Chapter 4

Price elasticity of demand – a *units-free measure* of the responsiveness of the quantity demanded of a good to a change in its price when all other influences on buying plans remain the same

$$\textbf{Price elasticity of demand} = \frac{\textbf{percentage change in quantity demanded}}{\textbf{Percentage change in price}}$$

We must know the quantity demanded of pizza at two different prices

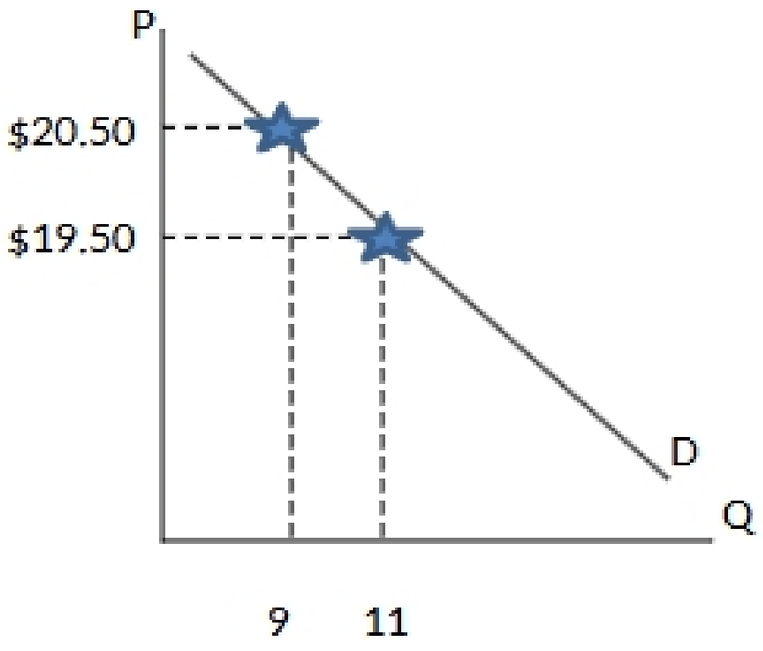
Change in price - a percentage of the average price

Change in quantity demanded – a percentage of the average quantity

%ΔPrice = (ΔPrice / Average price) * 100

%ΔQuantity = (ΔQuantity / Average Quantity) * 100

Price of elasticity of demand = %ΔQ / %ΔP



Quantity increase from 9 to 11

$$\frac{11-9/10 * 100\%}{(1/20)*100\%} = 4$$

$$\frac{11-9 \text{ (change in quantity)}}{10 \text{(average quantity)}}$$

$$\frac{1 \text{ (change in price)}}{20 \text{ (average price)}}$$

Elasticity is a *units-free measure* because the percentage change in each variable is independent of the units in which the variable is measured

When the price of a good rises, the quantity demanded decreases.

A positive change in price brings a negative change in the quantity demanded

the price elasticity of demand is a negative number, but it is the absolute value of the number

- **Perfectly Inelastic demand** – if the quantity demanded remains constant when the price changes, then the price elasticity of demand is zero; Quantity never changes (vertical line)

  Ex: Insulin; no matter what the price, the quantity diabetics buy remains the same

- **Unit elastic demand** – if the percentage change in the quantity demanded equals the percentage change in the price (%ΔQ = %ΔP), then price elasticity equals 1

- **Inelastic demand** – the price elasticity of demand is between zero and 1 (relatively steep line)

  Ex. Food and shelter

★ **Perfectly elastic demand** – if the quantity demanded changes by an infinitely large percentage in response to a tiny price change, then the price elasticity of demand is <u>infinity</u> (horizontal line)

Ex: Two soda machines with the same price; goods that have perfect substitutes

★ **Elastic demand** – the percentage change in the quantity demanded exceeds the percentage change in price. The price elasticity of demand is <u>greater than 1</u>. (Relatively flat line)

Ex: Automobiles and furniture

A linear demand curve has a constant slope but a varying elasticity *****Elasticity Is NOT a slope*****

Demand is unit elastic at the midpoint, elastic above the midpoint, and inelastic below midpoint

Total revenue –the price of the good multiplied by the quantity sold

Changed when prices change

- If demand is <u>elastic</u>, a 10% price cut increases the quantity sold by more than 10% and total <u>revenue increases</u>
- If demand is <u>inelastic</u>, a 10% price cut increases the quantity sold by less than 10% and total <u>revenue decreases</u>
- If demand is <u>unit elastic</u>, a 10% price cut increases the quantity sold by 10% and total revenue <u>does not change</u>

-A price cut in the elastic range brings an increase in total revenue – the percentage increase in the quantity demanded is greater than the percentage decrease in price.
- A price cut in the inelastic range brings a decrease in total revenue – the percentage increase in the quantity demanded is less than the percentage decrease in price.
- At unit elasticity, total revenue is at a maximum.

Total revenue test – a method of estimating the price elasticity of demand by observing the change in total revenue that results from a change in the price, when all other influences on the quantity sold remain the same

If a price cut increases total revenue, demand is elastic

If a price cut decreases total revenue, demand is inelastic

If a price cut leaves total revenue unchanged, demand is unit elastic

When a price changes, the change in your spending on the good depends on your elasticity of demand

- If demand is elastic, a 1% price cut increases the quantity you buy by more than 1% and your spending on that item increases
- If your demand is inelastic, a 1% price cut increases the quantity you buy by less than 1% and your spending on that item decreases

- If your demand is unit elastic, a 1% price cut increases the quantity you buy by 1% and your spending on the item does not change

If you spend more on an item when its price falls, your demand is elastic

If you spend the same amount when its price falls, your demand is unit elastic

If you spend less on an item when its price falls, your demand is inelastic

The elasticity of demand for a good depends on:

- The closeness of substitutes
  - The closer the substitutes, the more elastic is the demand for it

    Ex. Oil does not have any substitutes so it is inelastic

    Necessities (food) have poor substitutes – inelastic

    Luxuries are elastic
- The proportion of income spent on the good
  - Other things remaining the same, the greater the proportion of income spent on a good, the more elastic is the demand for it
  - Gum (inelastic) vs. housing (elastic)
    - If gum price doubles, you continue buying it
    - If rent doubles, you look for ways to lower it (more roommates, etc.)
    - Rent takes up a higher amount of budget than gum
- The time elapsed since the price change
  - The longer the time that has elapsed since a price change, the more elastic the demand
  - Demand for oil became more elastic as more time elapsed following the price increase

Cross elasticity of demand – a measure of the responsiveness of the demand for a good to a change in the price of a substitute or complement, other things remaining the same

Cross elasticity of demand = %Δ in quantity demanded / %Δin price of substitute or complement

$(\Delta Q/Q_{ave})/ (\Delta \text{Price of s or c}/P_{ave}$ s or c)

(Cross elasticity of demand is *positive* for a substitute and *negative* for complement)

If two items are close substitutes (burgers and hotdogs), the cross elasticity is large

If two items are close complements (movies and popcorn), the cross elasticity is large

Income elasticity of demand – a measure of the responsiveness of the demand for a good or service to a change in income, other things remaining the same

Income elasticity of demand = %Δ in quantity demanded / %Δ in income

- Greater than 1 (normal good, income elastic)