Lecture

INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

**Class:** SY BSc

**Subject :** Business Economics - Micro

**Subject Code:** PUSASQF3.4

**Chapter:** Unit 2 Chapter 3

**Chapter Name:** Elasticity of Demand

# Today's Agenda

1. Elasticity - concept
2. Types of Elasticity
3. Types of Price Elasticity of Demand
4. Method of Measuring Price Elasticity of Demand
    1. Ratio or Percentage Method
    2. Total Expenditure Method
    3. Point or Geometric Method
5. Income elasticity of demand
6. Cross elasticity of demand
7. Factor Influence Elasticity of Demand
8. Importance of Elasticity of Demand
9. Price Elasticity of Supply

# 1 Elasticity - concept

Explain, in your own terms, what is elasticity?

# 1 Elasticity - concept

What is Elasticity?

- If Price rises by 10% - What happens to demand?
- We know demand will fall
  - By more than 10%
  - By less than 10%
  - By exactly 10%

- Elasticity measures the extent to which demand will change

# 2 Types of Elasticity

**Price elasticity of demand**

$$Ed = \frac{\%\ change\ in\ quantity\ demanded}{\%\ change\ in\ price} = \frac{\Delta Q}{Q} \ X \ \frac{P}{\Delta P}$$

Where Q represents quantity demanded and P represents price and Δ represents change

**Income elasticity of demand**

$$Ey = \frac{\%\ change\ in\ quantity\ demanded}{\%\ change\ in\ income} = \frac{\Delta Q}{Q} \ X \ \frac{Y}{\Delta Y}$$

Where Q represents quantity demanded and Y represents income and Δ represents change

# 2 Types of Elasticity

**Cross elasticity of demand**

$$Ed = \frac{\%\ change\ in\ quantity\ demanded\ of\ A}{\%\ change\ in\ price\ of\ B} = \frac{\Delta\ QA}{QA}\ X\ \frac{PB}{\Delta\ PB}$$

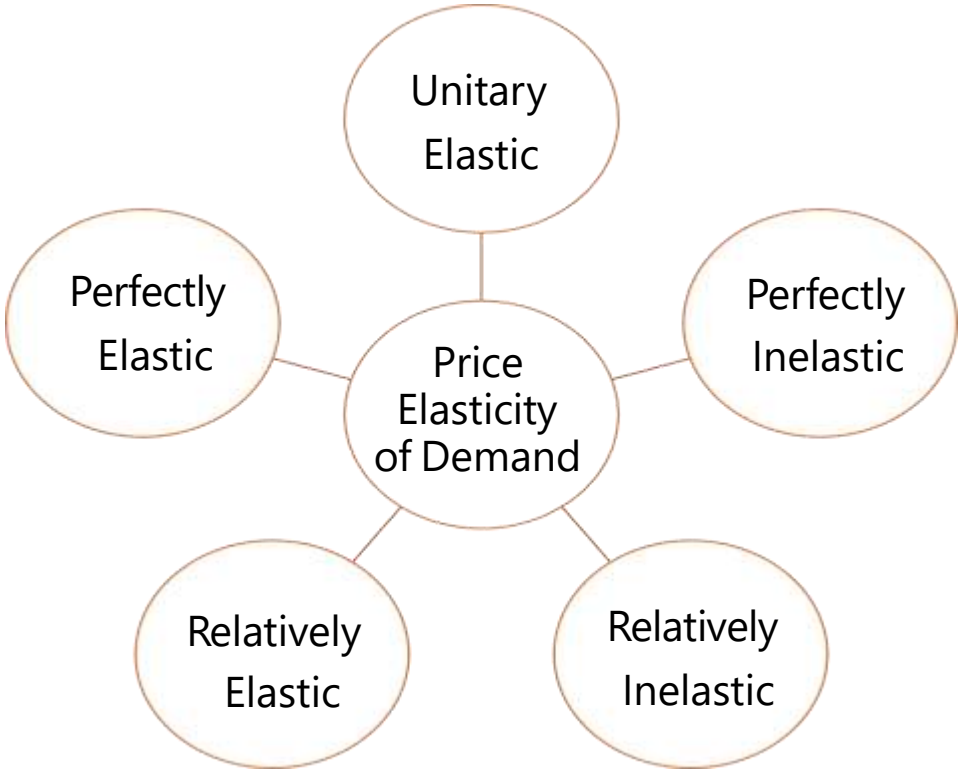
Where QA represents quantity demanded of product A and PB represents price of product B and Δ represents change

**Price elasticity of supply**

$$Es = \frac{\%\ change\ in\ quantity\ supplied}{\%\ change\ in\ price} = \frac{\Delta\ Qs}{Qs}\ X\ \frac{P}{\Delta\ P}$$

Where Qs represents quantity supplied and P represents price and Δ represents change

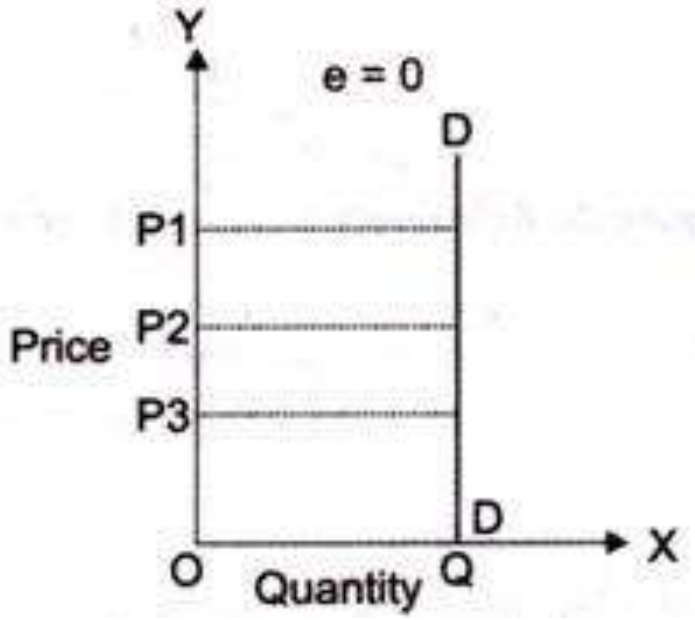
# 3 Types of Price Elasticity of Demand



# 3 Types of Price Elasticity of Demand

**Guess type of elasticity and value by graph**

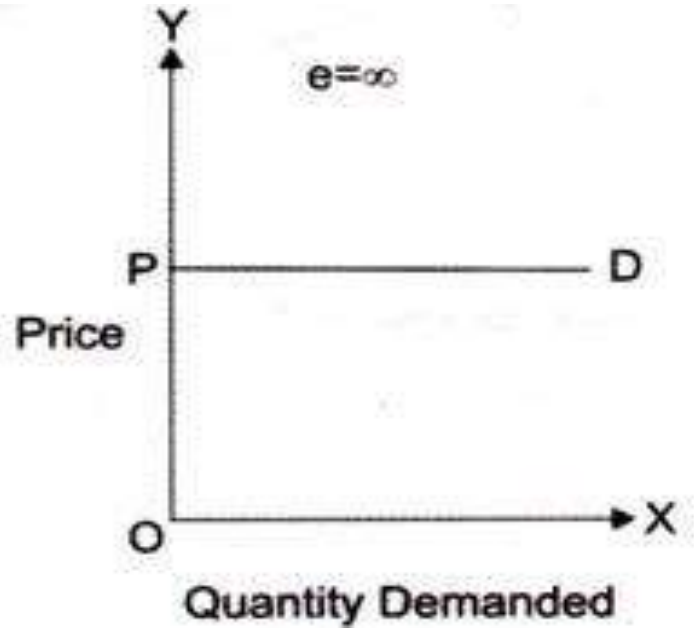
- Perfectly Inelastic
- Ed = 0
- Though, perfectly elastic demand is a theoretical concept and cannot be applied in the real situation. However, it can be applied in cases, such as perfectly competitive market and homogeneity products. In such cases, the demand for a product of an organization is assumed to be perfectly elastic.



# 3 Types of Price Elasticity of Demand

**Guess type of elasticity and value by graph**

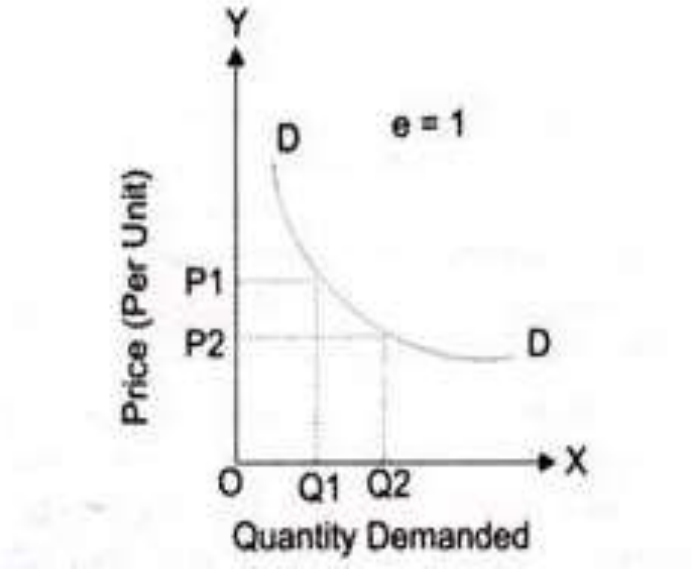
- Perfectly Elastic
- Ed = ∞
- Perfectly inelastic demand is a theoretical concept and cannot be applied in a practical situation. However, in case of essential goods, such as salt, the demand does not change with change in price. Therefore, the demand for essential goods is perfectly inelastic.



# 3 Types of Price Elasticity of Demand

**Guess type of elasticity and value by graph**

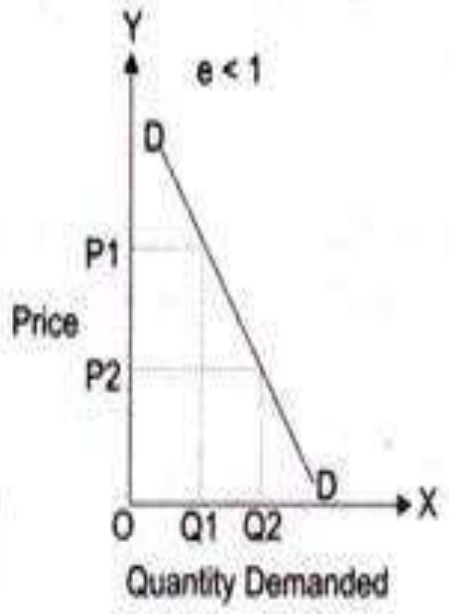
- Unitary Elastic
- Ed = 1
- The demand curve for unitary elastic demand is represented as a rectangular hyperbola. In this case, the percentage change in quantity demanded and the percentage change in price is the same



# 3 Types of Price Elasticity of Demand

**Guess type of elasticity and value by graph**

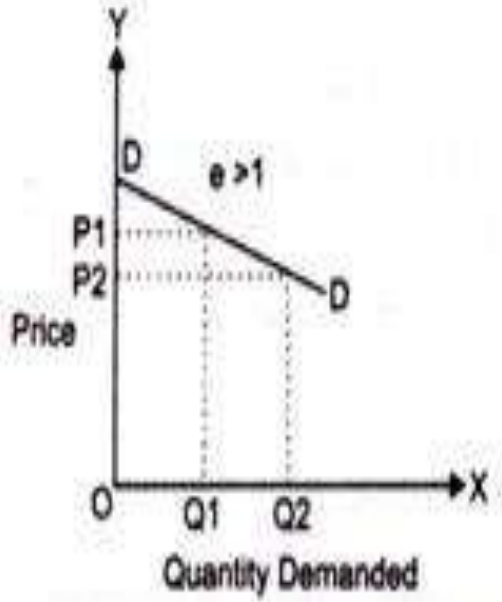
- Relatively Inelastic
- Ed < 1
- For example, the price of milk increases from Rs. 45 to Rs. 50. In such a case, consumers may not switch to another brand of milk due to limited substitutes and habit. Relatively inelastic demand has a practical application.



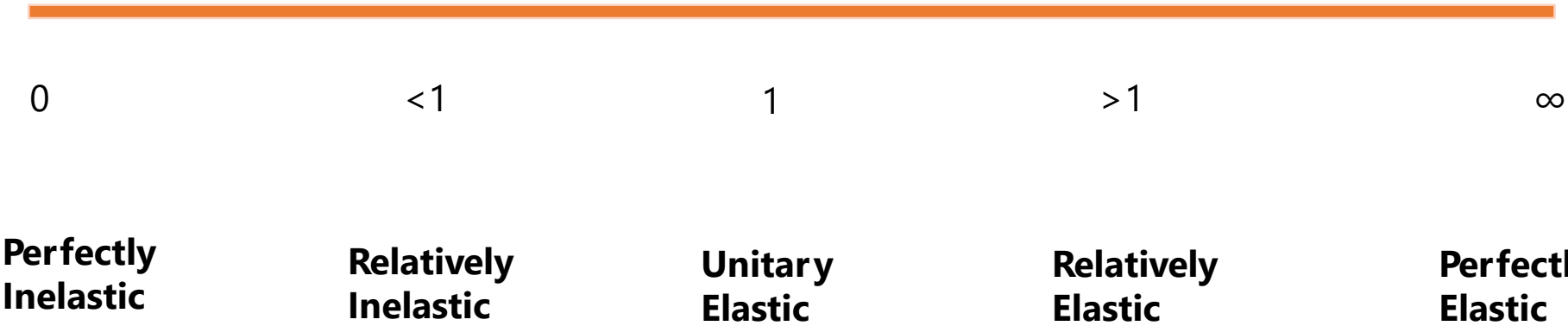
# 3 Types of Price Elasticity of Demand

**Guess type of elasticity and value by graph**

- Relatively Elastic
- Ed > 1
- For example, the price of a particular brand of cold drink increases from Rs. 15 to Rs. 20. In such a case, consumers may switch to another brand of cold drink. Relatively elastic demand has a practical application.



# 3 Types of Price Elasticity of Demand



# 3 Types of Price Elasticity of Demand

Explain which type of price elasticity of demand do the following products follow

1. Pepsi
2. Salt
3. Milk
4. Petrol
5. Rice
6. Home heating oil
7. Luxury car
8. Paracetamol

# 4.1 Ratio or Percentage Method

- Elasticity of demand is measured by dividing the percentage change in demand by the percentage change in price.
- Percentage method is also known as Arithmetic method.

$$Ed = \frac{\%\ change\ in\ quantity\ demanded}{\%\ change\ in\ price} = \frac{\Delta Q}{Q}\ X\ \frac{P}{\Delta P}$$

# 4.2 Total Expenditure Method

- In this method, total amount of expenditure before and after the price change is compared.
- Here the total expenditure refers to the product of price and quantity demanded.

Total Expenditure = Price X Quantity Demanded

# 4.2 Total Expenditure Method

**A) Relatively elastic demand (Ed >1):**
When with a given change in the price of a commodity total outlay increases, elasticity of demand is greater than one.

**B) Unitary elastic demand (Ed = 1):**
When price falls or rises, total outlay does not change or remains constant, elasticity of demand is equal to one.

**C) Relatively inelastic demand (Ed <1):**
When with a given change in the price of a commodity total outlay decreases, elasticity of demand is less than one.

# 4.2 Point or Geometric Method

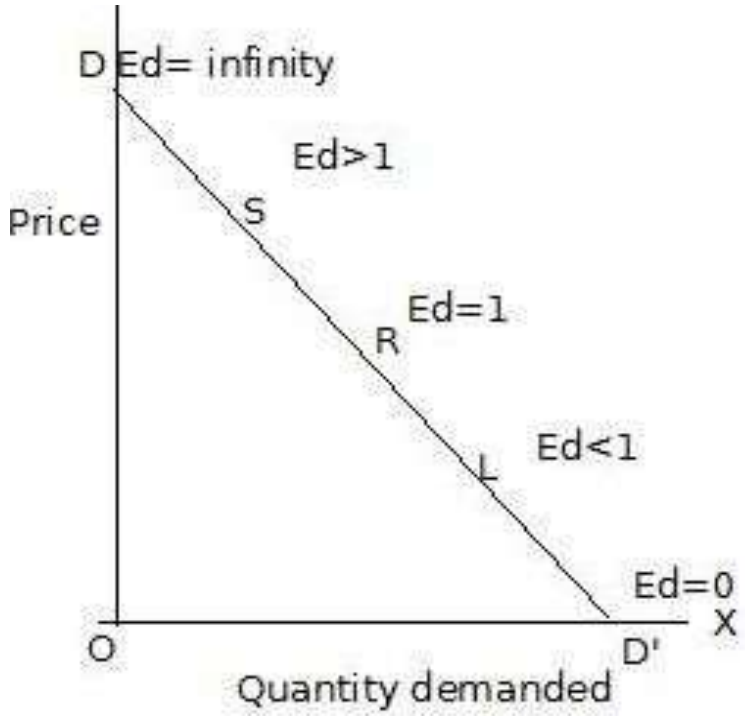
- The ratio method and total outlay methods are unable to measure elasticity of demand at a given point on the demand curve.
- At any point on the demand curve,

$$Ed = \frac{Lower\ segment\ of\ demand\ curve\ below\ a\ given\ point\ (L)}{Upper\ segment\ of\ demand\ curve\ above\ a\ given\ point\ (U)}$$

# 4.2 Point or Geometric Method

**Linear Demand Curve:**

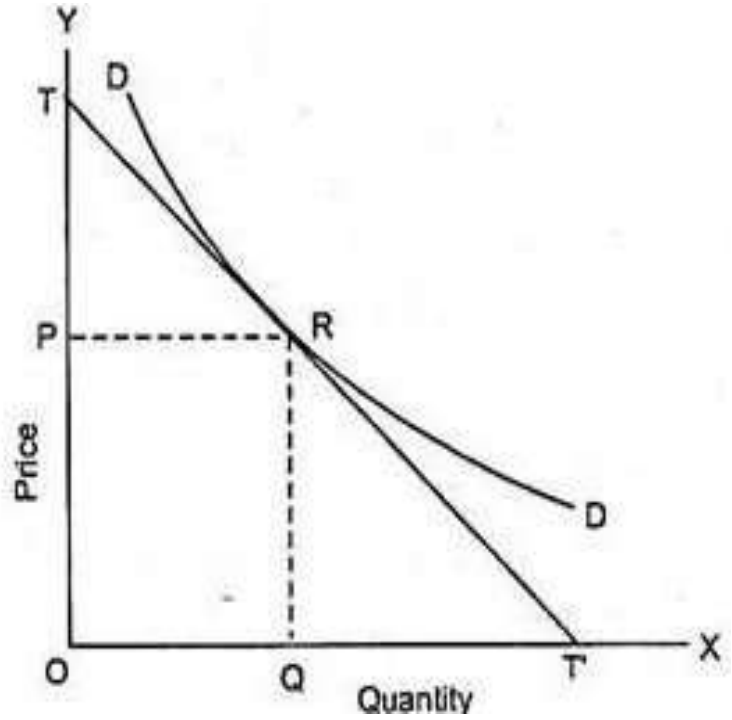
- When the demand curve is linear i.e. a straight line.
- Elasticity of demand will be different at each point.



# 4.2 Point or Geometric Method

**Non-Linear Demand Curve:**

- When the demand curve is non-linear i.e. convex to origin, to measure price elasticity of demand
- We have to draw a tangent ‘TT’ touching the given point on the demand curve and extending it to meet ‘Y’ axis at point ‘T’ and ‘X’ axis at point ‘T’.



# 5 Income elasticity of demand

Explain the effect on quantity demanded of normal goods, necessary goods and inferior goods with a rise in income

# 5 Income elasticity of demand

It refers to the degree of responsiveness of a change in quantity demanded to a change in the income

$$Ey = \frac{\%\ change\ in\ quantity\ demanded}{\%\ change\ in\ income} = \frac{\Delta Q}{Q}\ X\ \frac{Y}{\Delta Y}$$

1. Negative Income Elasticity – Inferior Goods
2. Zero Income Elasticity – Necessary Goods
3. Positive Income Elasticity – Normal Goods

# 6 Cross elasticity of demand

It refers to a change in quantity demanded of one commodity due to a change in the price of other commodity.

$$Ed = \frac{\%\ change\ in\ quantity\ demanded\ of\ A}{\%\ change\ in\ price\ of\ B} = \frac{\Delta\ QA}{QA}\ X\ \frac{PB}{\Delta\ PB}$$

1. Negative Cross Elasticity of Demand – Complementary Goods
2. Zero Cross Elasticity of Demand – Non-Related Goods
3. Positive Cross Elasticity of Demand – Substitute Goods

# Questions

1. Nike has changed the price of a trending casual shoes from Rs 749 to Rs 799. For the original price, the quantity demanded was 1500 shoes. For this product to have unitary elasticity of demand, what should be the change in quantity demanded and hence the new demand? (Find the answer to the nearest rounded value)

2. Yesterday, the price of envelopes was $3 a box, and Julie was willing to buy 10 boxes. Today, the price has gone up to $3.75 a box, and Julie is now willing to buy 8 boxes.? What is the value of Julie's elasticity of demand? What type of elasticity of demand does Julie have?

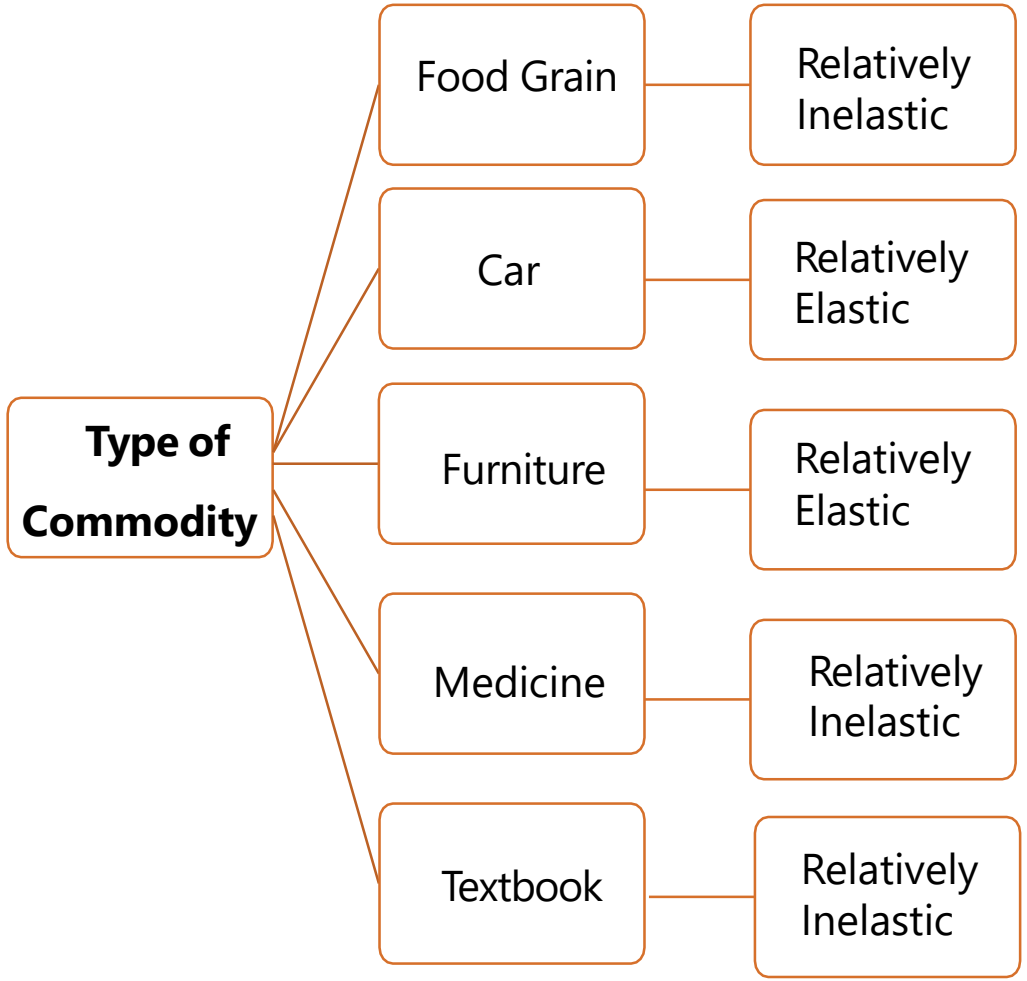
3. If Neil's elasticity of demand for hot dogs is constantly 0.9, and he buys 4 hot dogs when the price is $1.50 per hot dog, how many will he buy when the price is $1.00 per hot dog?

4. Katherine advertises to sell cookies for $4 a dozen. She sells 50 dozen, and decides that she can charge more. She raises the price to $6 a dozen and sells 40 dozen. What is the elasticity of demand? Assuming that the elasticity of demand is constant, how many would she sell if the price were $10 a box?

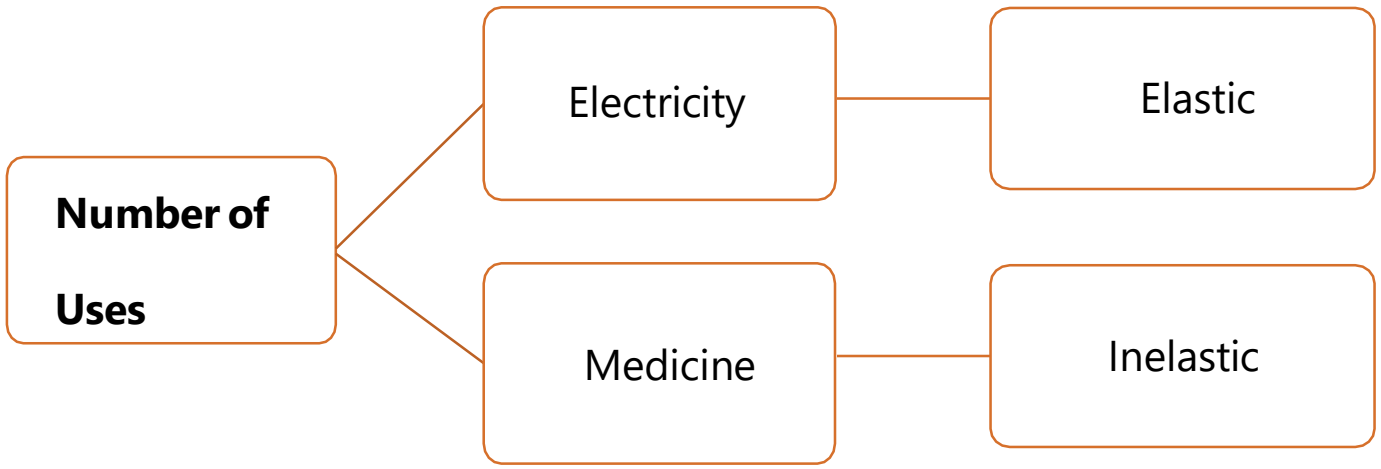
# 7 Factor Influencing Elasticity of Demand

What are the reasons that could affect elasticity of demand? (whether high or low)

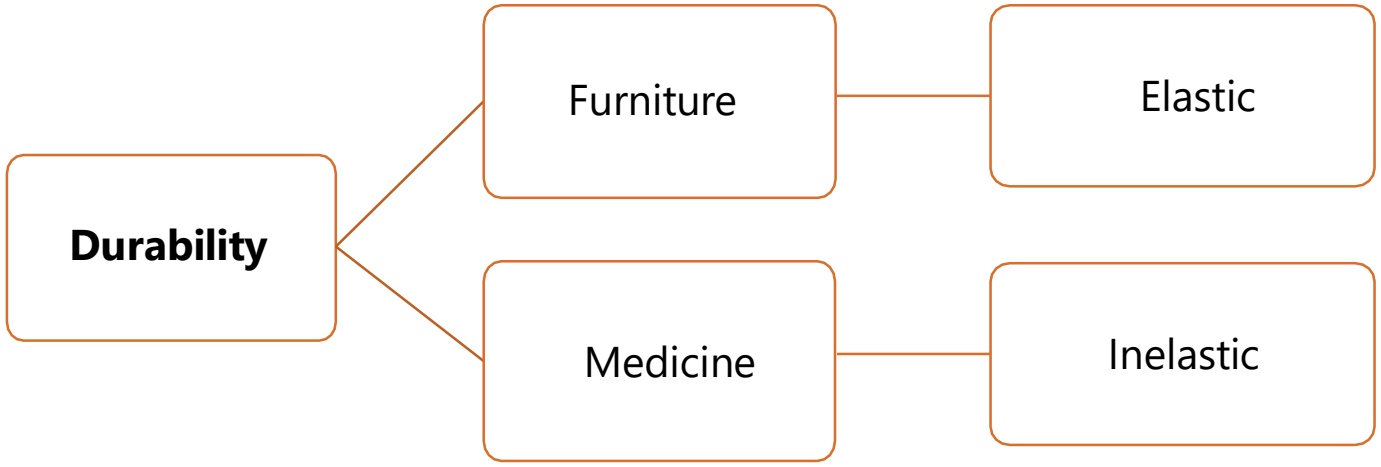
# 7 Factor Influencing Elasticity of Demand



# 7 Factor Influencing Elasticity of Demand



# 7 Factor Influencing Elasticity of Demand



# 7 Factor Influencing Elasticity of Demand

**Availability of Substitutes**

Inelastic
Thanos's Girlfriend wants Kahinoor Diamond

Elastic
Jethalal goes to have Dosa & suddenly Babita comes to have Idli  So just to accompany Babita Jethala also have Idli. Guess the demand for Dosa

# 7 Factor Influencing Elasticity of Demand

**Income of Consumer**

Inelastic
Mr. Mukesh Ambani is Comes under top 10 Rich person of India for him demand will be

Elastic
Katrina comes under below poverty line for her demand will be

# 7 Factor Influencing Elasticity of Demand

**Habit**

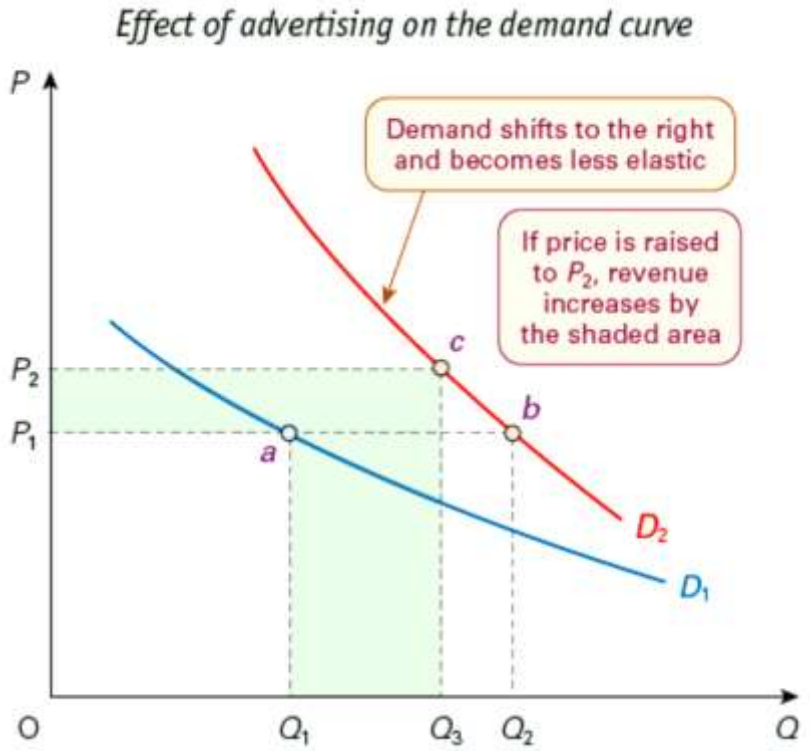
Inelastic
Kabir Singh is addicted to alcohol. Here demand for alcohol will be - Inelastic

# Advertising and Elasticity

Give reasons as to how both these things are done

Advertisers are trying to do two things:

- Shift the product's demand curve to the right.
- Make it less price elastic.



# 8 Importance of Elasticity of Demand

- Producer
- Government
- Factor Pricing
- Foreign Trade
- Public Utilities
- Proportion of Expenditure

# 9 Price Elasticity of Supply

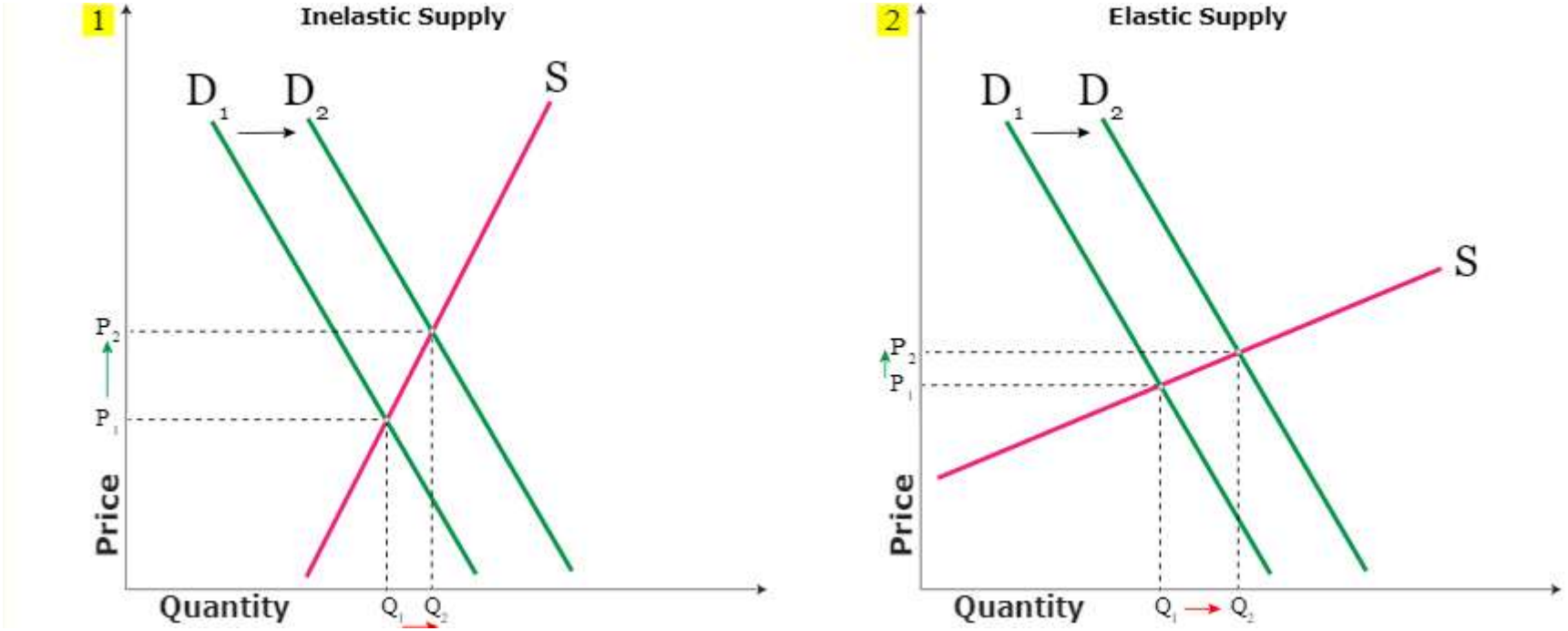
The price elasticity of supply (PES) measures the sensitivity of quantity supplied to a change in price.

$$Es = \frac{\%\ change\ in\ quantity\ Supplied}{\%\ change\ in\ price} = \frac{\Delta\ Qs}{Qs}\ X\ \frac{P}{\Delta\ P}$$

# 9 Price Elasticity of Supply

In general, PES > 0, i.e. firms will supply more at a higher price.

In broad terms, an elastic (inelastic) supply curve will be flat (steep), as a small (large) % change in price leads to a large (small) % change in quantity supplied.



# 9 Price Elasticity of Supply

The PES depends on factors such as:

- How costs increase with output (i.e. marginal costs).
  Lower marginal costs (eg because of excess capacity, readily available raw materials) will lead to a higher PES.

- Time period.
  It takes time to increase factor inputs and hence output and so the PES will be higher in the long run than the short run.

# Quick Recap

- **Elasticity** is the measure of change in demand/supply due to change in other variables.
- **Price Elasticity of demand** measures the change in the quantity demanded due to change in price.
- **Income Elasticity of demand** measures the change in the quantity demanded due to change in income.
- **Cross Elasticity of demand** measures the change in the quantity demanded one commodity due to a change in the price of other commodity.
- There are 5 types of elasticity of demand
  1. Perfectly Inelastic
  2. Relatively Inelastic
  3. Unitary Elastic
  4. Relatively Elastic
  5. Perfectly Elastic

# Quick Recap

- In **ratio or percentage method**, Elasticity of demand is measured by dividing the percentage change in demand by the percentage change in price.

- In this **total expenditure method**, total amount of expenditure (price x quantity) before and after the price change is compared.

- In this **point or geometric method**, Elasticity of demand for a particular point is obtained by dividing the length of lower segment of the demand curve by length of upper segment of the demand curve.

# Quick Recap

- Factors influencing Elasticity of Demand
  1. Type of Commodity
  2. Number of uses
  3. Durability
  4. Availability of Substitutes
  5. Income of Consumer
  6. Habit

- The **price elasticity of supply** (PES) measures the sensitivity of quantity supplied to a change in price.

- It depends on factors such as
  1. How costs increase with output (i.e. marginal costs).
  2. Time period.