

Industrial-Economics-Module-1-Important-Topics

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- 9. Cross Elasticity of Demand Problem
 - Q1 A tea manufacturing company was able to sell 8000 kg of tea when the price of coffee was Rs.70 per kg. Later they were able to sell 9000 kg when the price of coffee became Rs.80 per kg. Calculate the cross elasticity of demand for tea. Are the two commodities substitutes or complements? Give reason.
 - Q2 Suppose cross elasticity of demand between X and Y is 0.5. If there is a 50 percent change in the price of Y, what will be the percentage change in the quantity demanded of X?
 - Q3 Suppose the price of coffee rises from Rs. 4.50 per hundred grams to Rs. 5 per hundred grams and as a result the consumer's demand for tea increases from 60 per hundred grams to 70 per hundred grams. Find the cross elasticity of demand of tea and coffee.
- 10. Demand and Supply Problem
 - Q1: The demand function of a product is given as $D = 60 - 2P$ and the supply function $S = 30 + 4P$. Estimate equilibrium price and equilibrium quantity. Also find the excess supply when Price equals Rs.6?



1. Problem of scarcity

- Scarcity means that society has insufficient productive resources to fulfil all human wants and needs
- At one time only a limited amount of goods and services can be provided.



2. Basic Economic Problems

What to produce and in what quantities?

- Decide what type of goods to produce, More consumer goods or capital goods, necessary items or luxury items

How to Produce?

- This deals with the production technique
- Given good can be produced by different techniques
 - Labour intensive
 - Capital intensive

For Whom to Produce?

- This deals with the problem of distribution
- How the produced goods, is to be distributed among agents of production



3. Production Possibility Curve

Production possibility curve

It is a curve which shows different combinations of the quantities of two goods that can be produced with given amount of resources and with a given technology, when the resources are fully and efficiently utilised.

- PPC is a curve which shows various combinations of 2 goods, which can be produced with a given amount of resources and technology

Assumptions of PPC

- Only 2 commodities are produced in an economy
- Technology is given or constant
- There is full employment of resources

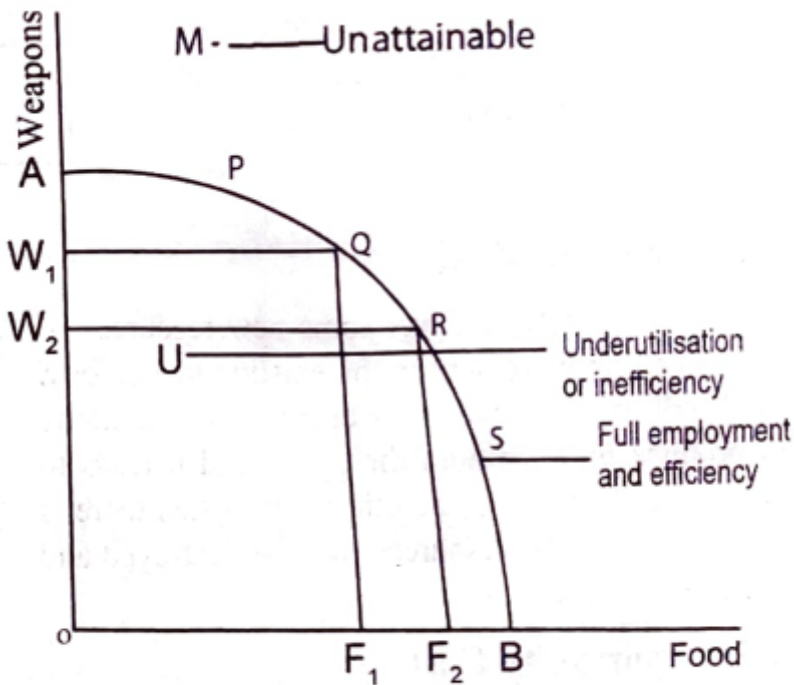


Fig 1.1 **PPC**

- If the production is at a point inside the PPC say U. It shows there is underutilization of resources.
- Any point on the PPC like S shows that the resources are fully utilized
- A point above PPC, like M is not attainable to the economy. This is due to the scarcity of resources



4. Law of Diminishing Marginal Utility

Basic Terms

- Utility -> Satisfaction of a consumer after consuming
- Total Utility -> Total Satisfaction Derived
- Marginal Utility

- Extra unit of additional utility in addition to the total utility when consumer consumes additional unit of commodity

Law

Law of diminishing marginal utility

The law states that as a consumer consumes more and more units of a commodity the marginal utility goes on diminishing.

- Example
 - Boy consumes 5 icecreams
 - 1st icecream has more satisfaction
 - 2nd, 3rd etc the satisfaction will decrease
 - It eventually reaches negative

Relations in the law

- When Marginal utility is positive, Total Utility increases
- When Marginal utility is 0, Total utility is Maximum
- When Marginal utility is negative, Total Utility decreases

Assumptions of the law

- Commodity consumed as identical and standard size
- No time gap between consumption
- Consumers taste and preferences remain constant
- Consumer is rational
- Commodity should be normal, Not intoxicant like alcohol
- Consumers income is constant

Example

utility are shown in the following table.

No. of ice creams Consumed	0	1	2	3	4	5	6	7
TU	0	10	18	24	28	30	30	28
MU	---	10	8	6	4	2	0	-2

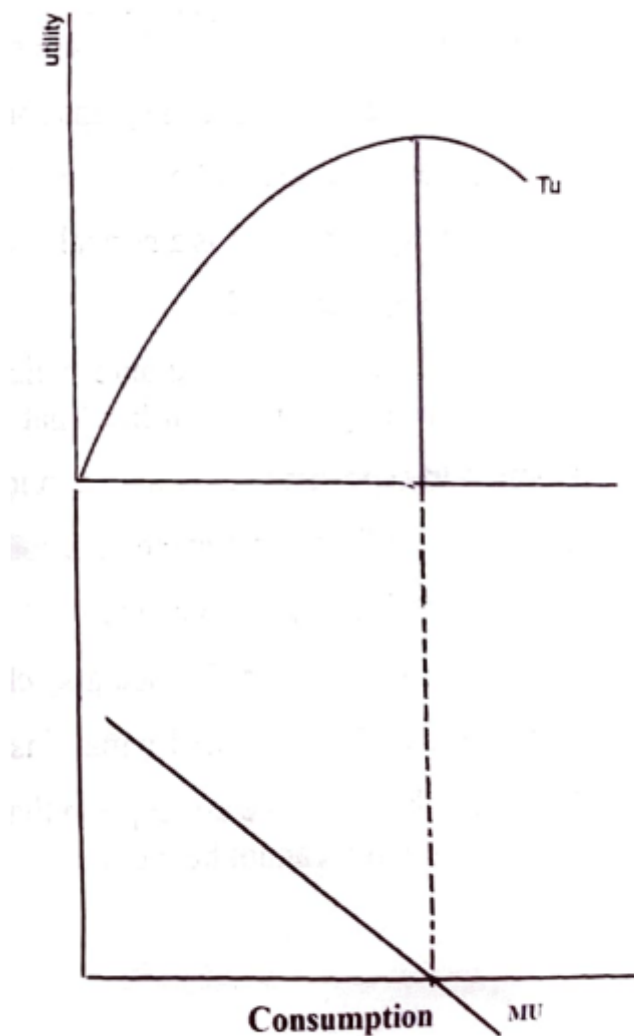


Fig 1.4 TU and MU

5. Demand

Demand

Demand is the desire backed by the ability and willingness to pay for a commodity

- Demand happens on the below two conditions

- When the person has enough money to buy
- When the person is ready to pay

Factors for demand

- Price of the commodity
 - Inverse relationship between demand and price
 - Price Increases, Demand Decreases
- Income of the consumer
 - Positive relation between income and demand
- Price of related goods
 - If 2 goods are related, Price of one commodity will affect the demand for another commodity
 - Substitutable Commodities
 - One can be subbed for the other
 - Example: Tea and coffee
 - If Price of tea increases, more people will drink coffee
 - Complimentary Commodity
 - Increase in price of X decreases demand of Y
 - Example: Petrol and Cars
 - Petrol price increases, demand of cars decreases
- Taste and preferences of consumer
- Advertisement
- Climatic Condition
- Seasonal
- Population

Law of Demand

Law of demand

The law states that other things remaining the same, price and quantity demanded of a commodity are inversely proportional

Exceptions to Law of demand

- **Giffin Goods**

- Inferior Good
- Price decrease, demand decreases
- Mostly consumed by lower income group
- Example: Price of potatoes decreases, People will use the extra money to buy higher goods like meat

- **Veblen Goods**

- Prestige goods
- Demand is high at higher prices

- **Speculation Goods**

- When there is upward trend in the price of shares, people will buy more shares on the expectation that the price will again increase and hence they make a profit

Demand Schedule and Curve

- Demand Schedule is a table which shows different quantities of commodity demanded at different prices

Price of X (in Rs.) Demand for X(units)

Price of X (in Rs.)	Demand for X(units)
5	10
4	20
3	30
2	40
1	50

- a demand schedule shows negative relation between price and demand
- Demand curve is the graphical representation of demand schedule

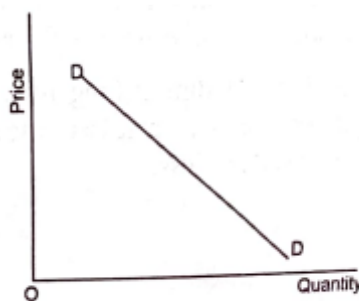
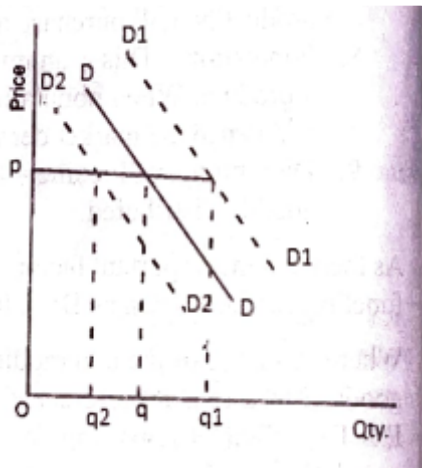


Fig 2.1 Demand Curve

Increase and decrease in demand



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- When demand increases, curve shifts rightwards
- When demand decreases curve shifts left
- Increase in demand
 - Same price, large quantity is demanded
- Decrease in demand
 - Same price, lesser quantity is demanded



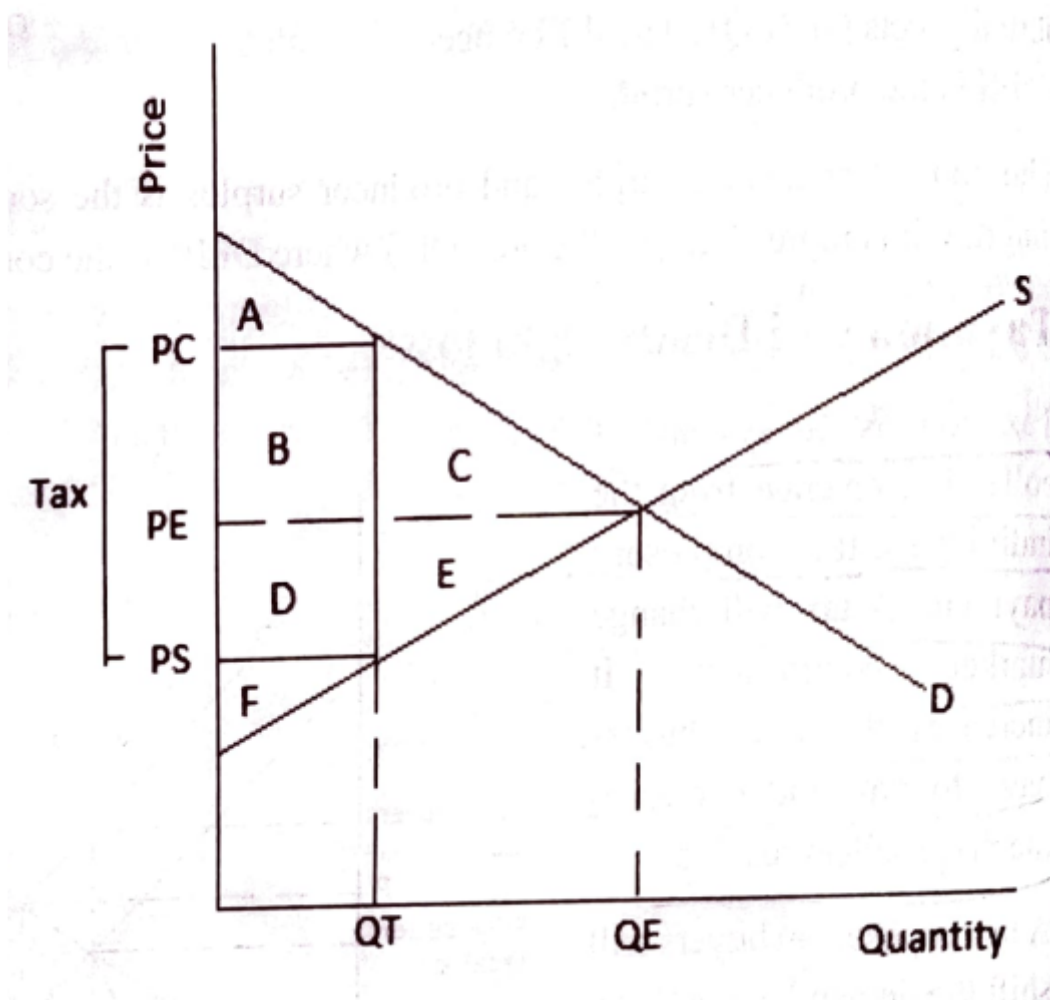
6. Taxation and Deadweight Loss

Deadweight loss

- Loss in social welfare due to imposition of tax

- Taxation
 - System of collecting revenue from individual, compulsory contribution

Deadweight loss diagram



- In absence of tax
 - **PE** = Price
 - **QE** = Quantity
 - **Consumer surplus** = A+B+C
 - **Producer surplus** = D+E+F
 - **Social surplus** = A+B+C+D+E+F
- When tax is imposed
 - **Price** increase to PC
 - **Quantity** decreases to QT
 - Price received decreases to PS
 - **Consumer surplus** decreases to A
 - **Producer surplus** decreases to F
 - **Tax Revenue** = B+D
 - **Deadweight loss** = C + E



7. Elasticity

- Elasticity is the degree of responsiveness of demand of product to change in any of the factor

Significance of elasticity

- Useful for government in fixing tax on a product
- Its useful for producer to fix price
- Useful to trade union in wage bargaining
- Useful for policy makers

Types of elasticity

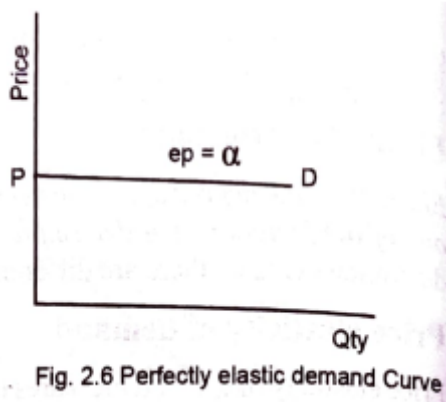
- Price elasticity
 - Extent to which demand changes with change in price
 - $ep = \text{Percentage change in qty of X} / \text{Percentage change in Price of X}$
- Income elasticity
 - Degree of responsiveness of demand of a commodity to change in income of consumer
 - $eg = \% \text{ change in qty} / \% \text{ change in income}$
- Cross elasticity
 - Degree of responsiveness of demand of commodity to change in price of related good
 - $ec = \% \text{ change in quantity demanded of X} / \% \text{ change in price of Y}$

Degrees of price elasticity

- Perfectly elastic demand
- Perfectly inelastic demand
- Unit elastic demand
- More elastic or elastic demand
- Less elastic

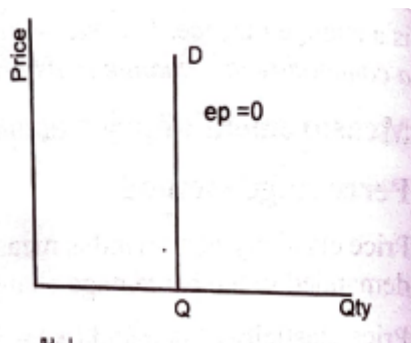
Perfectly Elastic Demand

- At the given price the demand of the product is infinite



- The value of ep is infinity

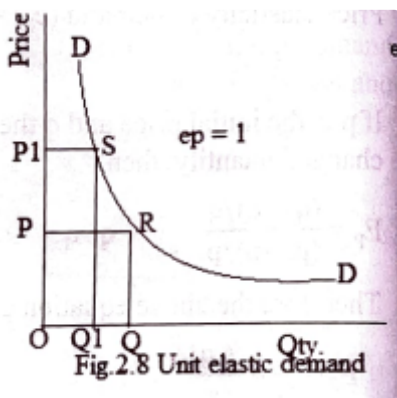
Perfectly Inelastic Demand



- Quantity demanded remains constant irrespective of change in price
- $ep = 0$

Unit Elastic Demand

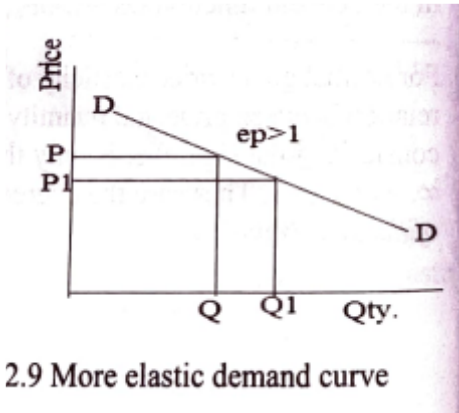
- Proportionate change in price leads to equally proportionate change in demand



- $ep = 1$

More elastic or elastic demand

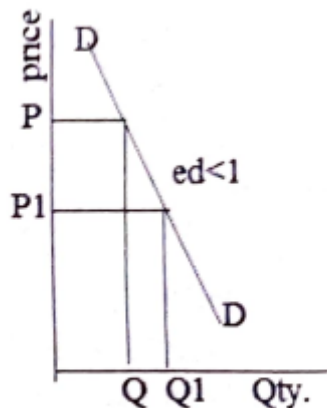
- When a given proportionate change in price cause a greater proportionate change in quantity demanded



- $ep > 1$

Less elastic or Inelastic demand

- This is the case where a given proportionate change in price leads to lesser proportionate change in quantity demanded



2.10 Inelastic demand curve

- $ep < 1$



8. Price Elasticity of Demand Problem

Q1 What should be the percentage change in price of a product if the sale is to be increased by 50 percent and its price elasticity of demand is

2

Price elasticity of demand = percentage change in quantity demanded / percentage change in price

- Percentage change in quantity demanded = 50
- Price elasticity = 2

$$2 = ?/50$$

$$? = 2 * 50 = 100$$

Q2 A company producing soft drink is selling its product for Rs. 22. It sells 1000 units, and then increases the price to Rs.24. Now sales fall to 900 units. What is the price elasticity of soft drink? Is the demand elastic or inelastic? Why?

- Price elasticity of demand is technical form used to indicate the degree of the responsiveness in demand due to the change in price
- Under this method we measure elasticity as the ratio of change in quantity demanded to percentage change in price
- Price elasticity of demand = $(\Delta Q / \Delta P) \times (P / Q)$
- Given
 - Initial quantity = 900
 - Final quantity = 1000
 - ΔQ (new quantity – initial quantity) = 900- 1000
 - ΔQ = 100 units
 - Initial Price = 22
 - Final Price = 24
 - ΔP (new price – initial price) = 24-22
 - ΔP = 2
 - P (initial price) = 22
 - Q (initial quantity) = 1000
- Subbing the values in the equation $(\Delta Q / \Delta P) \times (P / Q)$
 - Price elasticity of demand = $(100/2)/ (22/1000)$
 - Price elasticity of demand = 1.1

Demand is elastic since value of price elasticity is greater than 1



9. Cross Elasticity of Demand Problem

Q1 A tea manufacturing company was able to sell 8000 kg of tea when the price of coffee was Rs.70 per kg. Later they were able to sell 9000 kg when the price of coffee became Rs.80 per kg. Calculate the cross elasticity of demand for tea. Are the two commodities substitutes or complements? Give reason.

- **Cross elasticity of demand is the degree of responsiveness in quantity demanded of commodity X due change in the price of commodity Y**
- Cross elasticity of demand = $(\Delta Q_x / \Delta P_y) \times (P_y / Q_x)$
- Where
 - $\Delta Q_x = Q_{1x}$ (new demand of commodity x) – Q_x (initial demand of commodity x),
 - $\Delta P_y = P_{1y}$ (new price of commodity Y) - P_y (initial price of commodity Y)
 - P_y = initial price commodity y and Q_x = initial quantity of commodity x)
- Here Tea is commodity X
 - Its initial demand was 8000kg
 - Now its demand is 9000kg
- $\Delta Q_x = 9000 - 8000$
 - = 1000
- Here Coffee is commodity Y
 - initially its 70 per kg
 - Now its 80 per kg
- $\Delta P_y = 80 - 70 = \text{Rs } 10$
- $Q_x = 8000$ (Initial Demand)
- $P_y = 70$ (Initial price)
- Applying the values,
- Cross Elasticity of demand = $(1000/10) / (70/8000) = 0.875$

When the cross elasticity of demand is positive, it usually implies that the goods are substitutes. Substitutes are goods that can be used in place of each other, so when the price of one increases, consumers tend to buy more of the other.

Q2 Suppose cross elasticity of demand between X and Y is 0.5. If there is a 50 percent change in the price of Y, what will be the percentage change in the quantity demanded of X?

Cross elasticity of demand = Percentage change in quantity demanded of commodity X / Percentage change in the price of commodity Y

- Cross elasticity of demand = 0.5
- Percentage change in the price of commodity Y = 50%
- Percentage change in quantity demanded of commodity X = ?
- $0.5 = \text{Percentage change in quantity demanded of commodity X} / 50$
- Percentage change in quantity demanded of commodity X = 50×0.5
- Percentage change in quantity demanded of commodity X = 25 %

Q3 Suppose the price of coffee rises from Rs. 4.50 per hundred grams to Rs. 5 per hundred grams and as a result the consumer's demand for tea increases from 60 per hundred grams to 70 per hundred grams. Find the cross elasticity of demand of tea and coffee.

- Given
 - Initial demand 60
 - Final demand 70
 - Initial Price = 4.5
 - Final Price = 5
- $\Delta D_{tea} = 70 - 60 = 10$ and $D_x = 6$
- $\Delta P_{tea} = \text{Rs. } 5 - \text{Rs. } 4.5 = \text{Rs. } 0.5$ and $P_y = \text{Rs. } 4.5$
- Cross elasticity of demand of tea for coffee = *% change in demand of tea / % change in price of coffee*
- Cross elasticity of demand of tea for coffee = $(10/60) / (0.5/4.5) = 1.5$



10. Demand and Supply Problem

Q1: The demand function of a product is given as $D = 60 - 2P$ and the supply function $S = 30 + 4P$. Estimate equilibrium price and equilibrium quantity. Also find the excess supply when Price equals Rs.6?

- Given
 - $D = 60 - 2P$
 - $S = 30 + 4P$
- We need to find equilibrium price and equilibrium quantity
- When its equilibrium
 - Demand = Supply
 - So that, $60 - 2P = 30 + 4P$
 - $60 - 30 = 4P + 2P$
 - $30 = 6P$
- Equilibrium price (P) = 5
- Equilibrium quantity (Q) = $60 - 2 \times 5$ (substituting the value of P in demand function)
 - = 50 units
- Equilibrium quantity (Q) = $30 + 4 \times 5$ (substituting the value of P in supply function)
 - = 50 units
- Excess supply when Price equals Rs.6
 - = $30 + 4 \times 6$ (substituting the value of 6 in supply function)
 - = 54 units

