

Course Title: Applied Economics (3 Cr.)

Course Code: CAEC353

Year/ Semester: III/VI

Class Load: 3 Hrs./Week (Theory: 3 Hrs.; Tutorial: 1Hr.)

Course Description

This course of Applied Economics consists of the introduction to economic theories and application. It consists of theory of demand and supply, theory of consumer's behavior, theory of production, cost and revenue curves,

Theory of product pricing and factor pricing as well as contemporary macroeconomics like national income accounting, money banking and international trade with reference to Nepal.

Course Objective

This course of Applied Economics aims to enhance understanding of the economic theories and application to develop skills of students in personal and professional decision making related to business, IT and management.

Unit 1: Introduction [6 Hrs.]

- Concept and types of microeconomics and macroeconomics
- Distinction between microeconomics and macroeconomics
- Goals and instruments of macroeconomics

Unit 2: Elasticity of Demand and Supply [6 Hrs.]

- Concept and types of price, income and cross elasticity of demand
- Measurement of price, income and cross elasticity of demand: Total outlay method and Point method
- Uses of price, income and cross elasticity
- Concept of elasticity of supply and its measurement (Numerical exercise using excel)

Unit 3: Theory of Consumer Behavior 6 Hrs.

- Concept of cardinal and ordinal utility analysis
- Cardinal utility analysis: assumptions, consumer's equilibrium, criticisms and derivation of demand curve
- Ordinal utility Analysis: Concept, properties of Indifference curve, marginal rate of substitution, Price Line and consumer's equilibrium, Price effect: Derivation of PCC, Income effect: Derivation of ICC, Substitution effect, Decomposition of price effect into income and substitution effect, Derivation of demand curve (Hicksian approach)(Numerical exercise)

Unit 4: Cost and Revenue Curves [6 Hrs.]

- Concept of cost: actual cost and opportunity cost, implicit cost and explicit cost. accounting and economic cost.
- Derivation of short run and long run cost curves (total, average, marginal) and shape of short run and long run average cost curves.
- Relationship between short run and long run AC and MC curves
- Concept of revenue: total revenue, average revenue, and marginal revenue, revenue curves under perfect and imperfect competition, relation between average and marginal revenue (Numerical exercise using excel)

Unit 5: Market Structure [9 Hrs.]

Perfect competition– meaning and characteristics of perfect competition, short run and long run equilibrium of the firm and industry (TR-TC approach and MC-MR approach), derivation of short run and long run supply curve of a firm and industry.

Monopoly: Meaning and characteristic of monopoly; pricing under monopoly: equilibrium of firm in short run and long run (TR-TC approach and MC-MR approach); Price discrimination and degree of price discrimination.

Monopolistic Competition: Meaning and characteristics of monopolistic competition; Pricing under monopolistic competition: equilibrium of firm in short run and long run; equilibrium of firm under product variation and selling expenses

Oligopoly: Meaning and characteristic of oligopoly; Pricing under cartel (aiming at joint profit maximization)

(Numerical exercise using excel)

Unit 6: National income Accounting [6 Hrs.]

- Circular flow of income and expenditure in two sector, three sector and four sector economy
- Meaning and different concept of national income: GDP, NDP, GNP, NNP, national income at factor cost (NI), personal income (PI), disposable personal income (DI), per capita income (PCI)
- Real and nominal GDP, GDP deflator
- Computation of National income: Product, Income and Expenditure method (Numerical exercise using excel)

Unit 7: Money, Banking and International Trade [6 Hrs.]

- Concept and functions of money- value of money-money supply —components of money supply (M1, M2, etc.)
- Inflation : Types, causes and effects of inflation
- Banking: role and functions of commercial banks , role and functions of central bank with reference to Nepal Rastra Bank
- International Trade: Distinction between internal and international trade, balance of trade and balance of payment.

Practical Works

Excel or other relevant statistical software should be used to compute numerical exercise.

Teaching Methods:

The general teaching pedagogy includes class lectures, presentations, group works, case studies, guest lectures, research works, project works, assignments (Theoretical and practical). The teaching faculty will determine the choice of teaching pedagogy and statistical tools as per the requirements of topics.

Reference Books

- Ackley, Gardener. (1978). Macroeconomics: Theory and Policy. New York: Macmillan Publishing Co.
- Caves, Frankel, Jones, World Trades and Payments: (9th Ed.) Pearson Education
 - Dominick Salvatore, International Economics: (8th Ed.) . Wiley India.
 - Dwivedi, D.N. (2001). Macroeconomic Theory and Policy. Tata McGraw-Hill Publishing Company Limited, New Delhi

- G, Mankiw. (2007). Economics: Principles and Applications. South Western of Cengage Learning.
- Gupta, S.B. Monetary Economics, S.Chand & Co;New Delhi.
- Koutsoyiannis, A. (1991). Modern Microeconomics. Hongkong: ELBS
- Lipsey and Chrystal. Economics. Oxford University Press. (eleventh edition or latest one).
- Mankiw, N. Gregory. (2009). Principles of Microeconomics. Cengage Learning India Private Limited, New Delhi (4th edition)
- P. Samuelson and W. Nordhaus. Economics, Mcgraw Hill International Editions. (14th edition or latest one)
- Paul R. Krugman, Maurice Obstfeld, International Economics: (8th Ed.) Pearson Education
- Pindyck, Robert S. and Daniel, Rubinfeld. (2001). Microeconomics. New Delhi: Prentice Hall of India
- Salvatore, Dominic. (2009). Principles of Microeconomics. Publish in India Oxford University Press, New Delhi

What Economics is all about?

The science of economics was born with the publication of Adam Smith's An Inquiry into the Nature and Causes of Wealth of Nations in the year 1776. Adam Smith is known as the father of Economics. At its birth, the name of economics was 'Political Economy'. Towards the end of the 19th century there was a definite change from use of word 'Political Economy' to 'Economics'. The word 'Economics' was derived from two Greek words oikou (a house) and nomos (to manage). Thus, the word economics was used to mean home management with limited funds available in the most economical manner possible.

Lionel Robbins defines economics as a science of scarcity. Prof. Robbins in his book Nature and Significance of Economic Science states, "Economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses". Paul A. Samuelson defines economics as "the study of how men and society choose, with or without the use of money, to employ scarce productive resources which could have alternative uses, to produce various commodities over time and distribute them for consumption now and in future among various people and groups of society. This definition emphasizes growth over time. It is modern and wider in scope. The definition takes into account consumption, production, distribution and exchange of goods. Hence, it is most satisfactory definition of economics. This definition has been accepted universally.

Before 1930, there was only one 'economics'. French economist Ragnar Frisch coined the words 'micro' and 'macro' in 1933 to denote the two branches of economic theory, namely, microeconomics and macroeconomics.

Meaning of Microeconomics

The word 'Micro' is derived from the Greek word 'mikros' meaning small. Microeconomics deals with small segments of the society.

Microeconomics is a branch of economics that studies the behavior of individuals and firms in making decisions regarding the allocation of scarce resources and the interactions among these individuals and firms.

Microeconomics is defined as the study of behavior of individual decision-making units, such as consumers, resource owners and firms. It is also known as Price Theory since its major subject-matter deals with the determination of price of commodities and factors.

As the name suggests, microeconomics takes microscopic view of the economy. It is like dealing with individual trees in the economic forest.

According to Prof. Boulding, "Microeconomics is the study of particular firm, particular household, individual price, wage, income, industry and particular commodity." It is primarily concerned with the determination of prices of Individual commodities and factors. It explains how prices of wheat, cloth, shoes, pens and thousands of other goods are determined.

Similarly, how prices (remuneration) of factors of production (i.e., rent, wages, interest, etc.) are determined. Thus, the theory of product pricing and theory of factor pricing fall within the domain of microeconomics. Since prices of products and factors occupy the central place, microeconomics is, therefore, also called 'Price Theory'. Examples of microeconomics are: individual income, individual saving, consumer equilibrium, price determination of a good, demand of a commodity, etc.

In microeconomics, problems of individual economic units are studied such as equilibrium of a consumer (i.e., state of maximum satisfaction), equilibrium of a firm (i.e., state of maximum profit) and an industry. It explains how a consumer, a producer and an industry attain equilibrium. An individual household (or consumer) is said to be in equilibrium if it gets maximum satisfaction from allocation of its expenditure on various goods and services.

Since microeconomics splits up the entire economy into smaller parts for the purpose of intensive study, it is also known as "Slicing Method".

Features of Microeconomics

1. It studies the individual units of the economy
2. It is based on other things being unchanged
3. Major assumptions are full employment, perfect competition,
4. It focused on maximum utilization of scarce resources,
5. It follow the partial equilibrium approach, slicing method
6. It is also called price theory.
7. Mostly applicable on free market economy.

Microeconomics has both theoretical and practical importance. It solves the three central problems of an economy, i.e., what, how and for whom to produce. Subject-matter of microeconomics is vast and includes the following topics as shown

Scope or Subject-matter of Economics

Before 1930, there was only one 'economics'. Ragnar Frisch coined the words 'micro' and 'macro' in 1933 to denote the two branches of economic theory, namely, microeconomics and macroeconomics.

The scope or the subject matter of microeconomics is concerned with

Product pricing

The price of an individual commodity is determined by the market forces of demand and supply. Microeconomics is concerned with demand analysis i.e. individual consumer behavior, and supply analysis i.e. individual producer behavior.

Factor pricing theory

Microeconomics helps in determining the factor prices for land, labor, capital, and entrepreneurship in the form of rent, wage, interest, and profit respectively. Land, labor, capital, and entrepreneurship are the factors that contribute to the production process.

Theory of economic welfare

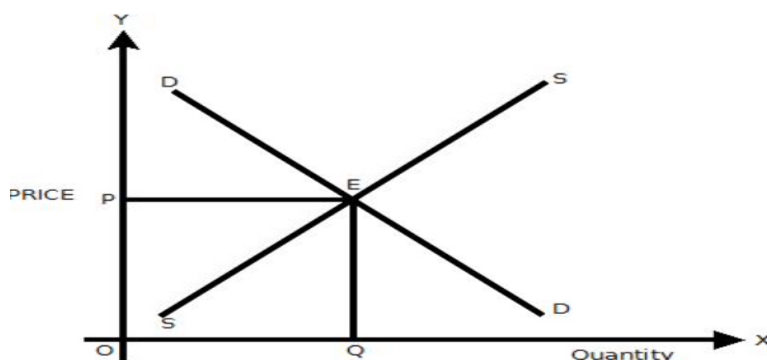
Welfare economics in microeconomics is concerned with solving the problems in improvement and attaining economic efficiency to maximize public welfare. It attempts to gain efficiency in production, consumption/distribution to attain overall efficiency and provides answers for 'What to produce?', 'When to produce?', 'How to produce?', and 'For whom it is to be produced?'

Types of Microeconomics

The variables in any economic model can be a stock and/or a flow. A relationship is postulated among these variables in the model. If all the variables in the model relate to the same time period, then it is a static relationship, while if the variables relate to different time periods it is a dynamic relationship. Following are the major types of Microeconomics

1. Simple Micro Static

Under this system, all the factors included in the model do not want to change their status but remains constant. And here the point of equilibrium is determined, and it is always constant. It is the analysis of micro economics equilibrium at a point of time.



Above figure assumes both demand and supply is constant. An economy is always equilibrium at price (P) and quantity Q with the interaction of demand (DD) and supply (SS). And hence it always gains the equilibrium at point E the given time.

2. Comparative Micro Static

This economics fall between simple statics and micro dynamics. It makes ta comparison between two equilibrium. It is like two steel pictures taken randomly. And the comparison made between those two pictures. Under this, all the factors in an economy may change. Equilibrium situation may change. One equilibrium breaks down and another form. And finally the comparison between those two equilibrium points is done. But it doesn't explain why the first equilibrium is broken and new is formed. It only compares.

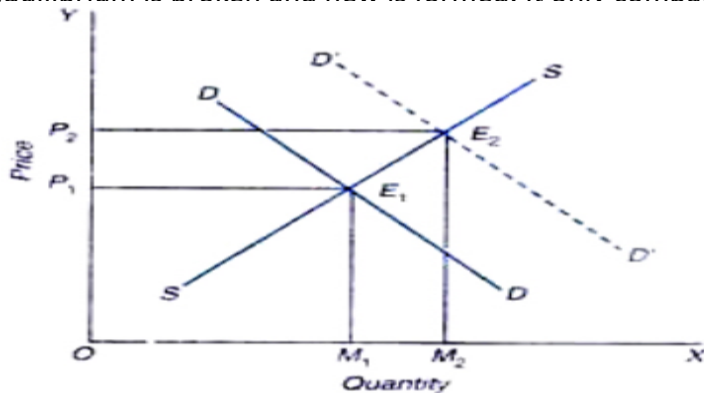


Fig. 4.3. Comparative Static Analysis

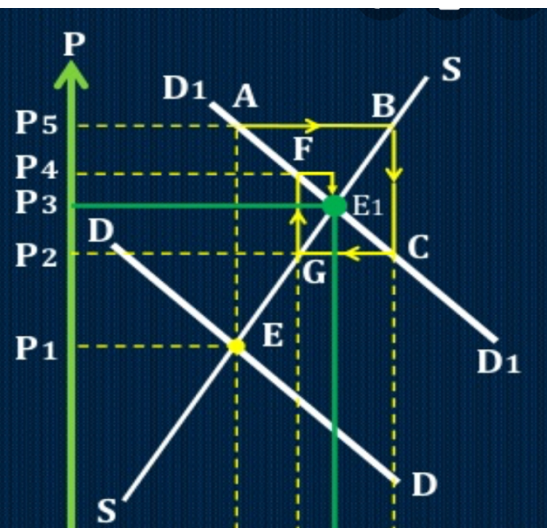
In an economy demand may increase from DD to D'D', which leads the change in equilibrium from E_1 to E_2 . Here the comparison between two equilibrium E_1 and E_2 is explained without making any process.

3. Micro Dynamics

As like the comparative micro static, it compares the two equilibrium points: old and new, but it also fully explains about the process of breaking of old equilibrium point and formation of new one. In another way, micro dynamics explains the lagged relationship among micro variables. Here the equilibrium of demand and supply is changed due to the bargaining and convincing relation of buyer and seller for quantity and price of the product

Such a process continues in the market until the new point of equilibrium establishes at point E_1 .

This is how micro dynamics is the study of the process of breaking of the equilibrium of a particular point of time and reestablishing the new point of equilibrium



Meaning of Macroeconomics

The word 'macro' is derived from the Greek word 'makro: which means large, as we take an economy-wide perspective. In macroeconomics we study the aggregate outcomes of economic behavior.

It is that part of economic theory which studies the economy in its totality or as a whole.

Macroeconomics is the study of aggregates and averages of the entire economy. Such aggregates are national income, total employment, aggregate savings and investment, aggregate demand, aggregate supply general price level, etc.

Prof. K.E. Boulding, “Macroeconomics deals not with individual quantities as such, but with aggregates of these quantities, not with individual income but with national income, not with individual price but with price level, not with individual output but with national output”.

According to Gardner Ackley, “Macroeconomics deals with economic affairs in the large.” It concerns the overall dimensions of economic life...to use a metaphor, “it studies the character of the forest independently of the trees which compose it”.

Here, we study how these aggregates and averages of the economy as a whole are determined and what causes fluctuations in them. Having understood the determinants, the aim is how to ensure the maximum level of income and employment in a country.

In short, macroeconomics is the study of national aggregates or economy-wide aggregates. In a way it is like study of economic forest as distinguished from trees that comprise the forest. Main tools of its analysis are aggregate demand and aggregate supply.

Since the subject matter of macroeconomics revolves around determination of the level of income and employment, therefore, it is also known as ‘Theory of Income and employment.

Features of Macroeconomics

1. Its new and modern science developed after the publication of J.M. Keynes book.
2. It studies the aggregative units of the economy
3. It is based on constant relative price and given resource
4. Major assumptions, full employment, perfect competition,
5. It focused optimum allocation of resources,
6. It follow the general equilibrium approach,
7. It is also called theory of income and employment.
8. Mostly applicable on socialist market economy.
9. It determines the magnitude and rate of the total output of a country during some given period of time,
10. It provides employment to nation’s work force,
11. It determines the levels of a country’s exports and imports.

We shall be considering the theory of employment, the theory of price level and the theory of economic growth. In other words, we shall be examining such aggregates as output, employment, consumption, investment, supply of money, general price level, exports and imports. Besides, our study will require an appreciation of the role of government in determining the levels of these aggregates and the manner in which it uses its policy instruments for these objectives.

The scope of macroeconomics

Macroeconomics is a vital field of study for the economists, government, financial bodies and researchers to analyze the general national issues and economic well-being of a country. Macroeconomics widely cover two major fundamentals which are further sub-parted into multiple topics, as explained below:

1. **Economic Growth and Development:** The status of a country's economy can be evaluated in terms of the per capita real income, as studied under macroeconomics. It study the growth and development of both developing and developed countries.
2. **Theory of National Income:** It covers the various topics related to the evaluation of national income, including the income, expenditure and budgeting. It focused on GDP, GNP, NNP, DI, PI...
3. **Theory of Money:** Macroeconomics analyzes the functions of the central bank in the economy, the inflow and outflow of money; it deals with demand and supply of money along with its impact on the employment level.
4. **Theory of International Trade:** It is a field of study that enlightens upon the export and import of goods or services. In brief, it determines the impact of cross-border trade and duty charged, on the economy.
5. **Theory of Employment:** This stream of macroeconomics helps to figures out the level of unemployment and prevailing employment conditions in the country. Also, to know how it affects the supply, demand, savings, consumption, expenditure behavior.
6. **Theory of General Price Level:** The most important of all is the analysis of product pricing and how these price levels fluctuate because of inflation or deflation. Types, Causes and impacts of both inflation and deflation are study under macroeconomics.
7. **Policy Fiscal Policy and Monetary Policy:** As we know, fiscal policy is a means of meeting the deficit of income over the expenditure; it is a form of budgetary decision under macroeconomics. **Monetary Policy:** Monetary policy is framed by the reserve bank in collaboration with the government. These policies are the measures taken to maintain economic stability and growth in the country by regulating the various interest rates.

Types of Macroeconomics

The variables in any economic model can be a stock and/or a flow. A relationship is postulated among these variables in the model. If all the variables in the model relate to the same time period, then it is a static relationship, while if the variables relate to different time periods it is a

dynamic relationship. A given set of relationships between the variables may lead to equilibrium or a disequilibrium solution. An equilibrium solution can be analyzed through a static methodology, whereas a disequilibrium solution can be analyzed through a dynamic methodology. If the model pertains to a situation where one equilibrium position is succeeded by another equilibrium position, then it can be analyzed through comparative statics.

1.Simple Macro-statics:-

Macro-statics deals with the final equilibrium of the economy at a particular point in time.

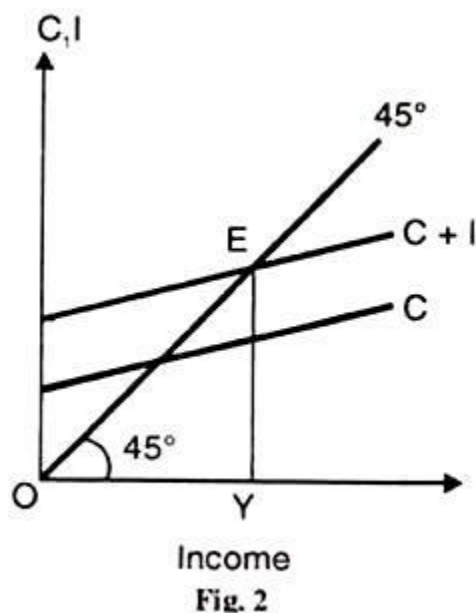
- Study of one static equilibrium point of the economy.
- Study of the relationship between aggregate economic variables from a still picture point of view.
- Don't deal with the process of attaining and breaking the equilibrium points.
- Related with a single point of time.

$$Y = C + I$$

Where Y= Total Income

C= Total Consumption,

I= Total Investment.



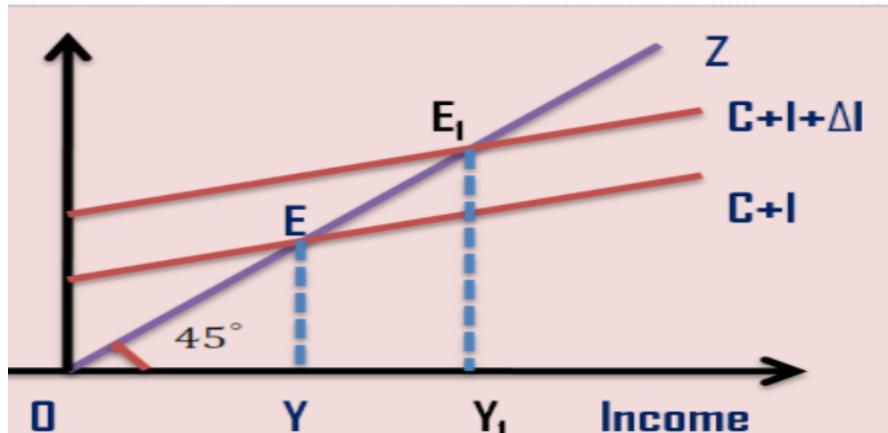
In the figure, the consumption schedule is shown by C and the combined consumption and investment are shown by C+I. The equilibrium point will be attained at E where the equilibrium national income is OY. This equilibrium position will be studied under simple macro-statics.

2. Comparative Macro-Statics

- Comparative macro-statics makes a comparative study between two equilibriums and draw the conclusions.
- Don't deal with the process of attaining and breaking equilibrium points.

Don't answer the following questions:

- What are the causes responsible for breaking the initial equilibrium point?
- What are the causes responsible for attaining the final equilibrium point?
- What is the actual process in between them?

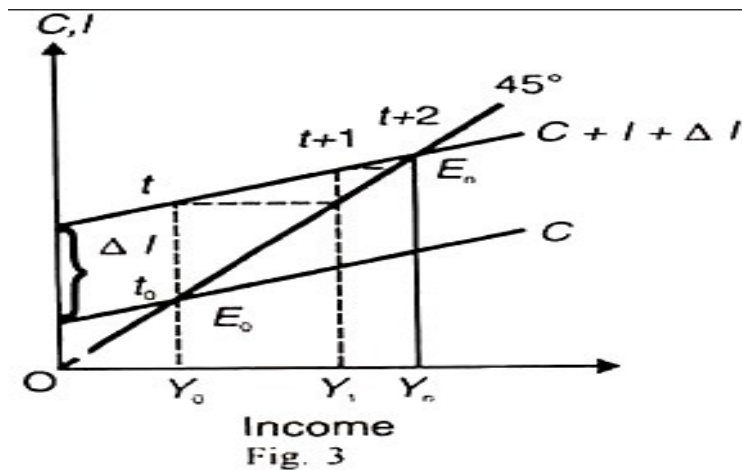


In the figure let, E is the initial equilibrium to the economy with equilibrium income (OY). But if there is an increase in investment, then the initial level of the equilibrium will be disturbed. The new equilibrium is attained at the point E_1 , where the new level of equilibrium income OY_1 . Comparative macro-statics studies these two equilibrium positions E and E_1 and does not talk about the process through which the equilibrium takes place. It states that when aggregate investment increase and increase aggregate in income will be Y. It also implies that OY is greater than OY_1 .

3. Macro Dynamic

Macro-dynamics studies the lagged relationship between macroeconomic variables. It studies the process of breaking old one and attaining new equilibrium points. Dynamic analyses the macroeconomic variables from the motion picture point of view. It involves the analysis of the period of time rather than a point of time. It answers all the following questions:

- What are the causes responsible for breaking the initial equilibrium point?
- What are the causes responsible for attaining the final equilibrium point?
- What is the actual process in between them?



In the figure, let E be the initial equilibrium and OY_0 be the initial equilibrium income. Now, there is an investment that leads to an increase in aggregate expenditure. The community would increase its expenditure from EY to YA at the OY level of national income. This increase in community expenditure increases the level of aggregate income in the next period at the level of OY_1 . At this increase new level of income people will spend more on consumption goods and the final (long-run) equilibrium point E_1 is attained where the new level of equilibrium income of OY_n . Hence the entire process is studied under macro-dynamics.

Goal/objectives of Macroeconomics

Following are the goals of macroeconomics;

(i) Full employment:

Performance of any government is judged in terms of goals of achieving full employment. Unemployment refers to involuntary idleness of mainly labour force and other productive resources. Unemployment (of labour) is closely related to the economy's aggregate output. Higher the unemployment rate, greater the divergence between actual aggregate output (or GNP/CDP) and potential output. So, one of the objectives of macroeconomic policy is to ensure full employment.

(ii) Price stability:

By price stability we must not mean an unchanging price level over time but within a reasonable limit. Sustained increase in price level as well as a falling price level produces destabilizing effects on the economy. Therefore, one of the objectives of macroeconomic policy is to ensure (relative) price level stability. This goal prevents not only economic fluctuations but also helps in the attainment of a steady growth of an economy.

(iii) Economic growth:

There is a conflict between the objective of economic growth and economic stability (in prices). Policy makers focused that macroeconomic policy should promote economic growth with reasonable price stability.

A country seeks to achieve higher economic growth over a long period so that the standards of living or the quality of life of people, on an average, improve. There are three major sources of economic growth, viz. (i) the growth of the labor force, (ii) capital formation, and (iii) technological progress.

(iv) Balance of payment equilibrium and exchange rate stability:

All countries aim at balanced flow of goods, services and assets into and out of the country. Whenever this happens, total international monetary reserves are viewed as stable. If a country's exports exceed imports, it then experiences a balance of payments surplus. When the country loses reserves, it experiences balance of payments deficit. However, depletion of reserves reflects the unhealthy performance of an economy and thus creates various problems. That is why every country aims at building substantial volume of foreign exchange reserves.

(v) Equal distribution of wealth:

Macroeconomic policy is also used to attain some social ends or social welfare. This means that income distribution needs to be more fair and equitable. In a capitalist market-based society some people get more than others. In order to ensure social justice, policymakers use macroeconomic policy instruments.

Macroeconomic Instruments

Macroeconomic policy instruments include monetary policy, fiscal policy, and income policy in a narrow sense. But, in a border sense, these instruments should include policies relating to labor, tariff, agriculture, anti-monopoly and other relevant ones that influence the macroeconomic goals of a country. Confining our attention in a restricted way we intend to consider two types of policy instruments the two monetary (credit) policy and fiscal (budgetary) policy. These two policies are employed toward altering aggregate demand so as to bring about a change in aggregate output (GNP/GDP) and prices, wages and interest rates, etc., throughout the economy.

Fiscal policy, on the other hand, aims at influencing aggregate demand by altering tax-expenditure-debt programs of the government. As fiscal policy has come into scrutiny in terms of its effectiveness in achieving the desired macroeconomic objectives, the same is true about the monetary policy. One can see several rounds of ups and downs in the effectiveness of both these policy instruments consequent upon criticisms and counter- criticisms in their theoretical foundations.

The two main instruments of fiscal policy are government taxation and expenditure. Changes in the level and composition of taxation and government spending can impact the following variables in the economy: (1) aggregate demand and the level of economic activity; (2) the pattern of resource allocation; and (3) the distribution of income.

The three main stances of fiscal policy are:

- Neutral fiscal policy, usually undertaken when an economy is in equilibrium. Government spending is fully funded by tax revenue and overall the budget outcome has a neutral effect on the level of economic activity.
- Expansionary fiscal policy, which involves government spending exceeding tax revenue, and is usually undertaken during recessions.

- Contractionary fiscal policy, which occurs when government spending is lower than tax revenue, and is usually undertaken to pay down government debt.

Following are major fiscal instruments:

A. Budget:

The budget of a nation is a useful instrument to assess the fluctuations in an economy. During inflation and prosperity, excessive spending activities are curbed with budgetary surpluses while budgetary deficits during recession with rising extra purchasing power. The government can easily adjust its finances according to the needs. It works smoothly in all times like depression, inflation, boom and recession; budget simply ensures stability but gives no guarantee that the system will get stabilized at the level of full employment.

B. Taxation:

Taxation is a powerful instrument of fiscal policy in the hands of public authorities which greatly effect the changes in disposable income, consumption and investment. An anti- depression tax policy increases disposable income of the individual, promotes consumption and investment. Obviously, there will be more funds with the people for consumption and investment purposes at the time of tax reduction.

C. Public Expenditure:

The active participation of the government in economic activity has brought public spending to the front line among the fiscal tools. The appropriate variation in public expenditure can have more direct effect upon the level of economic activity than even taxes. The increased public spending will have a multiple effect upon income, output and employment exactly in the same way as increased investment has its effect on them. Similarly, a reduction in public spending, can reduce the level of economic activity through the reverse operation of the government expenditure multiplier.

D. Public Works:

Keynes General Theory highlighted public works program as the most significant anti-depression device. There are two forms of expenditure i.e., Public Works and 'Transfer Payments. They include expenditures on public works as roads, rail tracks, schools, parks, buildings, airports, post offices, hospitals, irrigation canals etc. Transfer payments are the payments such like interest on public debt, subsidy, pension, relief payment, unemployment, insurance and social security benefits etc.

E. Public Debt:

Public debt is a sound fiscal weapon to fight against inflation and deflation. It brings about economic stability and full employment in an economy. Government collects and expenses the money from public and private by selling security to curb the inflation. Government injects money on the economy to increase aggregate demand, investment, and employment at the time of crisis.

Instruments of Monetary Policy

Monetary policy may be defined as a policy employing the central bank's control of the supply of money as an instrument for achieving the macroeconomic goals.

Monetary policy attempts to stabilize aggregate demand in the economy by influencing the availability and supply of money or price of money, i.e., the rate of interest, and credits in an economy.

The instruments or methods of credit control

1. Quantitative Control

It seeks to control the total quantity of money and bank credit or to make the bank lend more or less. These are four ways of quantitative control.

- **Bank Rate policy**

The bank rate is the rate at which the central bank is willing to discount the first-class bill of exchange. Bank rate is different from "Market Rate". The market rate is that rate of which the money market is willing to discount bill of exchange. The market rate is influenced by the bank's rate. A rise in bank rate is generally followed by a rise in market rate and similarly, a fall or rise in the bank rate is followed by increase and decrease in the borrowing, and the volume of credit will be adjusted accordingly to the requirements of the market.

- **Open Market Operation**

Open market operation is the most important instrument of monetary policy. It refers to purchase or sale of government securities, short term as well as long term, at the initiative of the central bank, as deliberate credit policy. These bonds and securities are purchased or sold from or to the commercial banks and the general public in the country.

- **Change in Reserve Ratio**

The commercial banks are required to keep a limited percentage of their deposits by law with the central bank. The central bank charges the ratio according to the need of controlling the credit. If the ratio is raised, the cash available with the bank will be reduced, which will compel them to contract the volume of credit. Similarly, when the ratio will be lowered, the credit power will expand.

- **Credit Rationing**

This instrument of monetary policy is applied only in time of financial crises. The bank can collect by re-discounting bill of exchange when credit is rationed by fixing the amount. This method of controlling credit can be justified only as a measure to meet exceptional emergencies because it is open to serious abuses. There can be a danger, the rationing may not be

satisfactory and the central bank may abuse the power by giving preferential treatment to favorite customers.

0. **Qualitative Control**

It aims to influence the special type of credit, or to divert bank advances into certain channels, or to discourage from lending for a certain purpose. These methods managing monetary policy are as below.

- **Consumer Credit Rationing**

The consumer credit method of money management can be applied only when there is a rise of the scarcity of certain listed articles in the country. The central bank will impose specific restraints on consumer credit by raising the required down payments and shorting the maximum period of payment.

- **Moral Persuasion**

The central bank of the country also implies a minor instrument of moral persuasion to influence the total borrowing at the central bank. Moral Persuasion, refer to the appeal to the commercial bank to act according to the directive of the central bank. The central bank may issue directives to commercial banks to follow the policies of the central bank.

- **Direct Action**

The central bank may take direct action if his policies are not followed by commercial banks. Direct action involves direct dealings of a central bank with the commercial banks. Direct action may be a refusal on the part of the central bank to re-discount the bill of exchange or it may be in the shape of penalty rate of discounting for the banks not following the required policies.

Distinction between 'Micro' and 'Macro' Economics:

The distinction between micro and macroeconomics is not very clear cut, because what is macroeconomics in one situation or from one view point may become microeconomics in another situation or from another viewpoint. For example, in the case of a closed economy a study of income, saving, consumption, employment etc. for the whole economy is macroeconomics—as it is the study of aggregates.

If, however, the country has trade relations with other nations, then a single country becomes just one unit in the international set-up and the study of its economic entries becomes microeconomics. In this sense, it seems that a micro-economy is an open economy while a macro-economy is a closed one.

Microeconomic theories are concerned with the analysis of price-output determination under different market conditions and the allocation of economic resources to particular uses;

whereas macroeconomic theories are concerned with the analysis of the levels of national product and employment.

Microeconomic theory depends upon the technique of partial equilibrium analysis on the assumption of *ceteris paribus*. It examines the problem of relative prices and changes in these prices. Macroeconomic theory, on the other hand, depends on the technique of general equilibrium analysis and studies the interdependence between different market prices and outputs of goods and services produced in the economy.

What microeconomics takes essentially as given—namely, the total output for the economy as a whole—is what microeconomics takes— as the main variable whose size or value is to be determined. Similarly, what macroeconomics takes as given—namely, the distribution of output, employment, expenditure amongst particular goods and services of individual industries and firms—are all variables in microeconomics. Again, microeconomics takes the general price level as given and relative prices as variables; whereas macroeconomics treats general price level as variable and relative prices as given

Table.

Macroeconomics VS Microeconomics

Table: Difference between Microeconomics and Macroeconomics

Microeconomics	Macroeconomics
It studies individual economic units	It studies aggregate economic units.
It deals with determination of price and output in individual markets	It deals with determination of general price level and national output in the country.
The basic parameter of microeconomics is price, that is, consumers and producers take economic decision on the basis of price.	The basic parameter of macroeconomics is income, that is, economic decision relating to consumption, saving, investment etc are on the basis of national income.
It uses the partial equilibrium method.	It uses the general equilibrium method.
It aims at optimal allocation of resources.	It aims at determination of aggregate output, national income, price level and employment level in an economy.
Examples: Individual demand, supply, individual, wage, income, expenditure etc	Examples: Aggregate demand, national income, output etc.

MCQ

1. The terms 'micro' and 'macro' are derived from.... A. Greek Language B. Latin Language C. French Language D. Russian Language.
2. ...is named as the father of modern macroeconomics. A. Alfred Marshall B. J.M. Keynes C. Gregory Mankiw D. J. R. Hicks
3. "(Microeconomics looks at what happens at particular parts of the economy and macroeconomics looks at the economy as a whole. Who said this? A. Marshall B. Macconnel C. Stoneir and Hague D K.E. Boulding

4. Which of the following has relation with microeconomics?
 A Comparative statics, general equilibrium and positive economics
 B Comparative statics, partial equilibrium and positive economics
 C. Comparative statics, general equilibrium and normative economics
 D Comparative statics, partial equilibrium and normative economics.
5. Which of the following is a tool of macroeconomics? (a) Monetary Policy (b) Fiscal Policy (c) Income Policy (d) All of the above.
6. Microeconomics splits up the entire economy into smaller parts for the purpose of intensive study, it is also known as (a) Slicing Method (b) General equilibrium Method (c) deductive method (d) inductive method.
7. The study of groups and broad aggregates of the economy is known as... (a) Microeconomics (b) Macroeconomics (c) International Economics (d) None of the above.
8. In which concept the macroeconomics is based? (a) Measurement of the economic sector (b) Concept of full employment (c) Trade promotion (d) To solve all the economic problems
9. Which of the following is a central issue in macroeconomics? (a) The deregulation of the bank (b) The effect of excise taxes on consumer's buying patterns (c) General price level (d) Inflation of drug prices
10. Macroeconomics is the study of the forces or factors that determine the level of aggregate production, employment and prices in an economy and their rates of change over time', who said this? (a) K.E. Boulding (b) Gardner Ackley (c) J.M. Keynes (d) Sapprio
11. . (The instruments of macroeconomic policy are.... A. Fiscal Policy, B. Monetary Policy, C. Income policy, D. All of the above
12. What is the goal of fiscal policy
 A. Full employment, B. High economic growth, C. Balance development, D. Above all

Theoretical Questions and Answer

1. What is microeconomics? Is microeconomics a positive or a normative science? Give arguments for your answer.
2. What is Macroeconomics? What are its types?
3. Differentiate between microeconomics and macroeconomics.
4. Discuss the need for macroeconomics from the viewpoint of the consumers, firms, and governments.
5. Distinguish between static and dynamic models in Micro and Macroeconomics.
6. What is macro comparative statics? How is it different from statics?

7. What are the various goal and instrument of Macroeconomics?

Unit 2

Elasticity of Demand and Supply

Concept of Elasticity of Demand

The elasticity of demand is a measure of a degree of responsiveness of quantity of a product to the change in its determinants. If the demand is more elastic, then a small change in price will cause a large change in quantity consumed. If the demand is less elastic, then it will take large changes in price to make a change in quantity consumed. The concept of elasticity of demand shows how much or to what rate the quantity demanded of a commodity will change as a result of a change in the price.

According to K.E. Boulding, "The elasticity of demand may be defined as the percentage change in the quantity demanded which would result from one percent change in its price".

According to Prof. Meyers, "Elasticity of demand is a measure of the relative change in the amount purchased in response to any change in price or a given demand curve".

According to Lipsey, "Elasticity of demand may be defined as the ratio of the percentage change in demand to the percentage change in price".

According to Mrs. John Robbins, "The elasticity of demand at any price or at any output is the proportional change to the amount purchased response to a small change in price, divided by the proportional changes of price".

In brief, the elasticity of demand is defined as the proportionate change in quantity demanded divided by the proportionate change in its determinants like price, income, etc.

Symbolically,

$$\text{Elasticity of demand (Ed)} = \frac{\text{Percentage change in quantity demand}}{\text{Percentage Change in determinants of demand}}$$

Degree/Types of Elasticity of Demand

Elasticity of demand has been divided into three parts:

1. Price Elasticity of Demand (E_p)

When the price of goods changed, its demand also changed. Price elasticity of demand measures by how much quantity demand of goods changes with a given change in the price of it. So, the price elasticity of demand is the measure of the responsiveness of quantity demanded of a product to the change in its price, being other things constant. The term other things refers to the income of the consumer, price of related goods, etc. The price of elasticity of demand is symbolized by the letter 'E_p' and it is written as:

$$E_p = \frac{\text{Percentage change in quantity demand}}{\text{percentage Change in Price}} = \frac{\frac{\Delta Q_d}{Q_d}}{\frac{\Delta P}{P}}$$

$$= \frac{\Delta Q_d / \Delta P}{P / Q_d}$$

Where,

E_p = Price elasticity of demand

ΔQ = Change in quantity demand, its different between original and new demand ($Q_{d_2} - Q_{d_1}$)

ΔP = Change in price, its different between original and new price ($P_2 - P_1$)

$Q(Q_{d_1})$ = Initial quantity demand

$P(P_1)$ = Initial price

Q. Suppose, initial price per packet of a noodle is Rs.10 and quantity demanded is 100 units. If price falls to Rs.8 and quantity demanded increases to 150 units, find the price elasticity of demand.

Ans 2.5

Example - 3. Calculate the price elasticity of demand at price Rs. 5 with given demand function, $Q = 20 - 2P$.

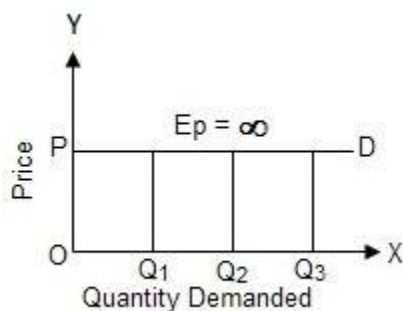
Ans 1

DEGREE / TYPES OF PRICE ELASTICITY OF DEMAND

Price elasticity of demand can be discussed under the following five types:

i) Perfectly Elastic Demand ($E_p = \infty$)

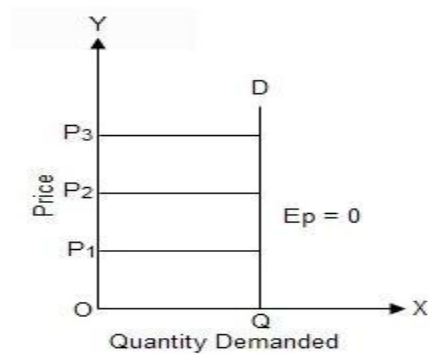
If very small changes or negligible change in the price of a good lead to an infinite change in quantity demanded that good, then the demand is known as perfectly elastic demand. In this type of demand, the value of price elasticity of demand reaches infinite. The demand curve indicates the change in price is insignificant; however the change in quantity demanded is infinite.



In the given figure, the price is measured in Y-axis and quantity demanded is measured along the X-axis. The point 'P' is the price where the consumer can buy any quantity of demand like Q_1 , Q_2 , Q_3 and so on. Hence, DD is the perfectly elastic demand curve sloping upward.

ii) Perfectly Inelastic Demand ($E_p=0$)

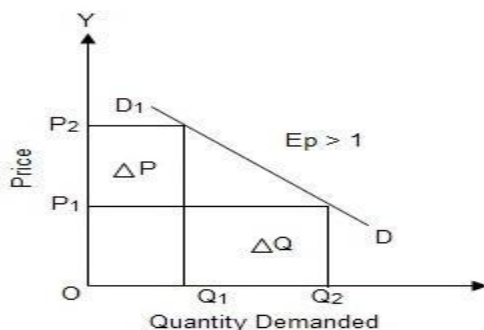
If the quantity demanded is totally irresponsive to the change in the price of a good, then the demand is known as perfectly inelastic demand. In such type of demand, whatever be the change in price, the quantity demanded remains same or unchanged. This type of elasticity is found in the case of basic necessary goods such as salt, medicine, etc. Therefore, the numerical value of elasticity becomes 0.



In the given figure, the price is measured in Y-axis and quantity demanded is measured along the X-axis. QD is the perfectly inelastic demand curve which remains constant even the price of a commodity increase from P_1 to P_2 to P_3 .

iii) Relatively Elastic Demand ($E_p > 1$)

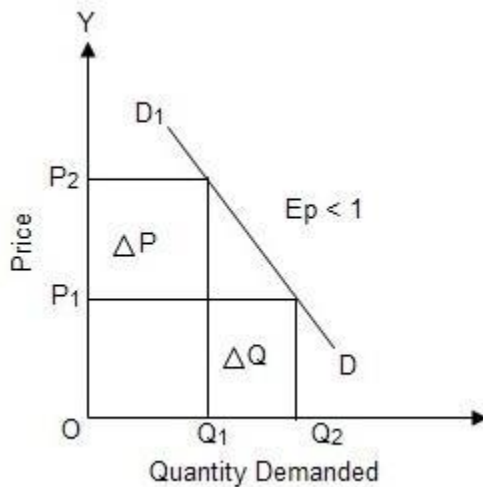
If the change in demand is greater than the change in the price of good, then the demand is known as relatively elastic demand. At that time percentage change in price leads to more than percentage change in quantity demanded. In this type of demand, the absolute value of price elasticity of demand remains greater than unity.



In the given figure, the price is measured in Y-axis and quantity demanded is measured along the X-axis. The curve is more flat which shows that demand is more elastic. The small fall in price from P_2 to P_1 effects majorly on quantity demand from Q_1 to Q_2 i.e. percentage change in demand is more than the percentage change in price.

iv) Relatively Inelastic Demand ($E_p < 1$)

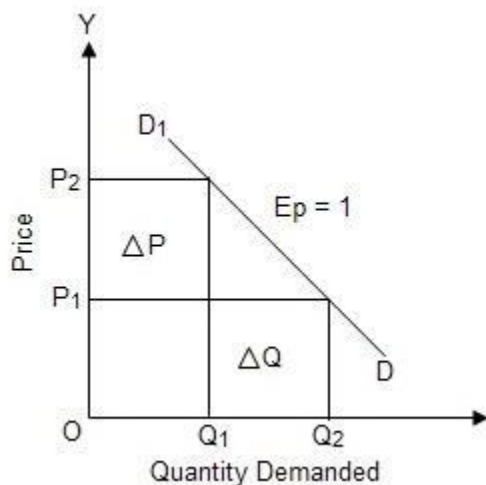
If the percentage change in demand is less than the percentage change in the price of a good, then the demand is known as relatively inelastic demand. At that time, one percentage change in price leads to less than one percentage change in quantity demanded. In this type of demand, the absolute value of price elasticity of demand remains less than unity.



In the given figure, the price is measured in Y-axis and quantity demanded is measured along the X-axis. There is a huge difference in price from P_1 to P_2 but the quantity demand has no vast difference from Q_1 to Q_2 . It means there is a small change in quantity demand even the price change with a huge amount. The demand curve DD_1 in the figure seems steeper.

v) Unitary Elastic Demand ($E_p = 1$)

If the percentage change in demand is equal to the percentage change in the price of a good, then the demand is known as unitary elastic demand. In such case percentage change in price equals to the percentage change in quantity demanded. At that time, the absolute value of elasticity of demand remains just equal to 1.



In the given figure, the price is measured in Y-axis and quantity demanded is measured along the X-axis. An initial point of price (P_1) and quantity demanded (Q_1) is shown as related and when there is a change in price from P_1 to P_2 then it results in an equal change in quantity demand from Q_1 to Q_2 . The percentage change in price and the percentage change in quantity demand is equal. DD_1 is the unitary elastic demand curve smoothly sloping downwards to the right.

2. Income Elasticity of Demand (E_y)

Income of the consumer is the most influencing factor of demand for a good. Demand for goods responds to the change in income of the buyer. The measure of the responsiveness of quantity demands a product to change in income of the buyer, being other things constant is known as income elasticity of demand. It is always expressed in term of ratio or percentage. The value of it may be positive, negative or zero depending on the nature of goods. Income elasticity is usually symbolized by 'E_y' and written as:

$$E_y = \frac{\text{Percentage change in quantity demand}}{\text{percentage Change in income}} = \frac{\frac{\Delta Q_d}{Q_d}}{\frac{\Delta Y}{Y}}$$

$$= \frac{\Delta Q_d / \Delta Y}{Y / Q_d}$$

Where,

E_y = Income elasticity demand

ΔY = Change in consumer income, its different between original and new income

ΔQ = Change in quantity demand, its different between original and new demand

Q = Initial Quantity

Y = Initial Income

Q. Suppose, a consumer's income rises from Rs. 100 to Rs. 150 and his demand for a commodity increases from 20 units to 40 units per day. Find income elasticity of demand for the commodity. Ans 2

DEGREE / TYPES OF INCOME ELASTICITY OF DEMAND

There are three types of income elasticity of demand. They are as follow:

i) Zero Income Elasticity of Demand ($E_y=0$)

If the quantity demand for a good is totally irresponsive to the change in income of a consumer, then the demand is known as zero income elasticity of demand. There is no relationship between change in income and demand. In that case, quantity demanded remains constant for all level of income and the value of elasticity remain zero.

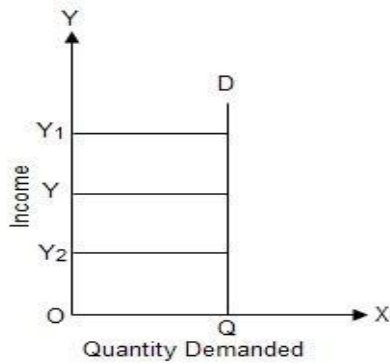


Fig: Zero income elasticity demand

In the given figure, Quantity demanded and income of the consumer is measured along X-axis and Y-axis respectively. The demand curve QD remains same for all level of income even the income decreases from OY to OY₂ or increases from OY to OY₁.

ii) Positive Income Elasticity ($E_y > 0$)

If the quantity demand for a commodity increases with the increase in consumer's income and decreases with the income of the consumer is known as positive income elasticity. Hence, there is a positive relation between income and demand. In that case, the value of elasticity remains greater than zero.

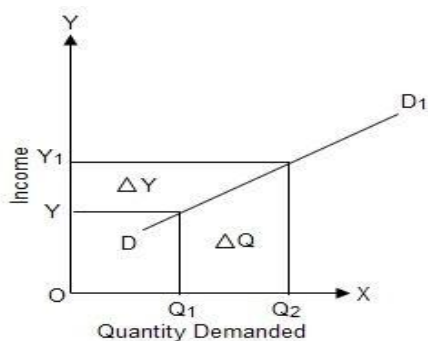


Fig: Positive income elasticity demand

In the given figure, quantity and income demanded of a commodity is measured along X-axis and Y-axis respectively. Q₁ and Y₁ are the initial quantity demand and income of the consumer respectively. As the income of the consumer increases from Y₁ to Y₂, the quantity demanded also increases Q₁ to Q₂. DD₁ is the positive income elastic demand curve sloping upward.

iii) Negative Income Elasticity ($E_y < 0$)

If the quantity demand of a commodity decreases with the increase in income of the consumer and increases with the decrease in income of the consumer is known as the negative elasticity of demand. Hence, there is a negative relation between quantity demand and income of the consumer. In that case, the value of elasticity remains less than zero.

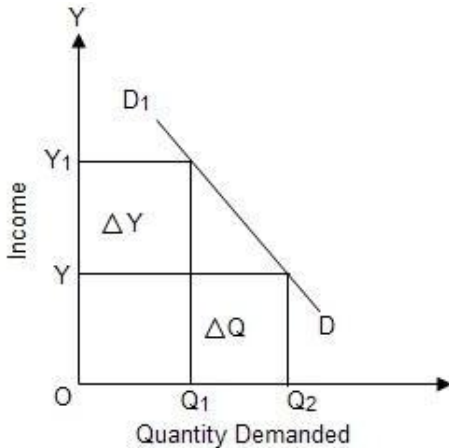


Fig: Negative income elasticity demand

In the given figure, quantity and income demanded of a commodity is measured along X-axis and Y-axis respectively. Q_1 and Y_1 are the initial quantity demand and income of the consumer. When the income of the consumer increases from Y_1 to Y_2 , the quantity demanded of a commodity decreases from Q_2 to Q_1 . DD_1 is the negative income elastic demand curve sloping downward.

Cross-Elasticity of Demand (E_{xy})

Cross elasticity of demand is a measure of responsiveness of demand for a product to the change in the price of related goods. In other words, the percentage change in quantity demanded of goods due to the change in the price of a related good that may be substitute goods or complementary goods, is called cross elasticity of demand. Cross elasticity of demand is symbolized by ' E_{xy} ' and written as:

$$E_{xy} = \frac{\text{Percentage change in quantity demand of X good}}{\text{percentage Change in price of Y good}}$$

$$= \frac{\frac{\Delta Q_{dx}}{Q_{dx}}}{\frac{\Delta P_y}{P_y}} = \frac{\Delta Q_{dx} / \Delta P_y}{P_y / Q_{dx}}$$

Where,

E_{xy} = Cross elasticity demand between x and y

ΔQ_{dx} = Change in quantity demand for x goods, its different between original and new demand.

ΔP_y = Change in price of y goods, its different between original and new price of related goods.

Q_{dx} = Quantity demand of x goods

P_y = Price of y goods

Q. With the help of the information given below, find out the cross elasticity of demand. Ans 0.44

Price of Tea (Rs.)	Demand for Coffee
20	1800
25	2000

DEGREE / TYPES OF CROSS ELASTICITY OF DEMAND

There are two types of cross elasticity of demand described below:

i) Positive cross elasticity ($E_{xy} > 0$)

If the two goods are close substitutes to each other, then the cross elasticity of demand are said to be positive. For example, tea and coffee, when the price of a tea increases, the demand for a coffee also increases and vice versa. Hence, the increases in the price of a commodity result to the rise in a quantity demand of a substitute good.

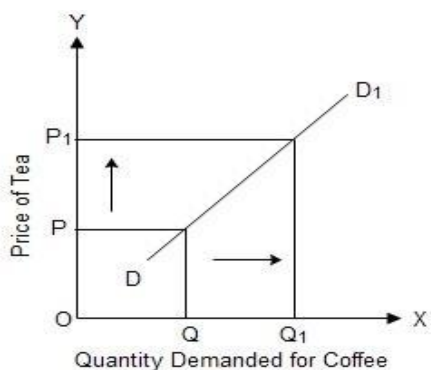


Fig: Positive cross elasticity demand

In the given figure, quantity demand of coffee is measured along X-axis and price of tea is measured along Y-axis. When the price of tea is OP , the quantity demand of coffee is OQ . When the price of tea increases from OP_1 to OP_2 , the quantity demand of coffee also increases from OQ_1 to OQ_2 . Hence, the DD_1 is the positive cross demand curve sloping upward to the right.

ii) Negative cross elasticity ($E_{xy} < 0$)

When two goods are complementary to one another, then the cross elasticity of demand is supposed to be negative. For example, pen and ink, when the price of the ink increases, the demand for pen decreases. Hence, rise in the price of commodity results to decreases in quantity demand of complementary goods.

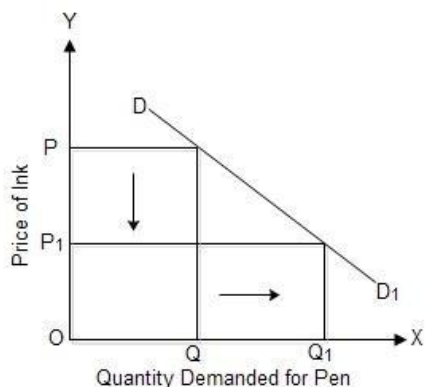


Fig: Negative cross elasticity demand

In the given figure, quantity demand of pen is measured along X-axis and price of ink is measured along Y-axis. When the price of ink is OP_1 , the quantity demand of pen is OQ_1 . When the price of the ink increased from OP_1 to OP_2 , the quantity demand of pen decreased from OQ_1 to OQ_2 . Hence, DD_1 is the negative cross elasticity demand curve sloping downward to the right.

Measurement of Price Elasticity of Demand

There are three methods of measuring price elasticity of demand. They are:

- Total Outlay Method
- Point Method
- Arc Method

Total Outlay Method

Total outlay method is the major methods of measuring price elasticity of demand. In this method, price elasticity of demand is measured by comparing the total expenditure of the consumers during the changes in the price of goods.

According to Alfred Marshall, "Elasticity of demand can be measured by considering the change in price and the subsequent change in the total quantity of goods purchased and the total amount of money spent on it".

Price elasticity of demand can be measured on the following three bases:-

1. Elasticity of Demand Greater than Unitary ($E_p > 1$)

If the total outlay of a commodity increases due to a small rise in price, then the price elasticity of demand is said to be greater than one, in this condition. Hence, the total expenditure and price of a commodity are inversely related to each other.

0. Elasticity of Demand Equal to Unitary ($E_p = 1$)

If the total expenditure of a commodity is totally irresponsive to the change in the price of a commodity, then the price elasticity of demand is said to be equal to the unitary. In this state, whatever the price of a commodity is, total expenditure of commodity remains constant.

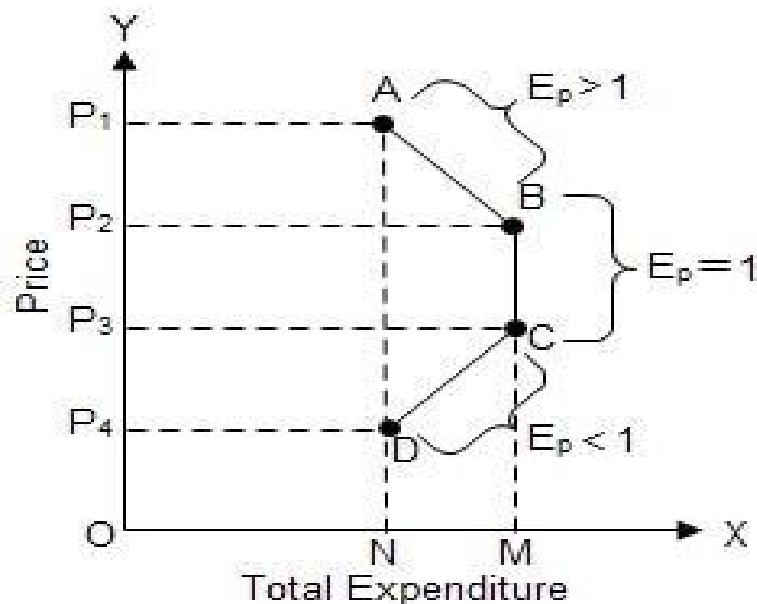
0. Elasticity of Demand Less than Unitary ($E_p < 1$)

If the total expenditure of a commodity falls due to the fall in price, then the price elasticity of demand is said to be less than one in this state. Hence, both total expenditure and price move in the same direction.

The above cases are prescribed with the table below:

Price (in Rs.)	Quantity demanded (in kg.)	Total Expenditure (in Rs.)	Elasticity
6	1	6	$E_p > 1$
5	2	10	
4	3	12	$E_p = 1$
3	4	12	
2	5	10	$E_p < 1$
1	6	6	

In the given table, quantity demanded of a commodity is increasing serially 1, 2, 3, 4, 5 and 6 as the price of a commodity is decreasing 6, 5, 4, 3, 2 and 1 respectively. In the column of total expenditure, it is rising at first and remains constant at certain then later it is decreasing. It shows all three cases based on the price elasticity of demand. These conditions are also mentioned with the help of a diagram.



In the above graph, total expenditure is measured along X-axis and price is measured along Y-axis respectively. The points A and B show the inverse relation between price and total expenditure, where the price increases and total expenditure falls and vice versa. Next point B and C seems to be parallel to price, where there is no change in total expenditure even there is a change in price. Point C and D shows the positive relation between price and total expenditure. When the price increases the total expenditure also increases and when the price decreases the total expenditure also decreases.

Measurement of Price elasticity of Demand by Percentage method

Percentage method is also called proportionate method. According to this method, E_d is calculated by the following formula:

The absolute value of the coefficient of elasticity of demand ranges from zero to infinity ($0 < E_p < \infty$). The five different magnitudes of elasticity of demand are,

Measuring Point Elasticity

Point Elasticity is the measure of price elasticity at a finite point on a demand curve. However, as 'point' is defined in geometry, it occupies no space and has no dimensions. It implies that there is no change in the price and hence no change in the quantity demanded. Therefore, the concept of 'point elasticity' may not appear to be reasonable. However, from practical point of view, point elasticity concept is applied to an insignificant change in the price and the consequent change in the quantity demanded. Point elasticity is, in fact, the measure of the proportionate change in the quantity demanded in response to a very small proportionate change in the price. The concept of point elasticity is useful where change in the price and the consequent change in the quantity demanded are infinitesimally small. Besides, it offers an alternative to the arc elasticity. Point elasticity may be symbolically expressed as

$$E_p = \frac{\text{Percentage change in quantity demand}}{\text{percentage change in price}} = \frac{\frac{\Delta Q_d}{Q_d}}{\frac{\Delta P}{P}} = \frac{\Delta Q_d / \Delta P}{P / Q_d}$$

Where,

E_p = price elasticity,

ΔQ_d = Percentage change in the quantity demanded,

ΔP = Percentage change in the price,

Here, E_d denotes the price elasticity of demand. The numerical value of E_p is called the coefficient of price demand elasticity.

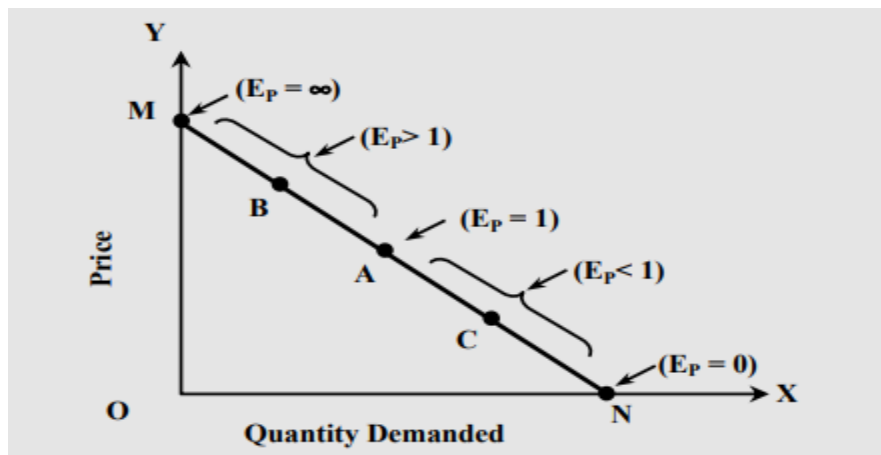
It may thus be said that price elasticity at any point on a straight line demand curve is given by

$$E_p = \frac{\text{Lower Segment of demand curve}}{\text{Upper Segment of demand curve}}$$

Given this formula, if the selected point falls at the midpoint of the demand curve, elasticity equals 1. If the point falls below the midpoint, elasticity is less than 1 and if it falls above the midpoint, elasticity is greater than 1.

A general formula for measuring the price elasticity of demand is derived as follows:

$$\begin{aligned} E_p &= \frac{\text{Percentage change in quantity demand}}{\text{percentage change in price}} = \frac{\frac{\Delta Q_d}{Q_d}}{\frac{\Delta P}{P}} \\ &= \frac{\Delta Q_d / \Delta P}{P / Q_d} \end{aligned}$$



In the figure price and quantity demanded are measured along the Y and x-axes respectively. At the midpoint A lower segment is equal to upper segment so there is unitary elasticity....

1. At mid-point of the demand curve (say A), the lower segment (AN) is equal to the upper segment (AM). Hence, elasticity of demand is equal to unity. Thus, at point A, $E_p = \text{Lower segment} / \text{Upper segment} = AN / AM = 1$ [$\because AN = AM$]
2. At any point between A and M, say B, the lower segment (BN) is greater than the upper segment (BM). Hence, elasticity of demand is greater than unity. Thus, at point B, $E_p = BN / BM > 1$ [$\because BN > BM$]
3. At any point between A and N, say C, the lower segment (CN) is less than the upper segment (CM). Hence, elasticity of demand is less than unity. Thus, at point C, $E_p = CN / CM < 1$ [$\because CN < CM$]
4. At the point where the demand curve touches the vertical axis (i.e. point M), the entire length of the demand curve is the lower segment and upper segment is zero. Hence, price elasticity of demand is infinity since any number divided by zero is infinity. Thus, at point M, $E_p = MN / 0 = \infty$
5. At the point where the demand curve touches the horizontal axis (i.e. point N), the entire length of the demand curve is the upper segment and the lower segment is zero. Hence, price elasticity of demand is zero since zero divided by any number is zero. Thus, at point N, $E_p = 0 / MN = 0$ Thus, elasticity of demand is different at different points on the same demand curve.

Q. Calculate the point elasticity of linear demand curve of different points

Points	A	B	C	D	E
Price	0	5	10	15	20
Quantity demand	40	30	20	10	0

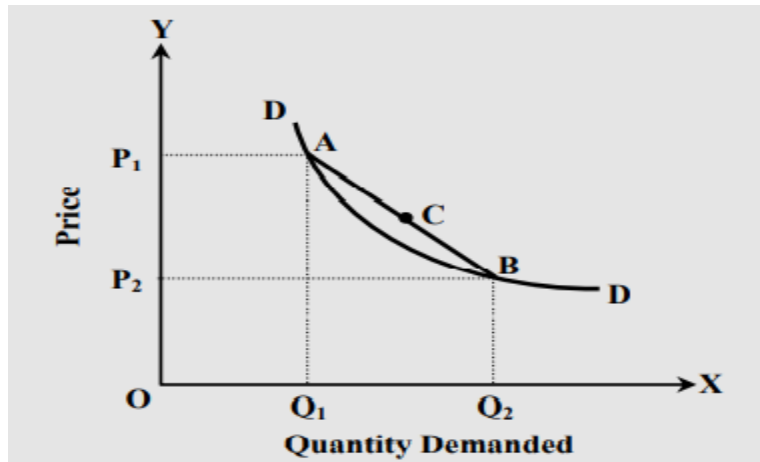
Q. From the following demand and supply function $D=60-6p$, $S=40+2p$, find

a) Equilibrium price and quantity.

b) Show the effect on demand and supply if price increased by Rs. 10.

Arc method

Arc method of measuring price elasticity of demand is relevant where there is substantial change in price and quantity demanded. This method measures the elasticity of demand between two points on the same demand curve. The area or stretch between two points of a demand curve is called an arc.



As shown in FIGURE... the area or stretch AB is an arc on the demand curve DD. Price elasticity of demand on this arc is measured between these points A and B. The point method of measuring elasticity at two points on a demand curve gives different values of price elasticity of demand. To avoid this discrepancy, elasticity for the arc is calculated by taking the average price and quantity demanded. That is, elasticity of demand is measured at mid-point C of the arc AB.

The formula for measuring price elasticity of demand at the middle point C of the arc on the demand curve is:

$$\begin{aligned}
 E_p &= - \frac{\text{Percentage change in quantity demand}}{\text{percentage change in price}} \\
 &= - \frac{\frac{\text{Change in quantity demanded}}{\text{Average quantity demanded}}}{\frac{\text{Change in Price}}{\text{Average Price}}} \\
 &= - \frac{\frac{\Delta Q_d}{Q_1 + Q_2 / 2}}{\frac{\Delta P}{P_1 + P_2 / 2}} \\
 &= - \frac{\Delta Q_d / Q_1 + Q_2}{\Delta P / P_1 + P_2} \\
 &= - \frac{Q_2 - Q_1}{P_2 - P_1} \times \frac{P_1 + P_2}{Q_1 + Q_2}
 \end{aligned}$$

Where,

Q1 = Initial quantity demanded

Q2 = New quantity demanded

P1 = Initial Price

P2 = New Price

ΔQ = Change in quantity demanded

ΔP = Change in Price Example

Q. Calculate price elasticity of demand from A to B and B to A by using Arc Method

Points	A	B
Price	20	30
Demand	100	50

Determinants of Price Elasticity of Demand

1. Availability of Close Substitution Goods

Substitution goods like Pepsi and coke, tea and coffee, etc. have more elastic demand than the other goods like sugar and salt. For example, if the price of the coke rises, people will switch over Pepsi, which is a close substitute. So the demand for coke is elastic. On the other hand, sugar and salt do not have their close substitute. So, their price elasticity is less.

0. Luxuries Goods

The elasticity of demand depends on nature of a commodity. Demand for luxuries goods is more elastic than other goods. Luxuries goods like a sofa, car, television, etc. can be postponed when their price rises. So, their price elasticity is more elastic.

0. Necessities Goods

The consumption of necessities goods cannot be postponed like a luxuries goods. Necessities goods include clothes, foods, vegetable, medicine, etc. Such goods are less elastic as they cannot be substitute with other goods.

0. Consumers Habit

The habit of the consumer varies according to the consumer. Some of the consumers have the habit of smoking. But the rise in the price of the cigarette does not affect much the demand. The demand for habituating goods is less elastic.

0. Range of alternative uses of commodity

When the price of multi-use goods decreases, the consumer increases its uses. For example, the consumption of electricity can be used for several uses like cooking, heating, lighting, etc. Therefore, the price elasticity demand for elasticity is more elastic at low cost.

Uses/Importance of Price Elasticity of Demand

Price elasticity of demand plays an important role in the formulation of economic policies. It is regarded as a tool to analyse various economic problems. The importance or uses of price elasticity of demand are as follows:

1..Product pricing:

Price elasticity of demand helps a producer to fix the price of his product. If demand for the product is inelastic, higher price can be fixed. On the other hand, if the demand is elastic, lower price is charged to maximize revenue. Thus, price increase policy is to be followed if the demand is inelastic in the market and price-decrease policy is to be followed if the demand is elastic.

2..Price discrimination:

Price discrimination means charging different prices to the different customers in different markets for the same product. It is a special feature of the monopoly market. Low price is charged in the market where demand is elastic and high price in the market where demand is inelastic.

3..Nationalization of public utilities:

The nationalization of public utility services can also be justified with the help of elasticity of demand. Demand for public utilities such as electricity, water supply, post and telegraph, public transportation etc. is generally inelastic in nature. If the operation of such utilities is left in the hand of private individuals, they may exploit the consumers by charging high prices. Therefore, in the interest of general public, the government owns and runs such services.

4. Factor pricing:

Price elasticity of demand helps in determining price to be paid to the factors of production. If demand for a particular factor is inelastic as compared to the other factors, then it will be paid more. It is because the employers cannot readily adjust the factor of production with the change in its price.

5. International trade:

In order to fix prices of exported goods, it is important to have knowledge about the elasticity of demand for such goods. The exporting country may fix higher prices for the products with inelastic demand in the importing country. However, if demand for such goods in the importing country is elastic, then the exporting country will have to fix lower prices.

6. Formulation of taxation policy:

The concept of price elasticity of demand is important for formulating taxation policy. Government can impose higher taxes on goods with inelastic demand, whereas, lower taxes on goods with elastic demand. If the demand is inelastic, increase in tax rate will not reduce the demand much. This will bring more tax revenue to the government. On the other hand, if the demand is elastic, decrease in tax rate will increase the demand largely. Hence, there will be increase in tax revenue with the decrease in tax rate.

Uses/Importance of Income Elasticity of Demand

The concept of income elasticity of demand plays a crucial role in business decision-making. It can play a very important role in the following grounds:

1..Useful for forecasting demand:

The concept of income elasticity of demand measures the change in demand with the change in income of the consumer. It helps to forecast demand for a product looking at the change in income. Therefore, it guides the producer about how much to produce at different level of income. It also helps the firm in future planning.

2. Useful to design marketing strategy:

Income elasticity of demand helps to classify people into different classes and their demand for different types of goods such as necessary, comfort and luxury. If a firm is producing luxury goods, rich people are its prime customers. Therefore, the firm should concentrate its marketing target in the city areas.

3. Helpful for government and business firm:

The concept of income elasticity helps in classifying goods into luxury, inferior and necessary. Demand for luxury goods is highly income elastic whereas demand for necessary goods is income inelastic. Therefore, the concept of income elasticity helps the government in its taxation policy. It also helps the business firms in their pricing policy.

4. Determines the effect of changes in economic activity:

Income elasticity of demand helps to study the effect of changes in business activity on various industries. In the time of prosperity, as there is increase in income of the people, a firm can earn more profits if their products have high-income elasticity. On the contrary, income may fall significantly if the economy moves into depression.

Uses/Importance of Cross Elasticity of Demand

Cross Elasticity of Demand is very much important and useful in business decision-making, which can be explained as follows:

1..Classification of goods:

The concept of cross elasticity of demand is very essential in classifying goods into substitutes and complementary. If the cross elasticity between two goods is positive, these goods are substitutes and if it is negative, these goods are complementary. If the goods are strong complementary, the cross elasticity will be highly negative. On the other hand, if the goods are close substitute, the cross elasticity will be highly positive.

2. Classification of market:

The market can also be classified on the basis of cross elasticity of demand. Higher the value of cross elasticity of demand between the goods, greater will be the competition in the market, and lower the value of cross elasticity, lower will be the competition in the market. If the cross elasticity is infinite, the market structure is perfectly competitive. If the cross elasticity of demand is zero, the market is monopoly.

3. Pricing policy:

In reality, many firms produce different related goods – substitutes and complementary. For example, Colgate produces both toothpaste and toothbrush. They are complementary goods. Similarly, Ice Cream Company produces ice cream of different flavor. They are substitute goods. Cross elasticity of demand helps the firms to decide whether to increase price of such related products or not.

4. Classification of industries:

On the basis of cross elasticity of demand, we can classify the different industries. The firm having high positive cross elasticity should be included in one industry. The firm having negative cross elasticity should be included in different industries.

Concepts of elasticity of Supply

The concept of elasticity of Supply initially developed by classical and scientifically used but neo-classical economist Alfred Marshall. The elasticity of Supply is defined as the degree of

responsiveness of supply for a commodity to the change in its determinants, such as consumers' income, price of others, technologies, future price expectations, taxes and subsidy and infrastructure development. The change in supply of a product depends on the nature and extent of change in these determinants. And, the overall elasticity of Supply for a commodity depends on the combined effects of changes in the determinants. But for the practice, we discuss in this chapter, the following kinds of elasticity.

1. Price elasticity of Supply
2. Income elasticity of Supply and
3. Cross-elasticity of Supply.

Price Elasticity of Supply

Definition and Measurement

Price elasticity of supply is the measure of responsiveness of the quantity supplied of a good to the change in its market price. The coefficient of price elasticity of supply (Esp) is the measure of percentage change in the quantity supplied of a good due to a given percentage change in its price. The formula of supply elasticity is given as

$$\text{Esp} = \frac{\text{Percentage change in quantity Supply}}{\text{percentage Change in Price}} = \frac{\Delta Q_s / Q_s}{\Delta P / P} = \frac{\Delta Q_s / \Delta P}{P / Q_s}$$

Esp = Coefficient of price elasticity of supply. It is independent of units.

Qs = Initial quantity supplied.

ΔQs = Change in quantity supplied.

P = Initial price of the good.

ΔP = Change in price.

The positive sign indicates that price and quantity supplied of a good are positively related, i.e., greater units of the good will be placed in the market only at higher prices and vice-versa.

Given the formula, price elasticity of supply can be easily measured.

When the price of four-star hotel rooms rose from \$160 to 180, supply rose from 3200 to 3600 rooms per week. Calculate the elasticity of supply. (Ans = 1)

Suppose, initial price per packet of a noodle is Rs.10 and quantity supplied is 100 units. If price rises to Rs.12 and quantity supplied increases to 140 units, find the price elasticity of supply.

Ans 2

Calculate the price elasticity of supply at price Rs. 10 with given supply function QS = 10+ 5P.

Ans 0.83

9.7.2 Determinants of Elasticity of Supply

The important factors affecting price elasticity of supply are,

- 1 Time Factors: Longer the time period, more the time is available to adjust the supply more elastic is the supply curve.
2. Nature of the Good: Inelastic supply in case of perishable goods (e.g. milk, bread, etc.) because its supply can be neither be increased nor be decreased within a short period case of durable goods.

3. Production Capacity: If unlimited production capacity exists (i.e., production can be increased easily), then there is elastic supply. If limited production capacity exists, then there is inelastic supply.

4. Production Methods and Techniques: If an industry uses complicated methods and techniques of production, supply of the commodity produced by that industry will be relatively inelastic. On the contrary, if an industry uses simple methods and techniques of production, supply of the commodity produced by that industry will be relatively elastic.

5. Stage of Laws of Return: If the law of diminishing return is applied on the production of a commodity, elasticity of supply for such a commodity will be inelastic. On the contrary, if the law of increasing return is applied on the production of a commodity, supply of such a commodity will be elastic.

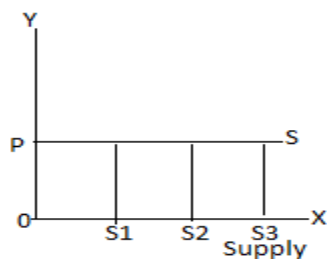
6. Future Price Expectation: If the producers expect that the price will rise in future, then they will supply less quantity in the market presently. Thus, supply will become inelastic. If the producers expect that the price will fall in the future, supply will be more elastic.

7. Number of Products being produced by an Industry: If an industry is producing many products, supply is elastic as the producers can switch over to the production of other goods and vice versa.

Degree/ types of elasticity of Supply

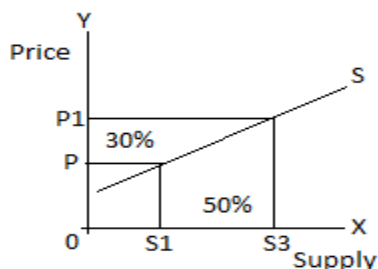
There are five degrees or types of elasticity of supply.

1. Perfectly Elastic Supply ($E_s = \infty$). Supply of commodity is said to be perfectly elastic when its supply expands (rises) or contracts (falls) to any extent without any change in the price. The coefficient of $E_s = \infty$ (infinity). It is shown graphically in Figure. 5... Perfectly Elastic Supply Curve



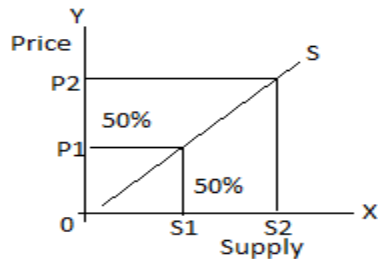
The perfectly elastic supply curve is S which is a horizontal line. It shows that at a price of oP per unit, any quantity of the commodity can be supplied.

2. Elastic Supply ($E_s > 1$). When percentage change in supply is more than the percentage change in price, supply is said to be elastic or more than unitary elastic. In this case, the value of the e_s is more than one. It is shown in Fig. 5. Elastic Supply Curve



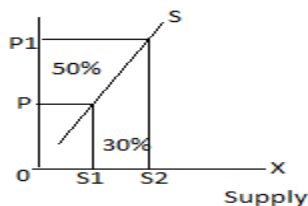
The elastic supply curve is SS which is upward sloping originating from the y-axis.

3. Unitary Elastic Supply ($E_s = 1$). Supply of a commodity is said to be unitary elastic if percentage change in supply equals the percentage change in price. In this case, the coefficient of E_s is equal to one. It is shown in Figure 5. Unitary Elastic Supply Curve



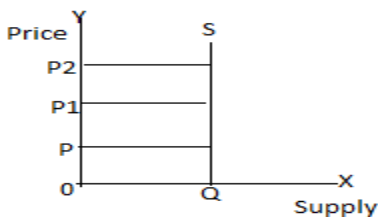
The unitary elastic supply curve is OC which is a straight positively sloping line from the origin.

4. Inelastic Supply ($E_s < 1$). When percentage change in quantity supplied is less than percentage change in price, supply is said to be inelastic or less than unitary elastic. This is shown in Fig. 5. Inelastic Supply Curve



The inelastic supply curve is SS which is upward sloping originating from the x-axis.

5. Perfectly Inelastic Supply ($E_s = 0$). When supply of a commodity does not change irrespective of any change in its price, it is called perfectly inelastic supply. In this case, $E_s = 0$. Its graphically in Figure 5....



5..Perfectly Inelastic Supply Curve

The supply curve, SS is a vertical line showing that quantity supplied is fixed at OS3 units irrespective of the price

Measurement of Elasticity of Supply

The elasticity of supply is measured on the basis of slope and nature of supply curve. There are three methods of measuring elasticity of supply, which are as follows:

Percentage method

Percentage method is also called proportionate method. This method measures price elasticity of supply by dividing the percentage change in the quantity supplied for a commodity by the

percentage change in its price. According to this method, price elasticity of supply (ES) is calculated by using the following formula:

$$Es = \frac{\text{Percentage change in quantity Supply}}{\text{percentage Change in Price}} = \frac{\Delta Qs/Qs}{\Delta P/P} = \frac{\Delta Qs/\Delta P}{P/Qs}$$

Where, Q_s = Initial quantity supplied P = Initial Price

ΔQ_s = Change in quantity supplied ΔP = Change in price

MCQ

1. A negative income elasticity of demand for a commodity indicates that as income falls, the amount of the commodity purchased... A Rises B. Falls C. Remains unchanged D. Any of the above
2. Giffen goods are those goods... A. For which demand increases as price increases B. Which have a high income elasticity of demand C. Which are in very short supply D. None of these
3. ...is the equilibrium condition of price determination. (a) Demand = Supply (b) Demand > Supply (c) Demand < Supply (d) Demand is not equal to supply.
4. Given the demand and supply functions: $D=100-2P$, $S=10+3P$, the equilibrium price and quantity are.... A. 18 and 64 B. 10 and 30 C. 64 and 18 D. Cannot be calculated
5. If the price of coffee suddenly shoots up, ceteris paribus, the demand for tea is expected to... A. Move rightward along the original demand curve B. Increase C. Remain unaffected D. Decrease
6. If the income elasticity for potato is 0.8, potato is ..good. A necessity B. luxurious C. Giffen D. (inferior
7. If total consumer expenditure on a good falls as its price falls this indicates that... A. $ep < 1$ B. $ep > 1$ C. $ep = 1$ D. $ep = \infty$
8. The elasticity of demand at the mid point of a straight line demand curve is... A. 0 B. 1 C. 1.5 D. 2
9. (Cross elasticity of complementary goods is..... A. Negative B. Zero C. High D. Infinite
10. (Which of the following least affects the elasticity of supply? A. Nature of commodity B. Time factor) C. Cost of production D. Preferences of the consumer

Descriptive Answer Questions

1. Define price elasticity of demand. Explain its types.
2. Explain the uses of price elastic of demand.
3. What is price elasticity of demand? How is it measured by point method?
4. What is income elasticity of demand? Explain its types.
5. Define cross elasticity of demand. Explain its type.

6. Explain the uses of income elasticity in business decision-making.
7. Explain the importance of cross elasticity of demand to a business firm.
8. Define price elasticity of supply. Explain its types.
9. Explain the different methods of measuring price elasticity of demand.
10. What is price elasticity of demand? Explain its determinants.
11. Explain the uses of price, income and cross elasticity of demand.
12. What is meant by price elasticity of supply? Explain its determinants.

Numerical

1. Price of a chocolate falls from Rs.5 to Rs.4 per unit. This leads to an increase in its demand from 10 units to 20 units a day. Comment on its elasticity of demand. Ans.: EP = 5, Elastic Demand
2. Calculate elasticity of supply by arc method when price increases from Rs.10 to Rs.20 and quantity supplied increases from 40 units to 80 units.
3. A consumer spends Rs.40 on a good at a price of Rs.1 per unit and Rs.60 at a price of Rs.2 per unit. What is the price elasticity of demand? What kind of good is it? What shape will its demand curve take? Ans.: (a) 0.25, necessity, steeper
4. Suppose a demand function is represented by $Q = 100 - 10P$.
 - a. What is the price elasticity of demand at the point where the price is Rs.4?
 - b. What is the price elasticity at the point where the price is Rs.5?
 - c. What is the arc elasticity between these two points? Ans.: a) EP = 0.67, b) 1 and c) 0.82
5. Consider the following table and find out cross elasticity of case: Demand for Coke (Bottle/ per week) increased 1,200 to 1,400 as Price of Pepsi increased from Rs.20 to 25. Also interpret the result.
6. Suppose a supply function is represented by $Q = 20 + 2P$. Calculate price elasticity of supply when price per unit is Rs. 10. Ans.: ES = 0.7

7. Consider the following supply schedule:

Points	A	B	C	D
Price	0	5	10	15
Supply	10	20	30	40

- a. Compute the price elasticity of supply at the movement from B to C by percentage method.
 - b. Compute the price elasticity of supply by arc method between C and D by arc method.
- Ans.: (a) ES = 0.5 (b) ES = 0.71