

Introduction to Health Economics, Cost & Cost Analysis, Demand & Supply

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Objectives

By the end of the session, learners will be able to-

- define economics and health economics
- describe objectives, importance, major tasks and components of health economics
- define and classify cost
- explain opportunity and marginal cost
- differentiate microeconomics and macroeconomics
- define need, demand and supply
- describe factors affecting demand and supply

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Economics: Overview

- **Economics** is the **study of scarcity** and the means by which we deal with this problem.
- Because resources are **essentially limited**, choices need to be made about how they are to be used.



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Economics: Overview

- **Economics** is the study of **maximizing the utilization** of **scarce resource**.
- Economics is the study of how people and society end up choosing to employ **scarce resources** that could have alternate use.
- According to **Adam Smith**, "Economics is an equity into the nature and causes of wealth of nations".

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Economics: Overview

There are **four specific** questions that are the primary concern of economics:

- **What** goods are being produced and in **what quantities**?
- **How** are these goods produced?
- How is **society's output of goods divided** among its members?
- How efficient is society's **production and distribution**?

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Health economics: Definition

- **Health economics** is a branch of economics that focuses on **health and healthcare**.
- The key objectives of healthcare system are to ensure **access to quality healthcare** and generate the **greatest health benefit** for the **greatest number of people** with a **finite set of resources**.
- Health economics is the study of how **scarce resources** are **allocated & distributed rationally** within the health economy.
- The production of healthcare and its distribution across population is the **domain of health economics**.

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Objectives of health economics



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Importance of health economics

- **Priority setting:** By estimation of disease burden.
- **Policy formulation/decision making**
- **Health care production, distribution and consumption**
- **Demand assessment and supply analysis**
- **Cost analysis**
- **Economic evaluation**
- **Health service financing**
- **Health market regulation**

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Importance of health economics

- Analysis of investment in health
- Budget formulation
- Rationing healthcare
- Health insurance
- Managed care in health
- Technological development in medicine
- National income generation

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Major tasks of health economics

Descriptive:

- Describe and quantify economic problems by funding, defining and measuring the problem.

Predictive:

- Identify and explain the problems in a cause-effect format.
- It performs by explaining and predicting certain problems.

Evaluative:

- Assess or evaluate the alternatives' performance in comparison to the standard.

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Components of health economics

- National health systems
- Meaning and scope of health economics
- Health sector budgeting and planning
- Determinants of health
- Demand for health and health care
- Supply of health care
- Health care markets

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Variables used in economic analysis

Types of economic variables are-

- **Quantity:** GDP, Unemployment
- **Quality:** Productivity, Utility
- **Distribution:** Gini coefficient
- **Macroeconomics variables:** GDP, Inflation, Unemployment, Government spending, Interest rate, Nominal exchange rate
- **Microeconomics variables:** Price, Individual expenditure, Consumption, Quantity produced, Wage, Individual investment
- **Artificial economic variables:** Utility

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Concerns of health economics

- The **allocation of resources** between various health-promoting activities
- The **quantity of resources** used in health delivery
- The **organization and funding** of health institutions
- The **efficiency** with which resources are allocated and used for health purposes
- The **effects** of preventive, curative and rehabilitative health services on individuals and society

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Contribution of health economics to SDGs

- **Cost-effective analysis**
- **Financing and resource mobilization**
- **Health system strengthening**
- **Policy formulation and evaluation**
- **Health inequalities and social determinants of health**

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Macroeconomics vs microeconomics

- Microeconomics called '**price theory**' and macroeconomics called '**income theory**'.
- Microeconomics is the study of **individual decision-making** units such as consumers, business, hospitals etc.
- Macroeconomics studies the **economic behaviour of a country** and how its policies impact the economy as a whole.

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Goods vs Commodity

Goods

- A good is a tangible physical product that can be used to satisfy someone's desire or need.
- It is capable of being delivered to a purchaser and involves transfer of ownership from seller to customer.

Commodity

- Commodity includes both tangible (medicine) and intangible (healthcare) products.
- All goods are commodity but all commodities are not goods.

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Rival goods vs Non-rival goods

Rival goods

- Rival goods are goods whose consumption by one consumer prevents simultaneous consumption by other consumer. e.g. abdominal belt

Non-rival goods

- Non-rival goods are the goods that can be enjoyed simultaneously by an unlimited number of consumers e.g. health education materials like banner, poster, billboard, mass media etc

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Cost vs Price

Cost

- Cost is simply what it takes, in terms of dollars or resources, to produce a particular product or service

Price

- A price is simply what someone is willing to pay for purchasing any product or service.
- **Price = cost + profit**
- Price is a **consumer** phenomenon, whereas cost is a **supplier** phenomenon.

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Types of cost

- **Fixed costs** are costs that do not vary in short term
- **Variable costs** vary with output as constant rate
- **Total cost** is the sum of fixed and variable cost
- **Average cost** is calculated by dividing the total cost with number of units of output
- **Marginal cost** is the additional cost of producing one extra unit of output

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Concept of efficiency

- **Efficiency** evaluate **how well the resources are utilized** in order to achieve a desired outcome at a **minimum cost**.
- Maximizing **benefit** by minimum **cost**.
- There are **two aspects** of efficiency:
 - Allocative efficiency:** measures the extent to which resources are allocated to the groups or individuals who can benefit most. Rational distribution of scarce inputs to satisfy the consumer's wants.
 - Technical efficiency:** measures the extent to which resources are combined or recombined and used to achieve a maximum outcome with a minimum number of resources.

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Concept of cost

- According to the chartered institute of management accountants, London, **cost** is defined as **the amount of expenditure** incurred on , or attributable to a specified **thing or activity**.
- It can be defined as **sacrifice** made in order to obtain a **good or service**.
- Cost may be defined as the **minority value** of all the inputs required in production of a **specific product or service** in a given time-period.

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Concept of cost analysis

- **Cost analysis** is an **essential pre-requisite** to allocate scarce resources for both production and consumption.
- Cost analysis is the act of **breaking down a cost summary** into its constituents and studying and reporting on each factor.
- Cost analysis is the **application of cost accounting principles** under a system to set up cost of rendering service or producing a commodity.
- Cost analysis should include-
 - **Different dimension of resources**
 - **Mixing up activities with sources**
 - **Physical inputs like personnel, equipment, supplies etc.**

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Cost in healthcare

- **Healthcare costs** are the costs that people, organizations, or a society have to pay directly or indirectly for **healthcare goods and services** that are meant to keep or improve a person's or a group's health.
- Healthcare costs can be of **two types**:
 - Direct costs**: healthcare
 - Indirect costs**: loss of production

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Classification of cost

Classification by inputs:

- Capital costs**: cost of items with a life of more than **one year**.
e.g. vehicles, equipment, buildings, training, social mobilization and personnel.
- Recurrent costs**: the cost of items that incur **each year**.
e.g. operation and maintenance of vehicle, building etc.

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Classification of cost

Classification from consumer perspective:

- i. **Direct cost:** Direct healthcare cost or **medical cost** and direct non-healthcare cost or **non-medical cost**. Direct cost in healthcare includes- **physician's cost, cost of drug, laboratory cost, travel cost and cost of food**.
- ii. **Indirect cost: Productivity losses.** These include-the cost of lost work due to absenteeism or early retirement, impaired productivity at work and lost or impaired leisure activity, costs of premature mortality. Indirect cost in healthcare includes- **loss of income, cost of disability, social cost, family cost and unofficial payment**.
- iii. **Intangible cost:** This cost can't be estimated in monetary value. E.g. the **cost of pain, sufferings, unhappiness and anxiety**.

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Opportunity cost

- As resources are scarce, an individual, in choosing to consume a good, in principle, chooses the good which gives him or her the greatest benefit, and thus **forgoes** the consumption of a range of **alternative goods of lesser value**.
- The **opportunity cost** is the value of the benefit of the **next best alternative**.
- **Opportunity cost** means the next best use to which the resources could have been put, if they had not been consumed in this activity.
- This measures how much is '**given up**' by carrying out the activity.
- The value of the second-best choice that is given up when a first-choice is made is known as **opportunity cost**.

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Catastrophic cost

The cost of illness is considered to be catastrophic when-

- The cost of coping with an illness **force household to spend less on other basis needs** (e.g. food or school fees)
- It incurs **debts**, or
- It compels one to **sell productive resources**

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Marginal cost

- How much **cost increases** if you increase your **activity by one unit**.
- The change in cost associated with a change in activity level is referred to as **marginal cost**.
- For example, if new patient is the spouse of an existing patient and has relatively minimal care needs, the cost of adding one more patient to a community nurse's case load may be relatively negligible.

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Determinants of cost

- **Technology**: cost reduction is the main goal of technological innovation.
- The **degree of utilization** of the plant and machinery
- **Size** of plant and **scale** of production
- **Prices** of factor inputs
- **Efficiency** of factors of production and management
- **Stability** of output
- Law of returns
- **Time period**

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Importance of cost analysis

- It will create **cost consciousness** to the employees
- It is a tool to **bring efficiency**
- **Future planning** will be easy
- **Performance** can be computed year wise
- **Fixation** of hospital charges
- Help in calculating **opportunity cost** of capital
- Helps in calculating the **valuation of cost and benefit** obtained by the different income groups

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Elements of hospital cost analysis

- **Defining** the major and relevant activity areas of the hospital
- **Gathering** information on the services provided or the output of the hospital
- **Determining** recurrent costs like per time labor, fuel, repair or maintenance costs
- **Ascertaining** the capital costs of the hospital
- **Allocating** indirect costs
- **Reviewing** and using the hospital cost summary

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Steps of hospital cost analysis

- Step 1: **Define the final product**
- Step 2: **Define cost centers**
- Step 3: **Identify the full cost for each input**
- Step 4: **Assign inputs to cost centers**
- Step 5: **Allocate all costs to final cost centers**
- Step 6: **Compute total and unit cost for each final cost center**
- Step 7: **Report results**

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Demand

- **Demand** is an economic concept that describes a **consumer's desire** to **purchase** a good or service.
- The price that consumers are willing to pay for the good or service is used to **determine demand**.
- Demand is the **consumer's intention** to **buy** a specific product or service.
- The degree to which supply and demand are in balance determines the price of a good or service, recognizing the idea of demand.
- Price appears to **increase** when there is a **greater demand** than there is **supply** for a certain good.
- Price **decrease** when a product's **supply exceeds its demand**.

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Need vs Demand

Need	Demand
A requirement for something that is required for survival or well-being	A requirement for something that is backed by the ability and willingness to pay for it
It is a subjective idea	It is objectively observable
It is natural, not created	It is shaped by status, aspiration
Is not marketable	Is marketable
Money isn't a factor	Money is a factor
e.g: food, water, healthcare etc.	e.g: new car, new phone etc.

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Effective demand for healthcare

Factors or features of effective demand:

- Desire to purchase or utilize healthcare
- Availability of healthcare
- Ability to purchase healthcare
- Willingness to purchase healthcare
- Accessibility to healthcare

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Healthcare as a special commodity

□ Features of healthcare as a special commodity-

- Demand for health is a **derived** demand
- Individual demand medical care when suffer from **injury, illness** etc.
- Presence and extent of **uncertainty**
- Concern with **externality** (both positive and negative)
- Asymmetry of **information**
- Agency relationship**: between physician and patients
- Supplier induced demand**

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Healthcare as a special commodity

- viii. Complexity of '**for-profit**' and '**not-for-profit**' issues with healthcare
- ix. Healthcare professional require **formal license**
- x. **Healthcare market**: Debate about applicability of competitive market in health sector
- xi. Involvement of **public sector** in the provision of healthcare services
- xii. **Financing** in health sector is different from other sector of economy
- xiii. **Insurance** plays an important role in financing healthcare services

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Demand curve

- The **demand schedule or demand curve** is the relationship between **price and quantity** brought.
- The quantity demanded and the price should be **inversely proportional**.
- From northwest to southeast the curve **slopes downward**.
- This property is named '**downward sloping demand**' and this is normally happened.
- It means when a commodity's **price is raised**, purchasers tend to **buy less** of it.
- Similarly, as the **price is reduced**, purchaser buy amount is **increased**.

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Demand curve

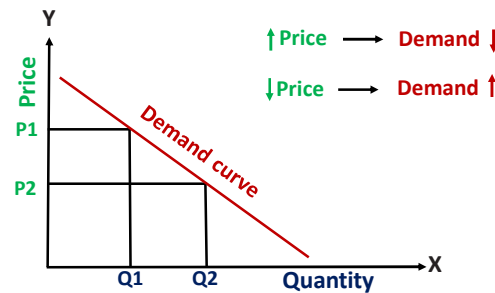


Fig: Demand curve

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Shifting of demand curve

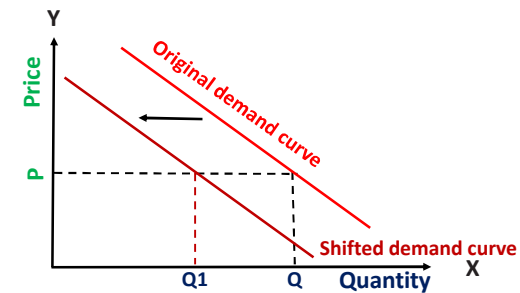


Fig: Inward shifting of demand curve

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Shifting of demand curve

□ Demand curve shifts inwards as a result of-

- A **fall** in **income**
- A **fall** in **preferences**
- A **fall** in price of **substitute**
- A **rise** in price of **complement**

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Shifting of demand curve

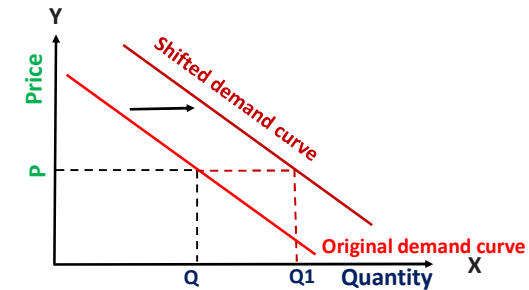


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- A **fall** in price of **complement**

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Price elasticity of demand

- **Price elasticity of demand** is a measurement of the change in the **consumption of a product** in relation to a change in its **price**.
- Mathematically it is expressed as-

$$\text{Price elasticity of demand} = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}}$$
- Demand can be classified as **elastic, inelastic and unitary**.
- When change in quantity demanded is large due to change in price is called **elastic** demand and when change in quantity demanded is small due to change in price is called **inelastic** demand.
- Formula to calculate price elasticity of demand is

$$\text{Price elasticity of demand} = \frac{\Delta \text{change in quantity demanded}}{\Delta \text{change in price}}$$

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Price elasticity of demand

□ Interpretation of price elasticity of demand (PED):

- **PED > 1** means the demand is **elastic** i.e. quantity changes faster than price
- **PED < 1** means the demand is **inelastic** i.e. quantity changes slower than price
- **PED = 1** means elasticity of demand is **unitary** i.e. quantity changes at the same rate as price

□ Determinants of elasticity of demand-

- Availability of substitute
- Urgency
- Duration of price change

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Price elasticity of demand

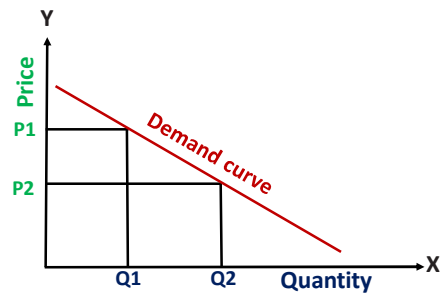
- Change in demand, $\Delta Q = \frac{|Q_1 - Q_2|}{\frac{Q_1 + Q_2}{2}}$
- Change in price, $\Delta P = \frac{|P_1 - P_2|}{\frac{P_1 + P_2}{2}}$
- **PED** = $\frac{\Delta Q}{\Delta P}$

• Exercise:

If the price of Ceevit increases from 2 taka to 2.5 taka, then amount you buy falls to 7 from 10. How will you calculate and interpret elasticity of demand?

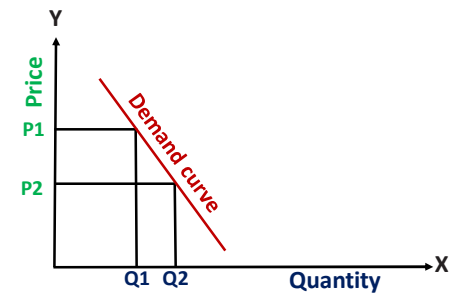
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Elastic demand



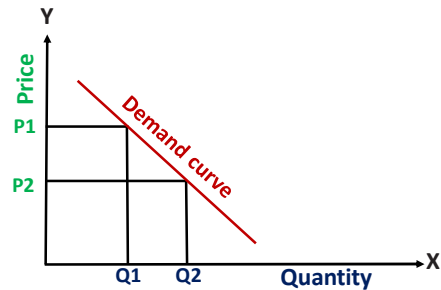
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Inelastic demand



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Unitary demand



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Cross-price elasticity of demand

- The **cross-price elasticity** gauges how the demand for one product is **affected** by a change in the price of another product or good or service.
- It might be used to calculate the **percentage change** in the quantity of **product x** that is demanded as a result of a **1% rise** in the price of **product y**.
- The **relationship** between two items determine the **direction** of the **cross-price elasticity**.
- The cross-price elasticity will be **positive** if the goods are being used as **alternatives or substitutes**.
- The cross-price elasticity will be **negative** if the goods are being used as **complements**.

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Complementary goods vs Substitute goods

Complementary goods

- A complementary good is a good with a negative cross-elasticity of demand i.e. a good demand is increased when the price of another good is decreased, and vice versa. E.g. x-ray films and x-ray machine

Substitute goods

- A substitute good is a good with a positive cross-elasticity of demand i.e. a good demand is increased when the price of another good is increased, and vice versa. E.g. coca-cola vs mojo

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Supply

- **Supply** denotes willingness and ability to **sell commodity** at each and every price over a given period of time, subject to all else being constant.
- Industries or firms produce commodities subject to **capacity and profit maximization**.
- The number of things that a provider is willing to **manufacture and sell** is referred to as **supply**.
- The relationship between a **commodity's market price** and the amount of that commodity that producers are willing to **produce and sell** is stated to as the supply schedule of that commodity.

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Supply curve

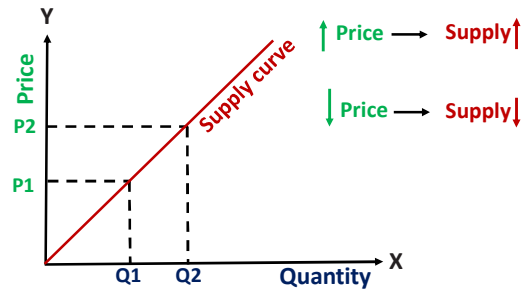


Fig: Supply curve

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Determinants of supply

- Price of the **good or service**
- Price of **related goods**
- Price of the **factors of production**
- State of **technology**
- **Government policy**
- Objectives of the **company**
- **Market** structure
- Industrial and international **policies**

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Shifting of supply curve

A shift in the supply curve will occur if any of these **underlying conditions** change.

- A shift to the **left/ inward** of the curve indicates a **reduction** in the quantity of product **supplied**.
- While a shift to the **right/ outward** indicates an **increase** in the quantity of product **supplied**.

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Shifting of supply curve

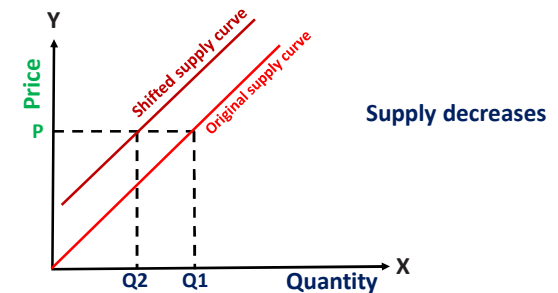


Fig: Inward shifting of supply curve

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Shifting of supply curve

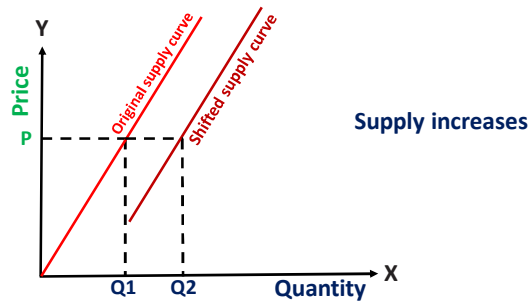


Fig: Outward shifting of supply curve

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Price elasticity of supply

- Price elasticity of supply of a good indicates the responsiveness of supply to price.
- The following formula is used to calculate PES
- **Price elasticity of supply** = $\frac{\Delta \text{change in quantity supplied}}{\Delta \text{change in price}}$
- **Interpretation of price elasticity of supply (PES):**
 - **PES > 1** means the supply is **elastic** i.e. large price increase minimally affects the supply
 - **PES < 1** means the supply is **inelastic** i.e. minimal price increase causes maximum change in supply
 - **PES = 1** means elasticity of supply is **unitary** i.e. supply changes at the same rate as price

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Supplier induced demand

- Healthcare supplier acts as **agent** for the consumer/patient.
- The concept of SID is a mean of analyzing this potential for **exploitation** of the innocent patients.
- According to professional judgement if extra treatment is given though not needed for the patient is known as **Supplier Induced Demand (SID)**.
- **SID** may be thought of as a **shift in demand**, induced by the **supplier** in response to underlying change in supply/demand conditions.

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Reduction of SID

- **Promoting** pharmaceutical health literacy
- **Developing, implementing and evaluating** policies to prevent induced demand for prescription of medicine
- **Reform** the education system and medical research
- **Development** of health information
- **Evaluating** health technology
- **Reform** the health system structure
- **Reform** the monitor and control system in the health system
- **Observance** of patient's right charter

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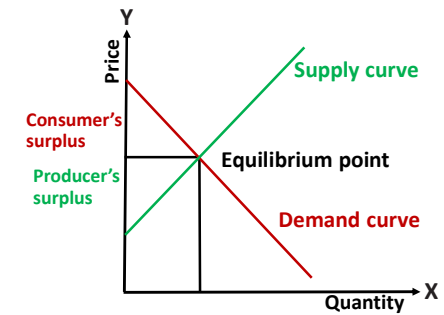
Reduction of SID

- **Developing and reforming** the laws and regulations of supply and prescription of medicine
- **Providing** mechanisms in the financial relationships of pharmaceutical companies with medical practitioners
- **Reform** supply, production and distribution of health resources
- **Reform** the insurance companies

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Consumer's surplus & producer's surplus

- When a consumer's willingness to pay for a product exceeds its market price, there is **consumer's surplus**.
- The difference between the amount a producer is willing to supply goods for and the actual amount he receives when he makes the trade is known as **producer's surplus**.



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