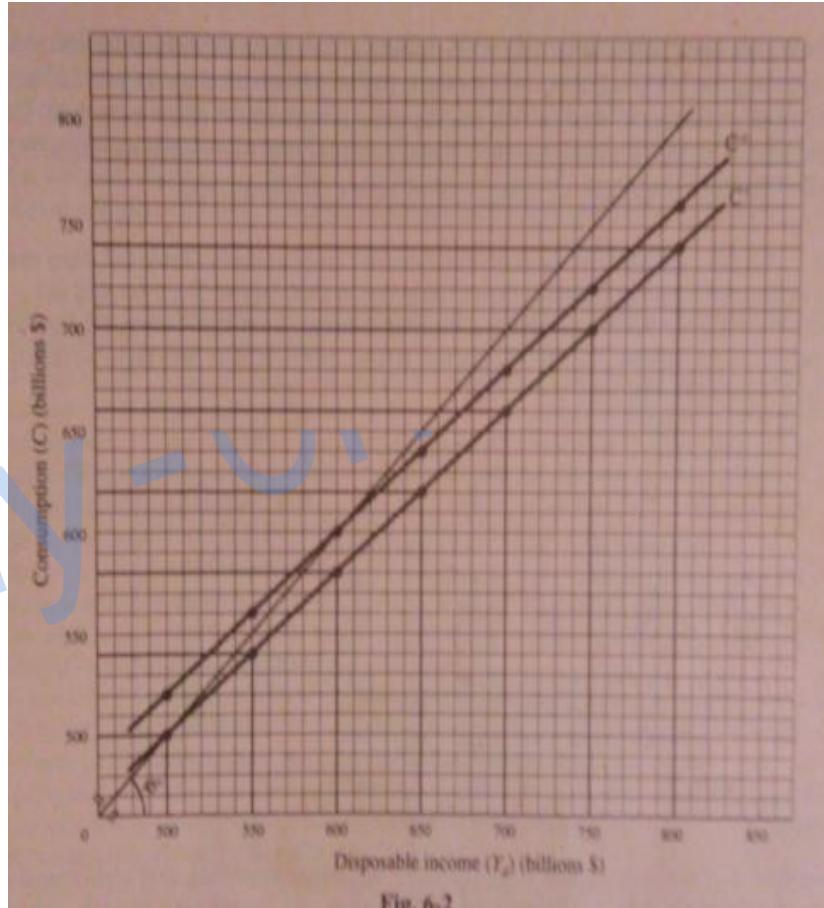


Fig. 6-2

EXAMPLE

- . Suppose consumers become more optimistic and are willing to spend their disposable income.
- . Such a trend would shift consumption function C' to C''
- . We now find that at disposable income \$500B, consumption exceeds disposable income.
- . This means the consumers are dissaving



DIS-SAVING

- Consumers can dissave-
ie,
- consume more than
their disposable income-
**by borrowing or by
spending accumulated
savings**
- Consumption now
equals disposable
income when Y_d is \$600B,
- for consumption
function C" there is less
saving at each level of
disposable income than
there is for consumption
function C'

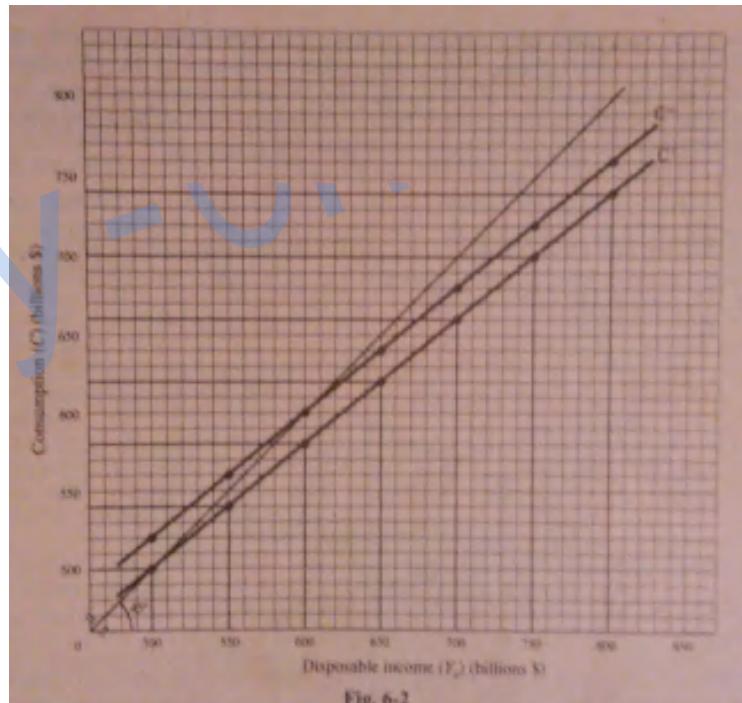


Fig. 6-2

The average and marginal propensity to consume and save

- Relationship between consumption and disposable income can be presented by several ratios:
- The **average propensity to consume** is the ratio of consumption to disposable income at a specific level of income ie,
- $$APC = \frac{C}{Y_d}$$
- At specific level of income



- **Average propensity to save** is the ratio of saving to disposable income ie
- $\text{APS} = \frac{S}{Y_d}$
- At each income level, $\text{APC} + \text{APS} = 1$
- For the consumption function in the above Table, the $\text{APC} = 1$ and $\text{APS} = 0$
- when disposable income is \$500b
- This indicates that consumers are spending 100% of their disposable income



- . At disposable income greater than \$500B, the APC <1
- . Consumers are now saving and the APS is >0

Hay - Why - UU



- The **marginal propensity to consume** is the **ratio of the change in consumption relative to the change in disposable income** between 2 levels of disposable income, ie
- $MPC = \frac{\Delta C}{\Delta Y_d}$
- Marginal propensity to save= $MPS = \frac{\Delta S}{\Delta Y_d}$
- From the table, consumption increases from \$500B, to \$540B, when disposable income increases from \$500B to \$550B
- The MPC is thus 0.80, since $\Delta C = \$40B$, and $\Delta Y_d = \$50B$, ie $40/50 = 0.8$



- . For the linear consumption function C', the MPC=0.80 for each change in disposable income
- . The **MPC is constant for a linear consumption function** since the MPC is the slope of the consumption function
- . All straight lines have a constant slope

Hay - Why



TO

	ΔYd	ΔC	$MPC = \frac{\Delta C}{\Delta Yd}$
500/500 =1.0	0	500	500
			$40/50=0.80$
540/550 =0.98	0.02	550	540
			$40/50=0.80$
580/600 =0.97	0.03	600	580
			$40/50=0.80$
620/650 =0.95	0.05	650	620
			$40/50=0.80$
660/700 =0.94	0.60	700	660
			$40/50=0.80$
700/750 =0.07	0.07	750	700

- Note that the APC falls from 1.0 to 0.92 as disposable income increases from \$500B to \$800B
- Since the APS is 1-APC, the APS increases from 0 to 0.080
- Consumers are not saving at disposable income level \$500B, but they save 8% of their income level when Y_d is \$800B
- The MPC is constant, 0.80, that is 80% of each increase in disposable income is consumed
- The MPS=0.20 since MPS is 1-MPC



The APC and MPC for the data are as follows:

APC= C / Yd)	APS	Yd	C	(MPC= $\Delta C / \Delta Yd$)
500/500=1.0	0	500	500	
				40/50=0.80
540/550=0.98	0.02	550	540	
				40/50=0.80
580/600=0.97	0.03	600	580	
				40/50=0.80
620/650=0.95	0.05	650	620	
				40/50=0.80
660/700=0.94	0.60	700	660	
				40/50=0.80
700/750=0.93	0.07	750	700	
				40/50=0.80
740/800=0.92	0.08	800	740	



CONSUMPTION, INVESTMENT AND NET EXPORTS

DISCUSSION CONTENTS

Investment

The Investment Demand Curve

Exports



INVESTMENT

- In the national income accounts, investment consists of residential construction, non-residential construction, producers' durable equipment, and changes in business inventories.
- Generally speaking, the decision to invest is a negative function of the rate of interest, holding all other factors (non-interest variables) constant.
- It is the least stable component of aggregate spending and a principal cause of the business cycle in the national income accounts.



REAL GDP AND REAL INVESTMENT , USA 1970-1992

- . Fig presents the annual percentage change in real GDP, real gross investment and the peaks and troughs in economic activity in the US between 1970 and 1993
- . Both real GDP and real investment display a cyclical movement.
- . It rose after a business cycle trough and fell after a business cycle peak

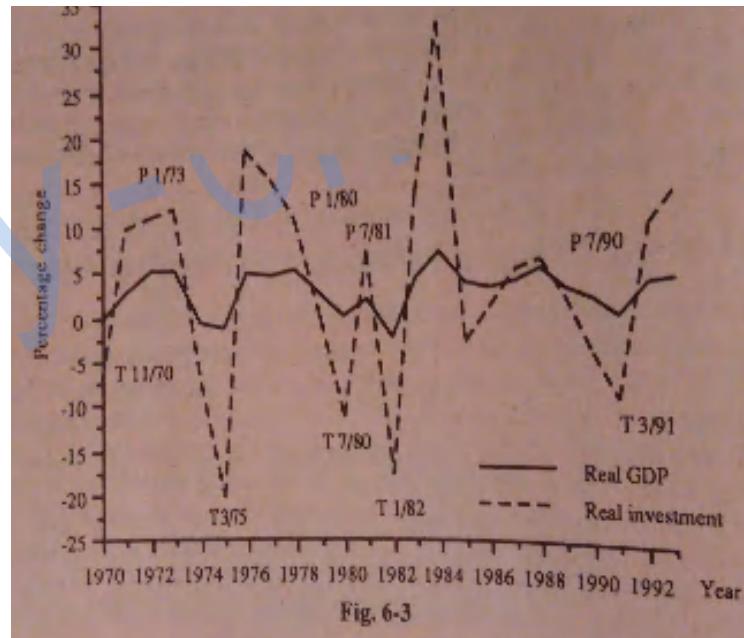


Fig. 6-3

- . Investment spending displays larger and more dramatic changes
- . Because of this, investment is considered the principal cause of economic fluctuations

Hay - Why



Business cycles

- . Monetary policy seeks to:
- . dampen economic fluctuations by moderating the growth of investment spending during an economic expansion
- . and slowing the decline in investment during a recession



INVESTMENT (cont'd.)

Other non-interest variables affecting investment demand include:

(a) residential construction i.e. purchase of housing units (single family and multi-family units) . Residential construction depends upon the willingness and ability of individuals to purchase housing units

This is also influenced by:

- demographics (size of house buying population)
- buyer's level of indebtedness
- wealth of buyers
- current and expected income level
- willingness to incur new debt
- ability of buyers to obtain loan
- cost of housing units, and
- mortgage rate of interest



INVESTMENT (cont'd.)

(b) non-residential construction i.e. offices, hotels and other commercial real estate.

Their demand is also influenced by:

- the rate of interest
- the vacancy rate of existing units
- needs for additional commercial space
- ability of business units to meet increased rental costs



INVESTMENT (cont'd.)

(c) producers' durable equipment (equipment purchases by businesses) is influenced by:

- borrowing costs
- utilization of existing productive capacity
- availability of more efficient technology
- current and expected sales
- existing and future competition

(d) changes in business inventories are linked to:

- rate of interest
- current and expected sales
- current and expected inventory prices
- certainty of inventory deliveries



THE INVESTMENT DEMAND CURVE

- It is a curve that shows the relationship between gross investment and the rate of interest, while other variables affecting investment spending are held constant.

- Investment spending is inversely related to the rate of interest i.e. the higher the investment the lower the rate of interest and vice -versa.



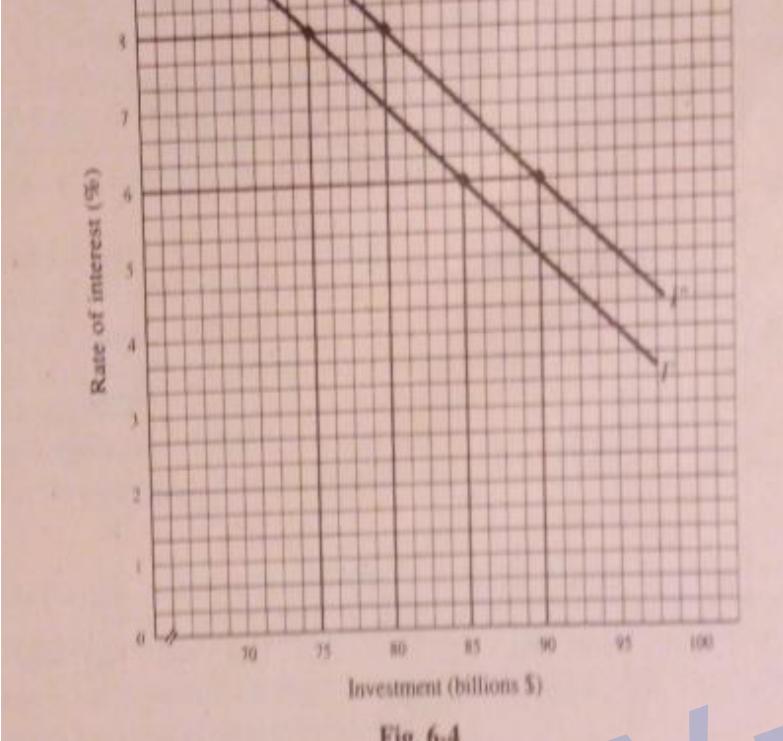
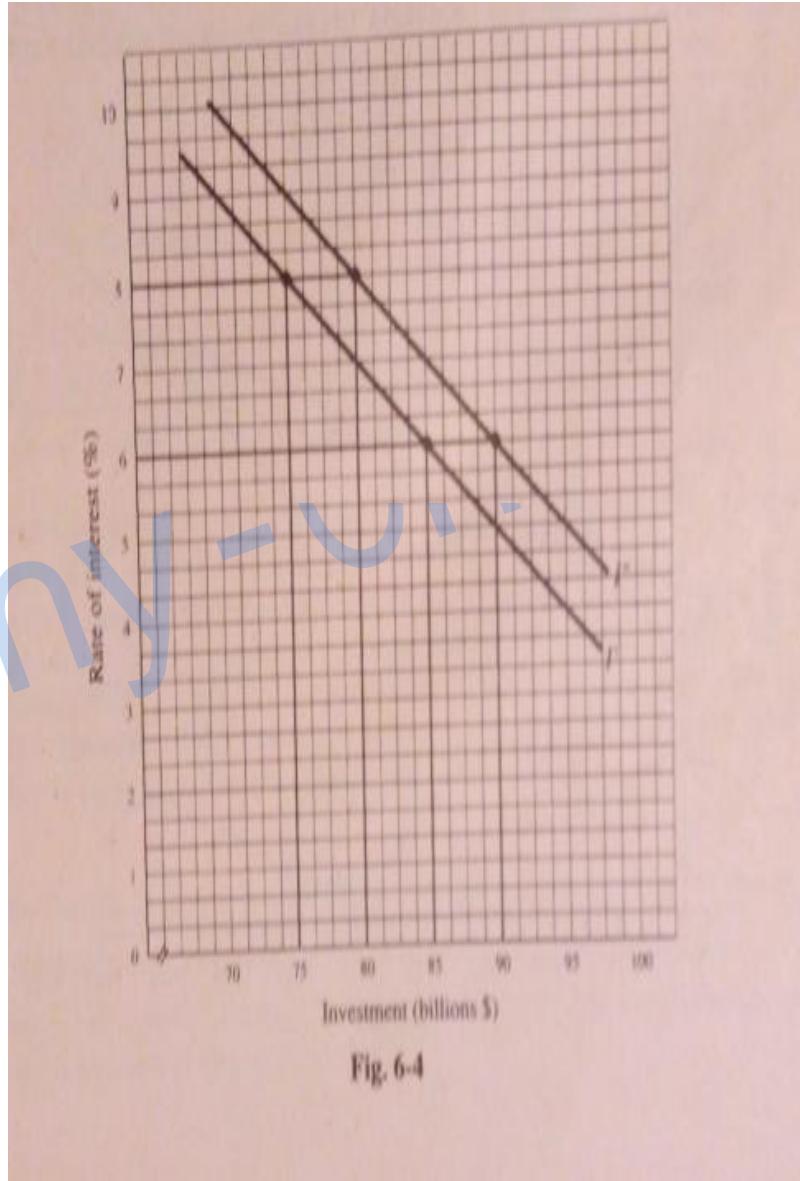


Fig. 6-4

DEMAND CURVE

- An investment demand curve shows the relationship between:
 - gross investment and
 - the rate of interest, holding constant other variables that affect investment spending

- . Investment spending is inversely related to the rate of interest, meaning
- . A lower rate of interest is associated with a higher level of investment,
- . In another word, a higher rate of interest is associated with a lower level of investment, holding other variables constant



GROSS EXPORTS AND GROSS IMPORTS

- *Gross exports* are the value of goods and services produced in a home country and sold abroad.
- *Gross imports* are the value of goods and services purchased by a home country from abroad.
- Imports usually lowers the aggregate spending of a nation on domestically produced goods.
- *Net exports* are the value of gross exports less gross imports.
- Net exports might be negative or positive. It is positive when the country exports more than it imports and negative when it imports more than it exports.



USA, IMPORTS, EXPORTS AND NET EXPORTS: 1975-1993

- Figure presents US gross exports, gross imports and net exports in 1987 dollars from 1975 to 1993
- Note the substantial growth of gross exports and gross imports and net exports in the 1980s
- Also note that US had a negative net export balance in 14 out of 19 years
- This means that aggregate spending on US produced goods and services was lower in 14 of these 19 years because of negative net export balance

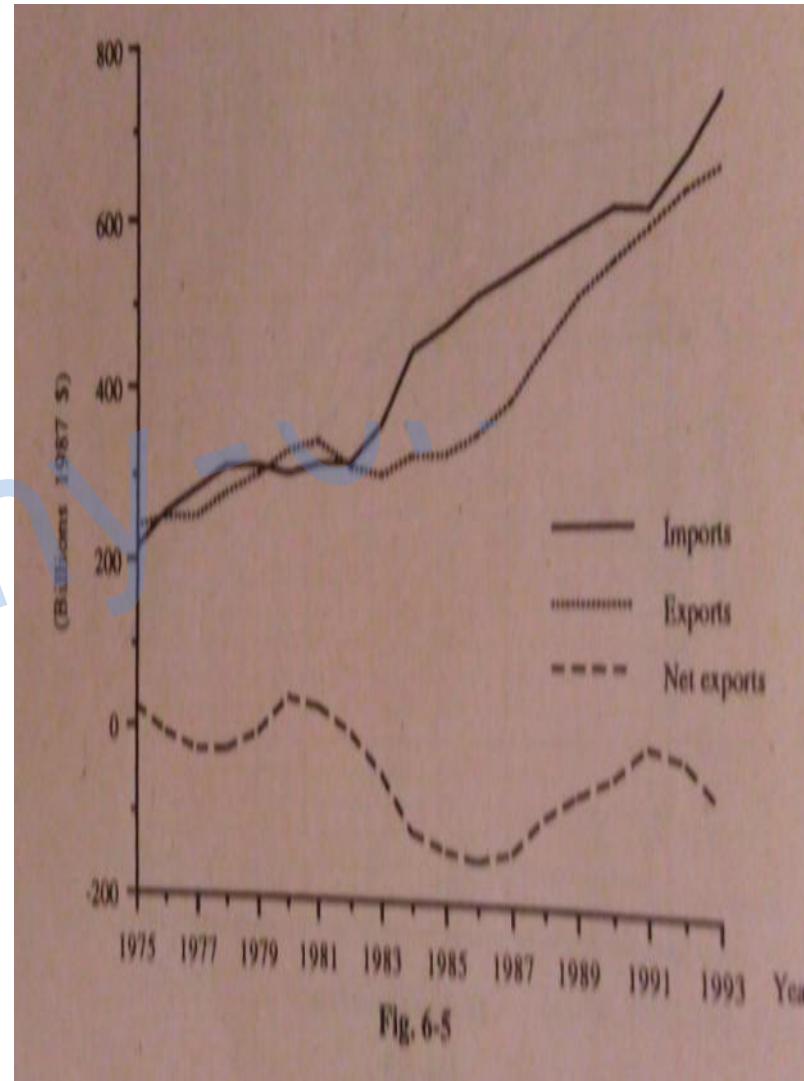


Fig. 6-5

NET-EXPORTS

- . Net exports are the value of gross exports less gross imports
- . It is the net addition to domestic aggregate spending that results from importing and exporting goods and services
- . Net exports are positive when the home country exports more than it imports
- . Net export is negative when the home country imports more than it exports.



FACTORS AFFECTING IMPORTS AND EXPORTS

- Level of income
- Foreign exchange rate
- Domestic price relative to prices in foreign countries
- Import tariffs
- Restrictions on imported goods

Hay - Why - U -



FACTORS AFFECTING IMPORTS AND EXPORTS

- Level of income
- Foreign exchange rate
- Domestic price relative to prices in foreign countries
- Import tariffs
- Restrictions on imported goods

Hay - Why - U -



COURSE CODE: AEM 102

COURSE TITLE: PRINCIPLES OF ECONOMICS

TOPIC: INFLATION, DEFICIT AND DEBT

LECTURER: MRS O.O. AYODEJI



MODULE VII: INFLATION, DEFICIT AND DEBT

Topic Outline

- Meaning of inflation
- Types of inflation
- Causes of inflation
- Effects of inflation
- Control of inflation
- Phillips curve
- Government deficit
- Public debt



INFLATION

- Inflation depicts an economic situation where there is a general rise in the prices of goods and services, continuously. It is frequently described as a state where “too much money is chasing too few goods”.
- When there is inflation, the currency loses purchasing power. The purchasing power of a given amount of naira will be smaller over time when there is inflation in the economy.
- For instance, assuming that N10.00 can purchase 10 shirts in the current period, if the price of shirts double in the next period, the same N10.00 can only afford 5 shirts.



INFLATION CONT'D

- In the definition of inflation, two key words must be borne in mind. First, is aggregate or general, which implies that the rise in prices that constitutes inflation must cover the entire basket of goods in the economy as distinct from an isolated rise in the prices of a single commodity or group of commodities.

Hay - Why



INFLATION CONTD

- Second, the rise in the aggregate level of prices must be **continuous** for inflation to be said to have occurred.
- In other words, the aggregate price level must show a tendency of a **sustained and continuous rise over different time periods**. This must be separated from a situation of a one-off rise in the price level.
- Inflation is usually estimated by inflation rate or price index (consumer price index).
- The CPI is the price of this basket of goods and services relative to the price of the same basket in some base year. It is the most commonly used measure of the level of prices.



CPI CONT'D

- For example, suppose that the typical consumer buys 5 apples and 2 oranges every month. Then the basket of goods consists of 5 apples and 2 oranges, and the CPI is:

$$\text{CPI} = \frac{(5 \times \text{Current Price of Apples}) + (2 \times \text{Current Price of Oranges})}{(5 \times 2009 \text{ Price of Apples}) + (2 \times 2009 \text{ Price of Oranges})}.$$

- In this CPI, 2009 is the base year. The index tells us how much it costs now(2022) to buy 5 apples and 2 oranges relative to how much it cost to buy the same basket of fruit in 2009. The consumer price index is the most closely watched index of prices, but it is not the only such index.



PRODUCER PRICE INDEX

- The Producer Price Index (PPI) measures the average change over time in the selling prices received by domestic producers for their output.
- Because wholesale prices are eventually translated into retail prices, changes in the PPI for consumer goods are usually a good predictor of changes in the CPI.
- Note: Do not confuse the CPI with the PPI, or producer price index, which is an index of prices of domestically produced goods in manufacturing, mining, agriculture, fishing, forestry, and electric utility industries.



TYPES OF INFLATION

1.Creeping Inflation: Creeping or mild inflation occurs when the rise in price is very slow. A sustained annual rise in prices of less than 3 per cent per annum falls under this category. Such an increase in prices is regarded safe and essential for economic growth. **This kind of mild inflation makes consumers expect that prices will keep going up. That boosts demand.** Consumers buy now to beat higher future prices. That's how mild inflation drives economic expansion. For that reason, the Fed sets 2% as its target inflation rate.

2.Walking Inflation: This strong, or destructive, inflation is between 3-10% a year. It is harmful to the economy because it heats-up economic growth too fast. **People start to buy more than they need to avoid tomorrow's much higher prices.** This increased buying drives demand even further so that suppliers can't keep up. More important, neither can wages. As a result, common goods and services are priced out of the reach of most people.



TYPES OF INFLATION CONT'D

- **3.Galloping Inflation:** When inflation rises to 10% or more, it wreaks absolute havoc on the economy. **Money loses value so fast that business and employee income can't keep up with costs and prices.** This type of inflation has tremendous adverse effects on the poor and middle class.
- **4.Hyperinflation:** Hyperinflation occurs when prices rise very fast at double or triple digit rates. **This could get to a situation where the inflation rate can no longer be measurable and absolutely uncontrollable.** Prices could rise many times every day. Such a situation brings a total collapse of the monetary system because of the continuous fall in the purchasing power of money



OTHER CONCEPTS OF INFLATION

- **Pure inflation** – A situation in which all prices including wages and other sources of income rise **at an equal rate**
- **Shock inflation** – a sudden change in the price level that is caused by a rise in price of an important good.
- **Stagflation** – This is when economic growth is stagnant, but there still is price inflation. It is a combination of inflation + slow economic growth and high unemployment.
- **Deflation**- is the opposite of inflation. It's when an annual fall in the general price level.
- **Disinflation** – a decrease in the rate of inflation.



OTHER CONCEPT OF INFLATION CONT'D

- **Wage Inflation:** Wage inflation is when workers' pay rises faster than the cost of living. When wages increase, consumers are likely to spend more, which ultimately increases consumer prices.

Hay - Why - U -



CLASS WORK

- Is Nigeria currently experiencing inflation? If yes, what type of inflation are we experiencing?
- What can the Government do to curb inflation in the country? Discuss.
- Is an increase in petroleum product prices in Nigeria a signal of inflation? Discuss.
- In year 2009, the price level was N200 and in year 2010, the price level was N210, what is the annual percentage of inflation ?



CAUSES OF INFLATION

- **Demand pull/demand-induced/Excessive demand inflation**-Demand-pull inflation exists when aggregate demand in an economy is more than aggregate supply. If demand exceeds supply, firms will respond by pushing up prices as firms try to **meet the increased demand** because of a lack of needed supply.

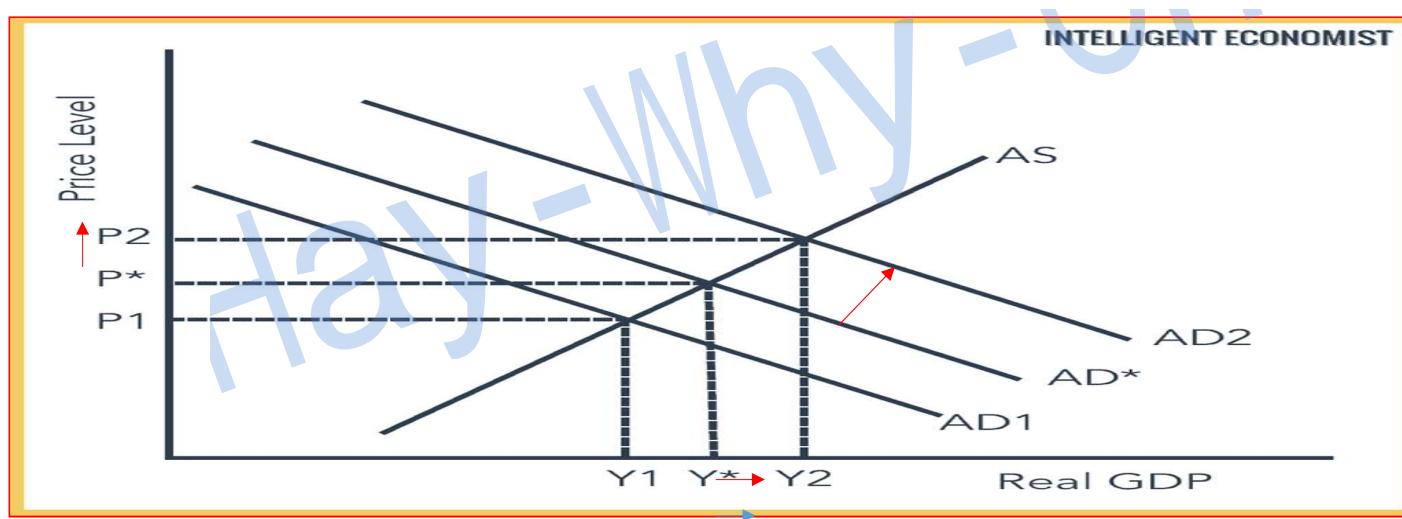


Figure1: Graphical Illustration of Demand pull inflation



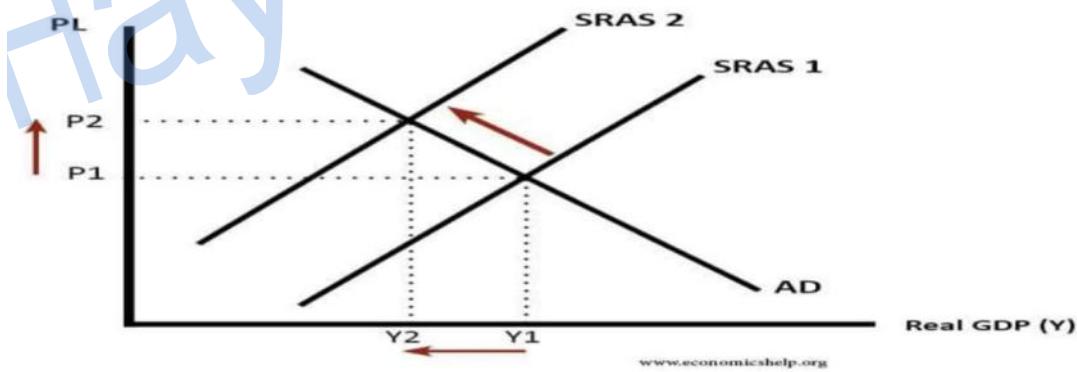
CAUSES OF DEMAND PULL INFLATION

- Rising inflation rate-When the inflation rate rises then demand goods and services usually rises as well because people want to protect their money by buying goods while they are still affordable.
- Increase in population
- Increase in income(demand) or a combination of both
- Technological Innovations-When new technologies are introduced, demand for the products and services that support them often goes up.



COST PUSH INFLATION

- Cost-push inflation is a type of inflation that is caused by the increase in the cost of labor and materials thereby causing an increase in prices for goods and services which results to a decrease in supply.
- A case is if the Nigeria Labour Congress (NLC) is able to get significant increase in wages without corresponding increase in production which result in higher cost.



CAUSES OF COST PUSH INFLATION

- 1.Rural-urban drift / migration leading to the neglect of agricultural sector
- 2.War effect- Efforts are diverted from production of goods to production of war equipment/ armament
- 3.Bad weather/ drought such as the 1973 Nigerian drought
- 4.Imported inflation i.e importing large quantities of goods and services from countries which have inflation.



EFFECTS OF INFLATION

A. Effect on income and standard of living:

1. Value of money falls
2. Fixed income earners such as recipients of transfer payments (pensions, unemployment insurance, social security, recipients of interest & rent, lose. **These people lose because they receive fixed payments while the value of money continues to fall with rising prices.**
3. Those of flexible income group like businessmen, shareholders, industrialists, traders real estate holders, speculators, gain. This category of persons becomes rich at the cost of the fixed income group. **This is because there is transfer of income and wealth from the poor to the rich.**



EFFECT OF INFLATION CONT'D

B. Effect on income distribution:

- 1.the rich tends to be richer & the poor, poorer during inflation.
- 2.During inflation, usually people experience rise in incomes. But some people gain during inflation at the expense of others. Some individuals gain because their money incomes rise more rapidly than the prices and some lose because prices rise more rapidly than their incomes during inflation.



EFFECT OF INFLATION CONT'D

C. Effect on borrowers and lenders (creditors and debtors)

When there is inflation, creditors are generally worse off because, the real value of their future claims is **reduced** to the extent of the rate of inflation.

On the other hand, when inflation occurs, debtors tend to **pay less** in real terms than they had borrowed. Therefore, it could be said that inflation favours debtors at the detriment of creditors.

- **D. Effect on salaried or wage earners:** Those with white-collar jobs lose during inflation because their salaries are slow to adjust when prices are rising. Wage earners may gain or lose during inflation depending on the speed with which their wages adjust to rising prices.



CONTROL OF INFLATION

- **Contract the economy by using monetary and fiscal policies**
 - forcing a recession/austerity measures/cutting down spending which may lead to hardship, reduction of unemployment benefits
 - Indexation. Here people become partially/wholly immunized from changes in the general price level through things like cost- of- living adjustment
- **Tax-based income policy:** This involves subsidizing companies whose wages and prices are rising slowly and taxing those that boost inflation.
- experiencing inflation.



CONTROL OF INFLATION CONT'D

- **Price control measure:** This involves setting up a price control board by government which **fixes** maximum prices of certain commodities.
- Total ban on importation of certain items.
- Increase in the production of essential consumer goods like food, clothing, kerosene oil, sugar, vegetable oils, etc.
- Rationing: This aims at distributing consumption of scarce goods so as to make them available to a large number of consumers. It is meant to stabilize the prices of necessary goods and assure distributive justice.



WHAT IS PHILLIPS CURVE?

- The Phillips Curve is a graphical representation of the inverse, or negative, economic relationship between the rate of unemployment (or more precise, the rate of change in unemployment) and the percentage rate of change in money wages (Inflation rate).

- The theory behind this is fairly straightforward. Falling unemployment might cause rising inflation and a fall in inflation might only be possible by allowing unemployment to rise.



PHILIPS CURVE CONT'D

- A high inflation and high unemployment are incompatible; therefore, governments have to choose the best combination of both.
- If the government wants to reduce the unemployment rate, it could increase aggregate demand but, this might temporarily increase employment, but it could also have inflationary implications in labour and the product markets.



TYPICAL EXAMPLE OF PHILLIPS CURVE



DEFICIT SPENDING

- Deficit spending can simply be called "deficit," or "budget deficit," the opposite of budget surplus.
- **Deficit spending** is the **amount** by which a government, private company, or individuals **spending exceeds income over a particular period of time**



PUBLIC DEBT

- It is the **cumulative** amount of money owed at any given time by any branch of the government.
- Public debt is distinct from a budget deficit in that it is **cumulative**, whereas deficit refers to a **particular budget year's shortfall**
- It encompasses the one owed by the federal government, the state government, and even the municipal and local governments



PUBLIC DEBT CONT'D

- Public debt is made up of **external debt**, which is money that is owed by the government to foreign lenders, either in the form of international organizations, other governments, or groups like sovereign wealth funds.
- It is also made up of **internal debt**, where citizens and groups within the country lend the government money to continue operating.
- In some ways, this is a lot like lending to oneself, since ultimately the responsibility for public debt falls back on the very people lending money.



PUBLIC DEBT CONT'D

- Public debt can also be broken down by the length of period of the loan
- Short-term public debt lasts only one or two years, and the turnover rate is fairly high
- Mid-term public debt lasts anywhere between three and ten years.
- Long-term public debt is designed to last more than ten years, with some long term debt lasting considerably longer than that.



ASSIGNMENT

- What do you think are some reasons for government indebtedness?
- In what ways do you think a nation can improve its budget deficit?
- What are the implications of budget deficit on the economy?
- What is the difference between budget deficit and public debt?

Hay - Why - U



THANK

YOU

Hay Why - U -

FOR

LISTENING



THE THEORY OF CONSUMER DEMAND AND UTILITY

AEM 102 / AEFM

Funminiyi P. Oyawole



Topic Outline

Description



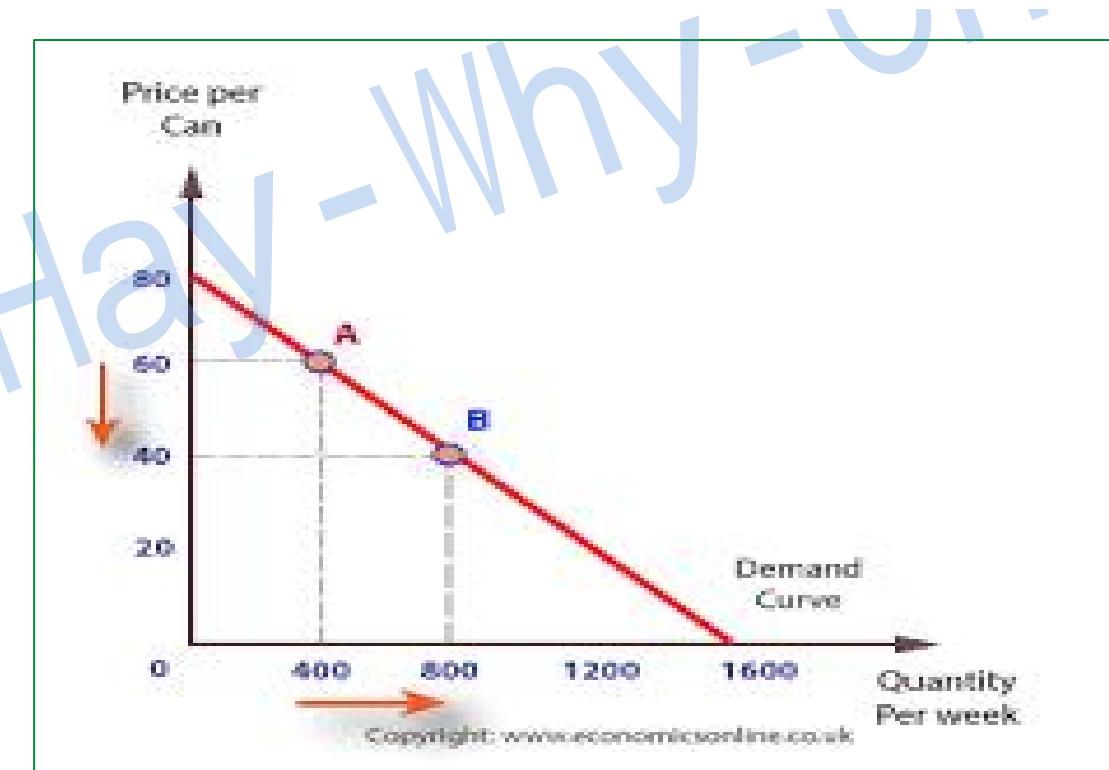
Outline

- Substitution and income effects and the downward sloping demand curve
- The law of diminishing marginal utility
- Derivation of individual demand curve
- Utility maximization and consumer equilibrium
- Consumer surplus

Hay-Why

Substitution and income effects and the downward sloping demand curve

- The market demand for a commodity is derived by adding the individuals' demand curves for the commodity
- Each individual's demand and the market demand curve for a commodity is **downward sloping** because of the **substitution** and **income effects**



Substitution and income effects and the downward sloping demand curve

- The substitution effect refers to the fact that as price of a commodity falls, consumers use it to replace similar commodities in consumption. **i.e. as price falls, an individual purchases more of this good to replace others whose price has remained unchanged.**
- The income effect refers to the fact that as the price of a commodity falls, a given money income allows the consumer to buy more of the and other commodities because his or her purchasing power has increased

Example

- When the price of coffee falls, consumers substitute coffee for tea in consumption.
- In addition, when the price of coffee falls, a consumer can buy more coffee and other commodities with a given money income
- Thus the consumer's demand and market demand for coffee is downward sloping because of the substitution and income effects
- The better and the greater the number of substitutes available for the commodity, the more elastic is its demand curve

Law of Diminishing Marginal Utility

- A complimentary explanation of the law of downward-sloping demand rests on the law of diminishing marginal utility. **Marginal utility is the addition to the total utility that is attributable to consuming one more unit of a good**
- An individual demands a particular commodity because of the satisfaction, or utility he receives from consuming it. The more units of a commodity the individual consumes per unit of time, the greater is the total utility he receives
- Although total utility increases, the extra or marginal utility received from consuming each additional unit of the commodity decreases. This is referred to as the law of diminishing marginal utility

Illustration

- Lets assume that satisfaction can actually be measured in terms of units of utility called UTILS
- The first 2 columns give an individual's hypothetical total utility TU schedule from consuming various quantities of commodity X, per unit time
- Note that as the individual consumes more units of X, TU increases
- Column 3 gives the individual's marginal utility MU schedule for commodity X. Each value of column 3 is obtained by subtracting two successive values of column 2.



Illustration (contd)

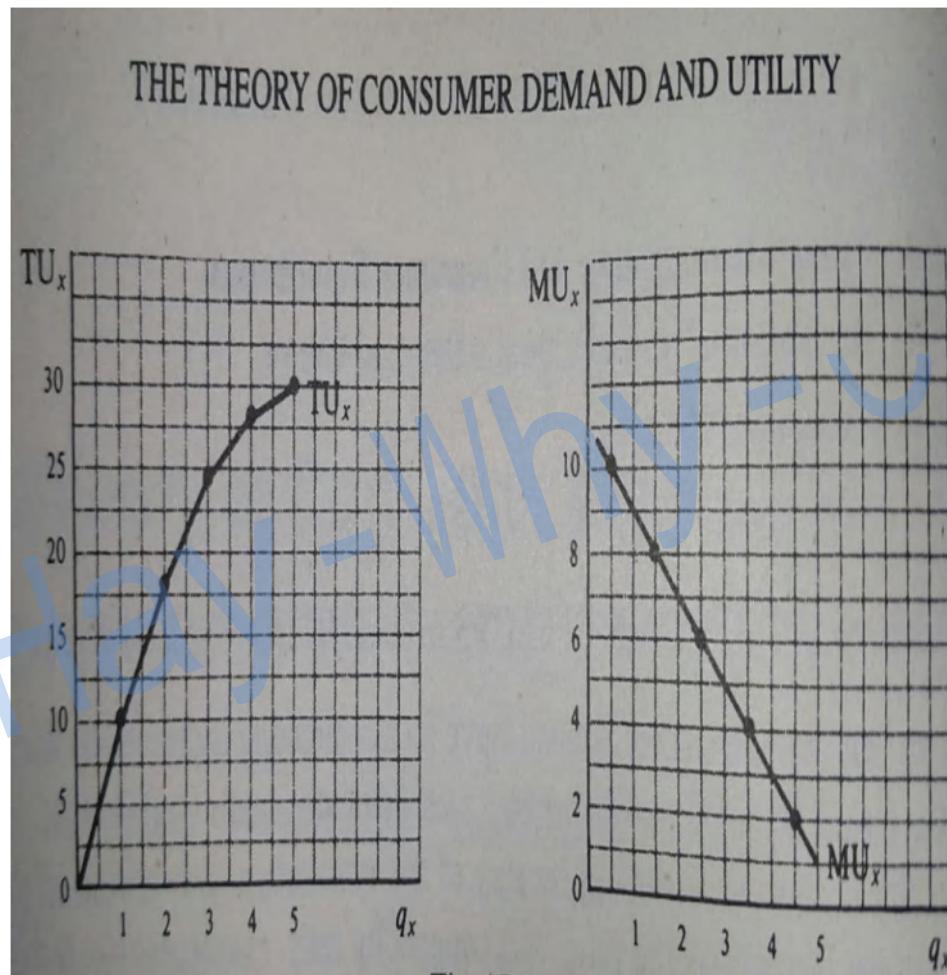
- For example, if the individual's consumption of X goes from zero units to 1, TU goes from 0 utils to 10 utils, and the MU of the first unit of X is 10 utils.
- Similarly, if consumption of X rises from 1 unit to 2 units, TU rises from 10 to 18 and the MU of the second unit of X is 8

(1) q_x	(2) TU_x	(3) MU_x
0	0	10
1	10	8
2	18	6
3	24	4
4	28	2
5	30	

Total and Marginal Utility Schedules

- The total and marginal utility schedules give the total and marginal utility curves.
- Since marginal utility is defined as the change in total utility from a one unit change in consumption, each value of MU is recorded midway between the 2 levels of consumption.
- The falling MUx curve illustrates the law of diminishing marginal utility

Total And Marginal Utility Curves



Utility Maximization And Consumer Equilibrium

- A consumer maximizes the total utility or satisfaction obtained from spending his or her income and is said to be in equilibrium when the MU of the last naira spent on each commodity is the same.
- This equilibrium condition for utility maximization can be restated as follows;
- $MU_x/P_x = MU_y/P_y = \dots = \text{common MU}$ of the last N spent on each commodity

Table showing MU that an individual receives from consuming various units of X and Y per unit of time

Units of the Commodity	MUX	MUY
1	10	6
2	8	5
3	6	4
4	4	3
5	2	2

Suppose that the consumer has ₦7 to spend on X and Y and $P_x = ₦2$ and $P_y = ₦1$

- The consumer maximizes total utility and is in equilibrium by spending ₦4 of his ₦7 to buy 2X and the remaining ₦3 to purchase 3Y.
- At this point,

$$\begin{aligned} \text{MU}_x \text{ of } 8 \text{ utils}/P_x \text{ of } ₦2 &= \text{MU}_y \text{ of } 4 \text{ utils}/P_y \text{ of } ₦1 \\ &= \text{MU of } 4 \text{ utils from the last } ₦1 \text{ spent on X and Y.} \end{aligned}$$

- By purchasing 2X and 3Y, $TU_x = 18$ ($10+8$), $TU_y = 15$ ($6+5+4$) and TU from both is 33 ($18+15$)
- If this consumer spent his ₦7 in any other way, his TU would be less

DERIVATION OF AN INDIVIDUAL'S DEMAND CURVE

- Starting with a consumer in equilibrium, we get one point of his or her demand curve.
- At a lower price, the consumer must purchase more of the commodity to be in equilibrium, and so we get another point on the demand curve.
- From these and other points of consumer equilibrium, we can derive a downward sloping demand curve because of diminishing MU
- In the example, we saw that the consumer was in equilibrium when he spent his income of N7 to purchase 2X and 3Y, at $P_x=2$ and $P_y=N1$. Thus, $P_x=2$ and $q_x=2$ is one point of consumer demand for X.



DERIVATION (Contd)

- From the table we see that at $P_x = N1$, this consumer would be in equilibrium by purchasing 4X and 3Y because at that point;

$$\begin{aligned} \text{MU}_x \text{ of 4 utils}/P_x \text{ of } N1 &= \text{MU}_y \text{ of 4 utils}/P_y \text{ of } N1 \\ &= \text{MU of 4 utils from the last } N \text{ spent on X and Y.} \end{aligned}$$

- Two points on the consumers demand schedule for commodity X are:

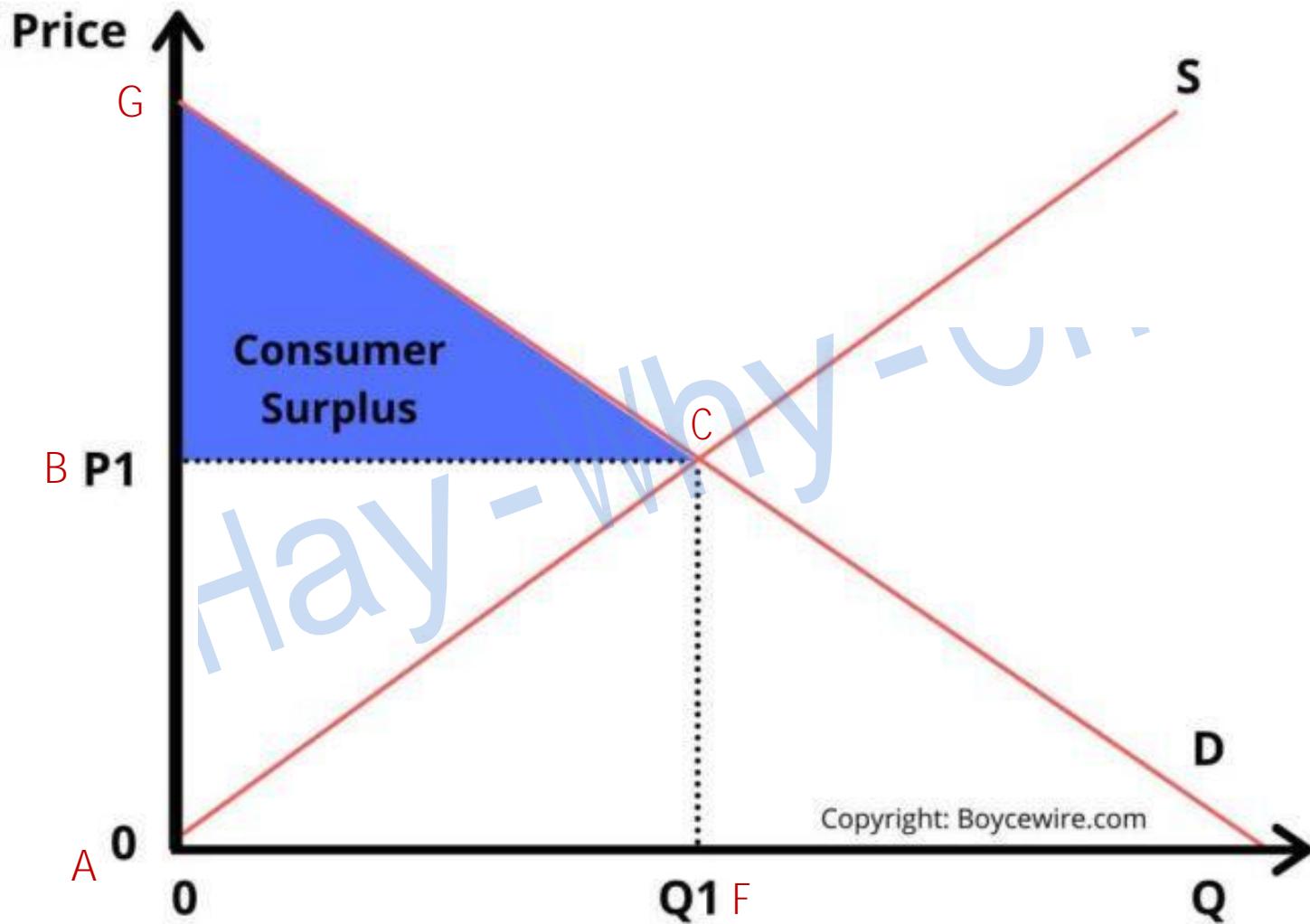
P_x	$N2$	$N1$
Q_x	2	4

- Other points could be similarly obtained
- Note that because MU declines, P_x must fall to induce the individual consumer to buy more of X. Thus a downward demand curve can be explained in terms of diminishing MU.

CONSUMER SURPLUS

- Consumer's surplus refers to the difference between what the consumer would be willing to pay to purchase a given number of units of a commodity and what he or she actually pays for them.
- It arises because the consumer pays for all units of the commodity the price he or she is willing to pay for the last unit purchased, even though the MU on earlier units is greater
- Consumer surplus can be measured by the area under the consumer's demand curve and above the commodity price

CONSUMER SURPLUS



Copyright: Boycewire.com

GRAPH EXPLANATION

- Consumer purchases AF units of the commodity at price AB and spends AB times AF (the area of the rectangle ABCF) on the commodity.
- However this consumer would have been willing to pay a higher price for all but the last unit of this commodity purchased (as indicated by the height of her demand curve) because these previous units give her greater MU than the last unit purchased.
- The difference between what she will be willing to pay for AF units (the area of AGCF) and what she actually pays for them (the area of ABCF) is an estimate of this consumer's surplus (the area of triangle BGC)

Contact

Funminiyi Oyawole

Agricultural Economics and
Farm Management

oyawolefp@funaab.edu.ng

Hay-Why-U'



COST OF PRODUCTION

AEM 102 / AEFM

Funminiyi P. Oyawole



Topic Outline

Why - How -
Day

Description



Outline

- Explicit costs, implicit costs and economic profit
- The law of diminishing returns
- Short run Total Costs
- Short run per unit costs
- Long run production costs
- Constant, increasing and decreasing returns to scale

Day - Why - U -



Explicit costs, implicit costs and economic profit

- Our discussion will focus on the firm's production costs ie what lies behind the firm's supply curve
- Explicit costs are the actual, out of pocket expenditures of the firm to purchase or hire the services of the factors of production it needs
- Implicit costs are the costs of the factors owned by the firm and used in its own production processes

Explicit costs, implicit costs and economic profit (contd)

- These costs should be imputed or estimated from what these factors could earn in their best alternative use or employment
- In economics, costs include both explicit and implicit costs
- Profit is the excess of revenues over these costs

Day - Why

EXAMPLE

- The explicit costs of a firm are the wages it must pay to hire labor, the interest to borrow money capital and the rent on land and buildings used in production process
- To these, the firm must add such implicit costs as the wage that the entrepreneur would earn as a manager for somebody else, the interest he would get by supplying his money capital if any to someone else in a similarly risky business, and the rent on his owned land and buildings, if he were not using them himself
- Only if total revenue received from selling the output exceeds both its explicit and implicit costs is the firm making an economic or pure profit

THE LAW OF DIMINISHING RETURNS

- The law of diminishing returns is one of the most important and unchallenged laws of production
- It states that as we use more and more units of some factors of production to work with one or more fixed factors of production, after a point we get less and less extra or marginal output or product from each additional unit of the variable factor used

Short run, Long run

- The time period when at least one factor of production is fixed in quantity i.e. cannot be varied is referred to as the short run
- Thus the law of diminishing returns is a short run law
- In the long run, all factors of production are variable



Example

Variable factor (Labour - persons)	Total product (Tons/year)	Marginal Product (MP)
0	0	
1	3	3
2	8	5
3	12	4
4	15	3
5	17	2

- Table shows the total and marginal product of using each additional unit of labor on the same land, say one hectare of land.
- Note that with zero labor, $TP=0$
- By adding the second unit of labor, $TP=3$ and MP , the unit change in $TP=3$

Example (contd)

- Table shows the total and marginal product of using each additional unit of labor on the same land,say one hectare of land.
- Note that with zero labor, $TP=0$
- By adding the second unit of labor, $TP=3$ and MP , the unit change in $TP=3$
- By adding the second unit of labor, $TP=8$ and $MP=5$
- The 3rd unit of labor leads to a TP of 12 and MP of 4
- The law of diminishing returns begins to operate in this example with the addition of the 3rd unit of labor

SHORT RUN TOTAL COST

- In the short run, there are total fixed costs (TFC), total variable costs (TVC) and total cost (TC)
- Total fixed costs (TFC) are the costs which the firm incurs in the short run for its fixed inputs.
- These are constant regardless of the level of output and whether it produces or not
- An example of the TFC is the rent which a producer must pay for the factory building over the life of the lease

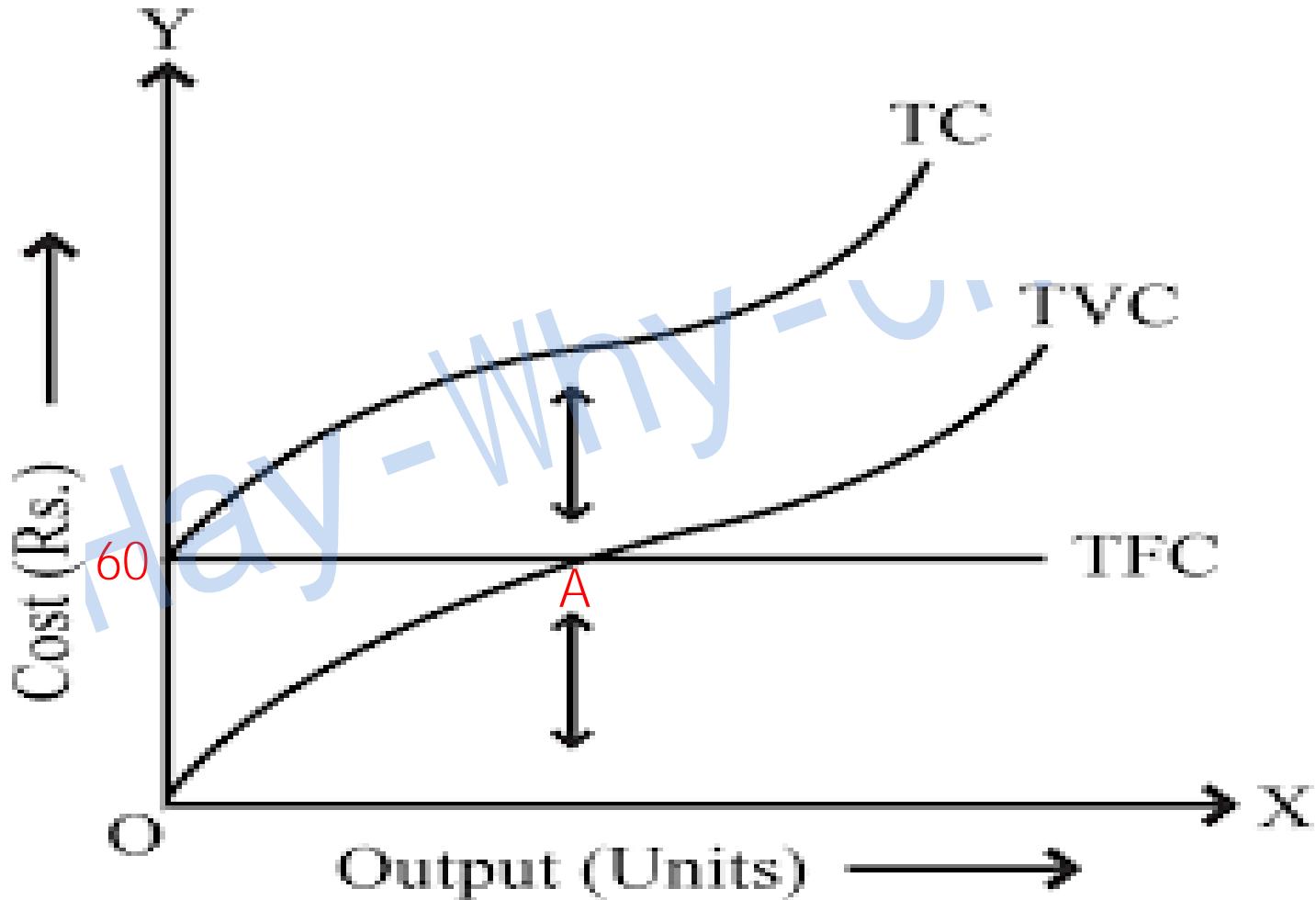
SHORT RUN TOTAL COST (Contd)

- Total Variable Costs (TVC) are the costs incurred by the firm for the variable inputs it uses
- These vary directly with the level of output produced. Examples of TVC are raw material costs and some labor costs
- Total costs TC, are equal to the sum of total fixed costs and total variable costs

HYPOTHETICAL TFC, TVC and TC

Q	TFC	TVC	TC = TFC + TVC
0	60	0	60
1	60	30	90
2	60	40	100
3	60	45	105
4	60	55	115
5	60	75	135
6	60	120	180

GRAPH OF TFC, TVC and TC



Graph Explained

- See that regardless of the level of output, TFC is 60
- It is reflected in the figure in a TFC curve which is parallel to the quantity axis and N60 above it
- TVC is zero when output is zero and rises as output increases
- The shape of TVC curve follows from the law of diminishing returns
- Up to point A the firm is using so few of the variable inputs together with its fixed inputs that the law of diminishing is not yet operating



Graph Explained (Contd)

- Therefore, TVC increase at a decreasing rate and TVC curve faces down
- Past point A, the law of diminishing returns begins to operate, so that TVC increase at an increasing rate and TVC curve faces up
- At every output level, TC equals TFC plus TVC
- For this reason, the TC curve has the same shape as the TVC curve and in this case , is every where N60 above it

SHORT RUN PER UNIT COSTS

- Though total cost are very important, per unit costs or average costs are even more important in the short run analysis of the firm
- The short run per unit costs that we consider are the:
 - Average Fixed Costs
 - Average Variable Costs
 - Average Total Costs and
 - Marginal Cost

SHORT RUN PER UNIT COSTS (Contd)

- Average Fixed Cost AFC equals total fixed cost divided by output i.e. TFC/Q
- Average variable cost AVC, equals total variable cost divided by output i.e. TVC/Q
- Average cost AC equals total costs divided by output i.e. TC/Q
- AC also equals AFC plus AVC
- Marginal cost MC equals the change in TC or the change in TVC per unit change in output i.e. dTC/dQ or $dTVC/dQ$

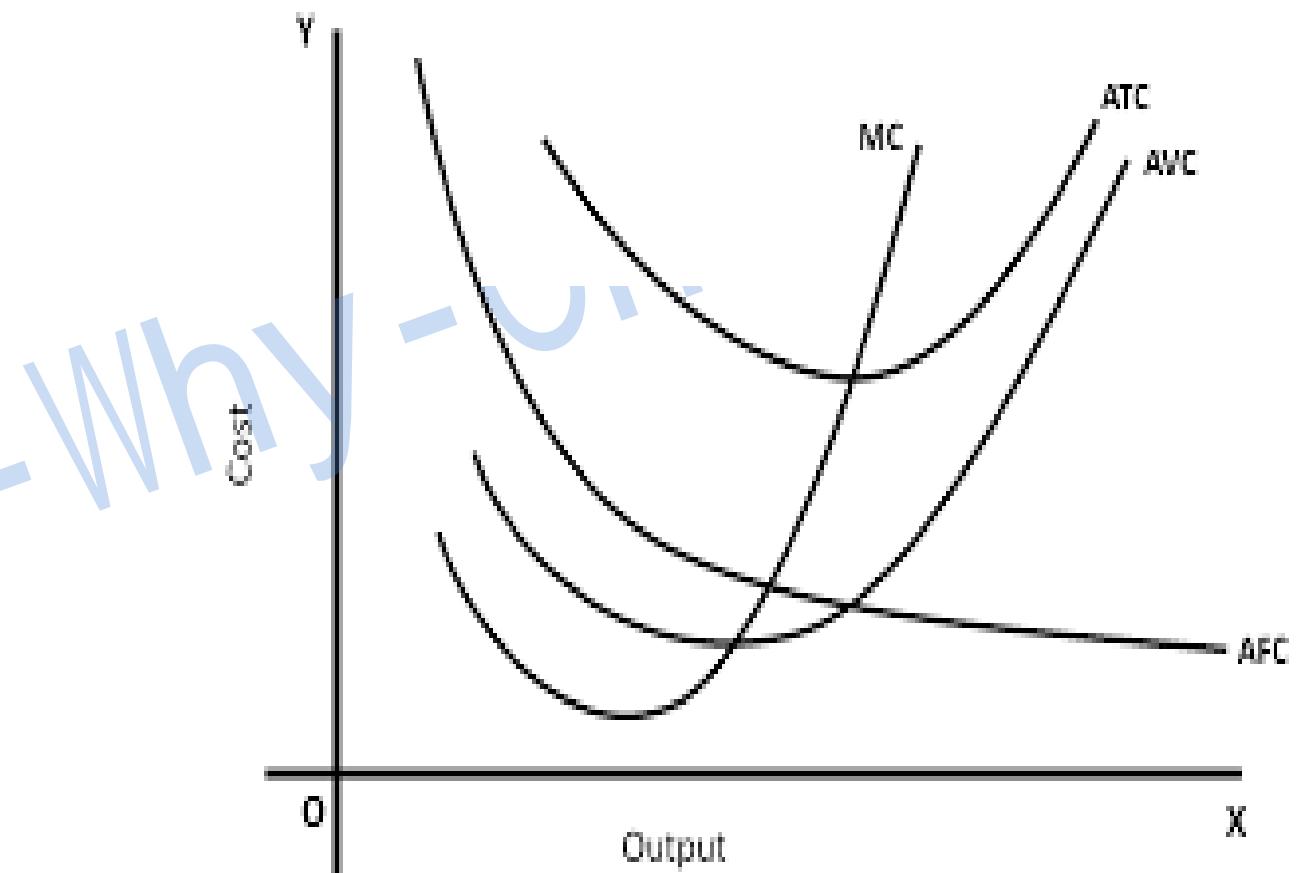
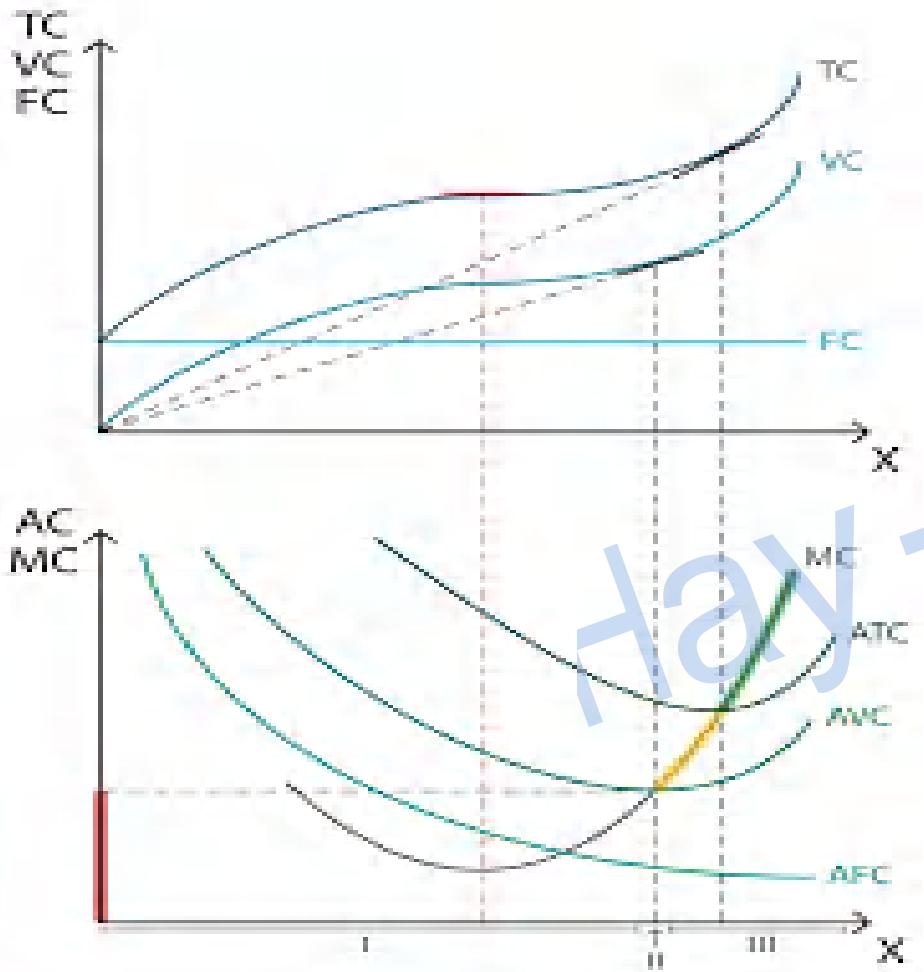
TFC, TVC, TC, AFC, AVC, AC and MC schedules

Q	TFC	TVC	TC (TFC+TVC)	AFC (TFC/Q)	AVC (TVC/Q)	AC (TC/Q)	MC (dTc/dQ)
1	60	30	90	60	30	90	10
2	60	40	100	30	20	50	5
3	60	45	105	20	15	35	10
4	60	55	115	15	13.7	28.7	20
5	60	75	135	12	15	27	45
6	60	120	180	10	20	30	

TFC, TVC, TC, AFC, AVC, AC and MC schedules Explained

- Table presents AFC, AVC, AC and MC schedules derived from TFC, TVC and TC
- AFC column is obtained by dividing TFC by corresponding quantities of output Q
- AVC schedule is obtained by dividing TFC by output
- AC schedule is obtained by dividing TC by output
- MC schedule is obtained by subtracting successive values of TC
- Thus MC does not depend on the level of TFC

GRAPH OF AFC, AVC, AC and MC



GRAPH OF AFC, AVC, AC and MC (Contd)

- Note that the values of the MC schedule are plotted half-way between successive levels of output
- Also note that while the AFC curve falls continuously as output is expanded, the AVC, the AC and the MC curves are U-shaped
- The MC curve reaches its lowest level of output than either the AVC curve or the AC curve
- Also the rising portion of the MC curve intersects the AVC and AC curves at their lowest points
- This is always the case

LONG RUN PRODUCTION COSTS

- In the long run, there are no fixed factors, and the firm can build a plant of any size
- Once a firm has constructed a particular plant, it operates in the short run
- A plant size can be represented by its short run average cost SAC curve
- Larger plants can be represented by SAC curves which lie further to the right
- The long run average cost, LAC curve shows the minimum per-unit cost of producing each level of output when any desired size of plant can be built.
- The LAC curve is thus formed from the relevant segment of the SAC curves

HYPOTHETICAL PLANT SIZES THAT FIRM COULD BUILD IN THE LONG RUN

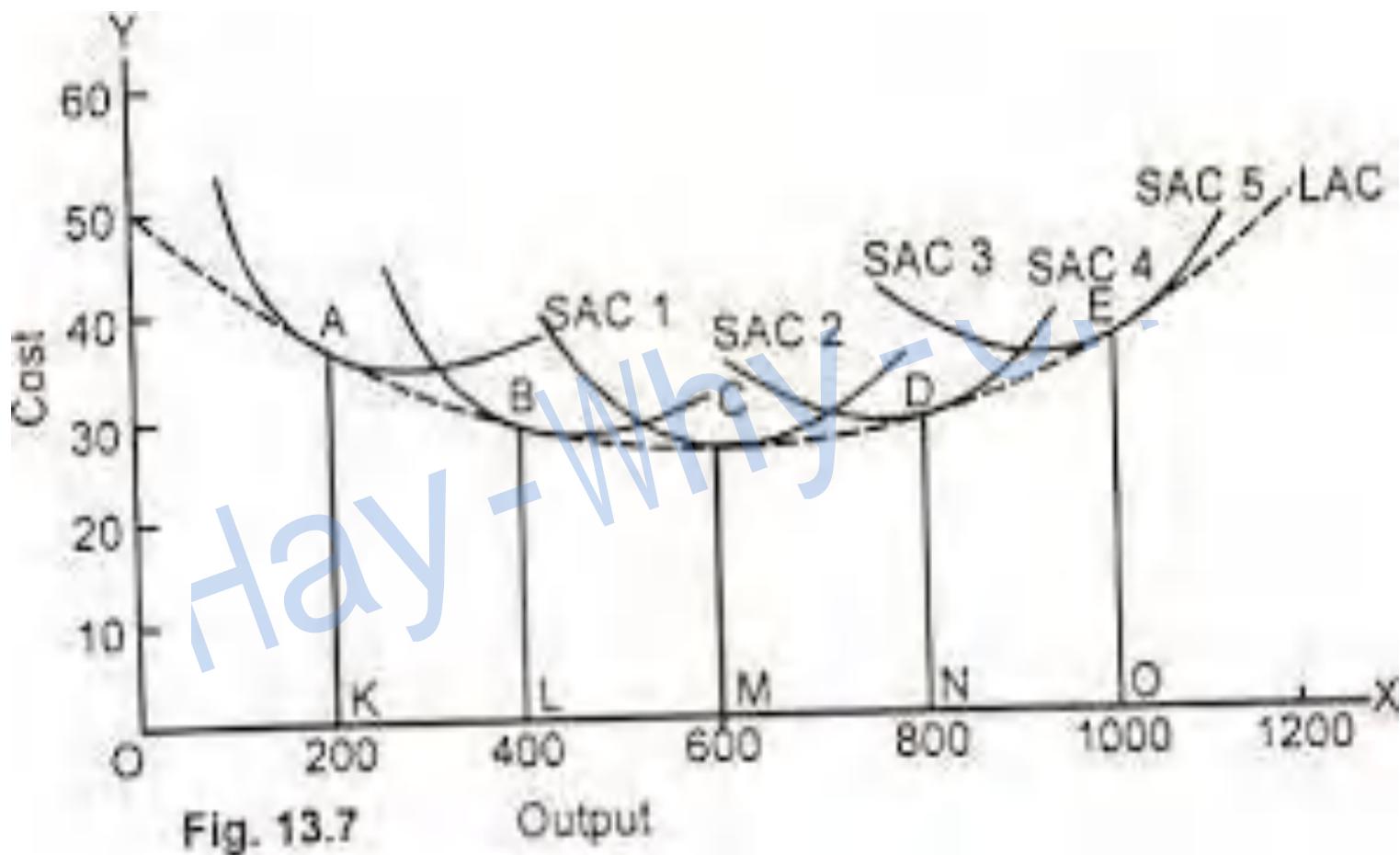


Fig. 13.7

LONG RUN PRODUCTION CURVE

Explained

- Each plant is shown by SAC curve
- To produce up to 200 units of output, the firm should build and utilize plant1, given by SAC_1
- From 400 units of output, it should build larger plant given as SAC_2
- From 600 output, it should operate SAC_3 etc
- Note that the firm could produce an output of 400 with plant 1 but only at a higher cost than with plant 2

CONSTANT, INCREASING AND DECREASING RETURNS TO SCALE

- If in the long run we increase all factors used in production by a given proportion, there are three possible outcomes.
 1. Output increases in the same proportion, so that there are constant returns to scale or constant costs
 2. Output increases by a greater proportion, giving increasing returns to scale or decreasing costs and
 3. Output increases in a smaller proportion, giving decreasing returns to scale or increasing costs

Contact

Funminiyi P. Oyawole
Agricultural Economics and
Farm Management
oyawolefp@funaab.edu.ng

Hay-Why-U'

