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# Chapter 5: Elasticity and Its Application

## THE ELASTICITY OF DEMAND

Elasticity – A measure of the responsiveness of quantity demanded or quantity supplied to a change in one of its determinants

### The Price Elasticity of Demand and Its Determinants

Law of demand – Fall in the price of a good raises the quantity demanded

- Price elasticity of demand – A measure of how much the quantity demanded of a good responds to a change in the price of that good
  - Computed as the percentage change in quantity demanded divided by the percentage change in price
  - *Elastic* - quantity demanded responds substantially to changes in the price
  - *Inelastic* – quantity demanded responds only slightly to changes in the price
- Measures how willing consumers are to buy less of the good as its price rises

What influences the price elasticity of demand?

- Availability of Close Substitutes
  - Goods with close substitutes tend to have more elastic demand because it is easier for consumers to switch from that good to others
    - Butter margarine similar → price in butter increases, butter sold falls by a large amount
    - Egg no substitute → price in egg increases, demand of eggs inelastic
- Necessities versus Luxuries
  - Necessities have inelastic demand, luxuries have elastic demand
    - Price of doctor rise → no dramatic reduction of doctors visits
    - Price of sailboat rise → quantity demanded falls substantially
  - Depends on buyer
    - Sailor might think sailboats are a necessity
- Definition of the Market
  - How we draw boundaries in the market
    - Narrowly defined markets have more elastic demand than broadly defined markets
      - Food → inelastic demand (no substitute)
      - Ice-cream → more elastic (other desserts)
      - Vanilla Ice-cream → very elastic demand (other flavors)
- Time Horizon
  - Goods tend to have more elastic demand over longer time horizons
    - Gasoline price rises → only small fall of demand in the beginning
      - People move closer to work

- Buy fuel efficient cars
- Switch to public transportation

- Several years → quantity gasoline demanded falls dramatically

**Computing the Price Elasticity of Demand**

Price elasticity of demand =

- percentage change in quantity demanded / percentage change in price
  - 10 percent increase in price
  - quantity demand falls by 20 percent
- 20/10 → elasticity 2
  - Absolute values → greater number represents greater responsiveness of quantity demanded to changes in price

**The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities**

Calculating price elasticity of demand between two points on a demand curve

- Point A to B, different than point B to A
- *Midpoint Method* – Divide change by midpoint of initial and final
  - Eg: $4 rise to $6 (midpoint $5)
  - (6-4)/5 x 100 = 40 (40% fall)

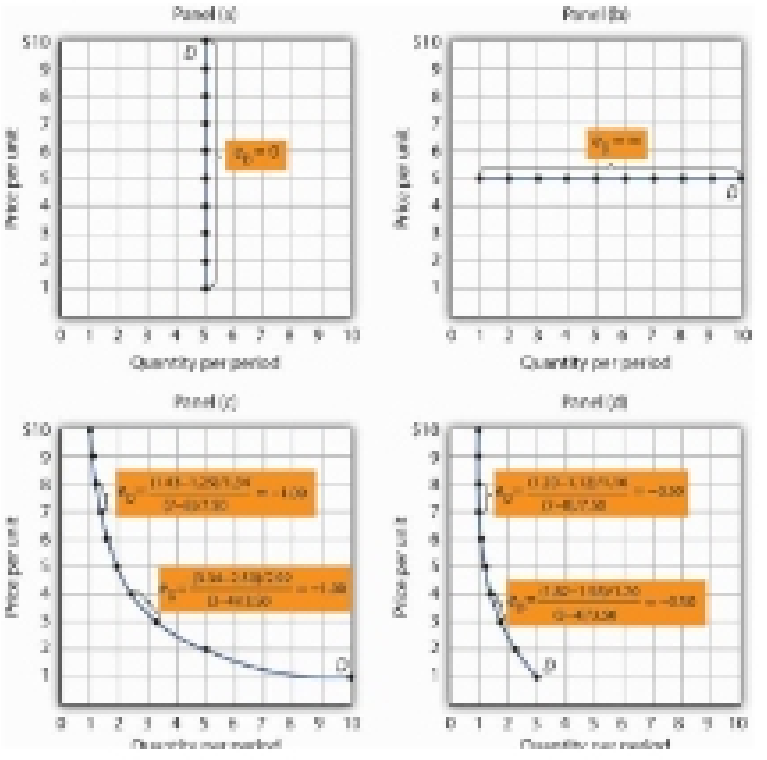
Price elasticity of demand → $(Q_1, P_1)$ and $(Q_2, P_2)$

$$\frac{(Q_2-Q_1)/[(Q_2+Q_1)/2]}{(P_2-P_1)/[(P_2+P_1)/2]}$$

**The Variety of Demand Curves**

- Classification on demand curves according to their elasticity
  - Demand is elastic when elasticity is greater than 1
    - Quantity moves proportionally more than price
  - Demand is inelastic when elasticity is less than 1
    - Quantity moves proportionally less than price
  - Unit elasticity when elasticity is exactly at 1
    - Quantity moves same amount proportionately as the price
- Rule of thumb →
  - Flatter the demand curve, greater the price elasticity of demand
  - Steeper the demand curve, smaller the elasticity of demand

price



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**Total Revenue and the Price Elasticity of Demand**

Total Revenue – The amount paid by buyers and received by sellers of a good

- (Price of the good x quantity sold) → (P x Q)

How does it change along demand curve?

- Inelastic demand → increase in price causes increase in total revenue
  - Extra revenue from selling at higher price compensates for selling fewer units
- Elastic demand → increase in the price causes a decrease in total revenue
  - Reduction in quantity demanded is greater than gains from increased price

**Elasticity and Total Revenue along a Linear Demand Curve**

How elasticity varies along a linear demand curve

- Straight line has constant slope → price/quantity (rise/run)
  - Constant slope but changing elasticity
    - Low price high quantity → inelastic
    - High price low quantity → elastic

**Other Demand Elasticities**

Income elasticity of demand – A measure of how much the quantity demanded of a good responds to a change in consumer income

- Percentage change in quantity demanded / percentage change in income
  - *Normal goods* – higher income more demand
  - *Inferior goods* – higher income less demand
    - Public transportation

Cross-price elasticity of demand – A measure of how the quantity demanded of one good responds to a change in the price of another good

- Percentage change in quantity demanded of good 1 / percentage change in the price of good 2
  - Positive or negative elasticity depends on goods being compliments or substitutes
    - Substitutes → cross-price elasticity is positive
    - Compliments → cross-price elasticity is negative

**THE ELASTICITY OF SUPPLY**

Producers of a good offer to sell more of it when the price of the good rises