Elasticity

From:

Book 1: Chapter 6

Price Elasticity of Demand

- Measures buyers' responsiveness to price changes
- Elastic demand
  - Sensitive to price changes
  - Large change in quantity
- Inelastic demand
  - Insensitive to price changes
  - Small change in quantity

Price Elasticity of Demand Formula

- Formula for price elasticity of demand

$$E_d = \frac{\text{Percentage Change in } \textbf{Quantity Demanded} \text{ of Product X}}{\text{Percentage Change in } \textbf{Price} \text{ of Product X}}$$

Price Elasticity of Demand Formula

- Use the midpoint formula
- Ensures consistent results

$$E_d = \frac{\text{Change in quantity}}{\text{Sum of quantities / 2}} \div \frac{\text{Change in price}}{\text{Sum of prices / 2}}$$

Price Elasticity of Demand Formula

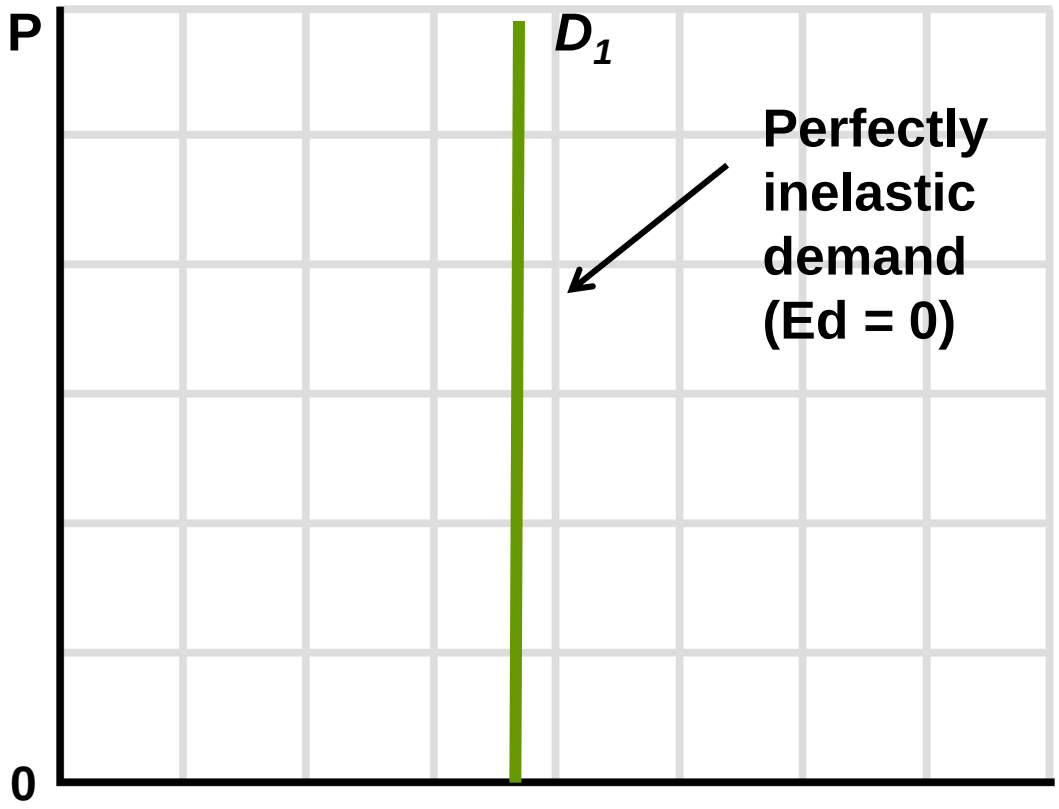
- Use percentages
  - Unit free measure
  - Compare responsiveness across products
- Eliminate the minus sign
  - Easier to compare elasticities

Interpretation of Elasticity of Demand

- $E_d > 1$ demand is elastic
- $E_d = 1$ demand is unit elastic
- $E_d < 1$ demand is inelastic

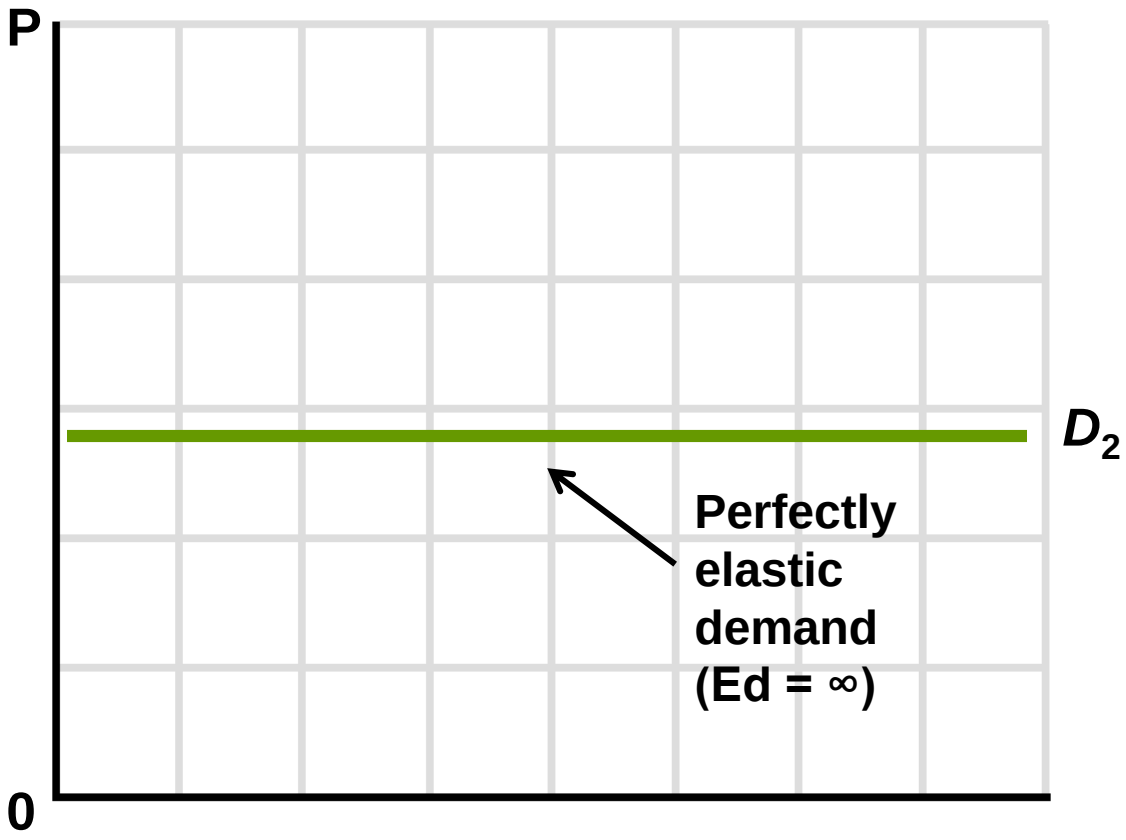
- Extreme cases
  - Perfectly inelastic
  - Perfectly elastic

Extreme Cases



Perfectly inelastic demand

Extreme Cases

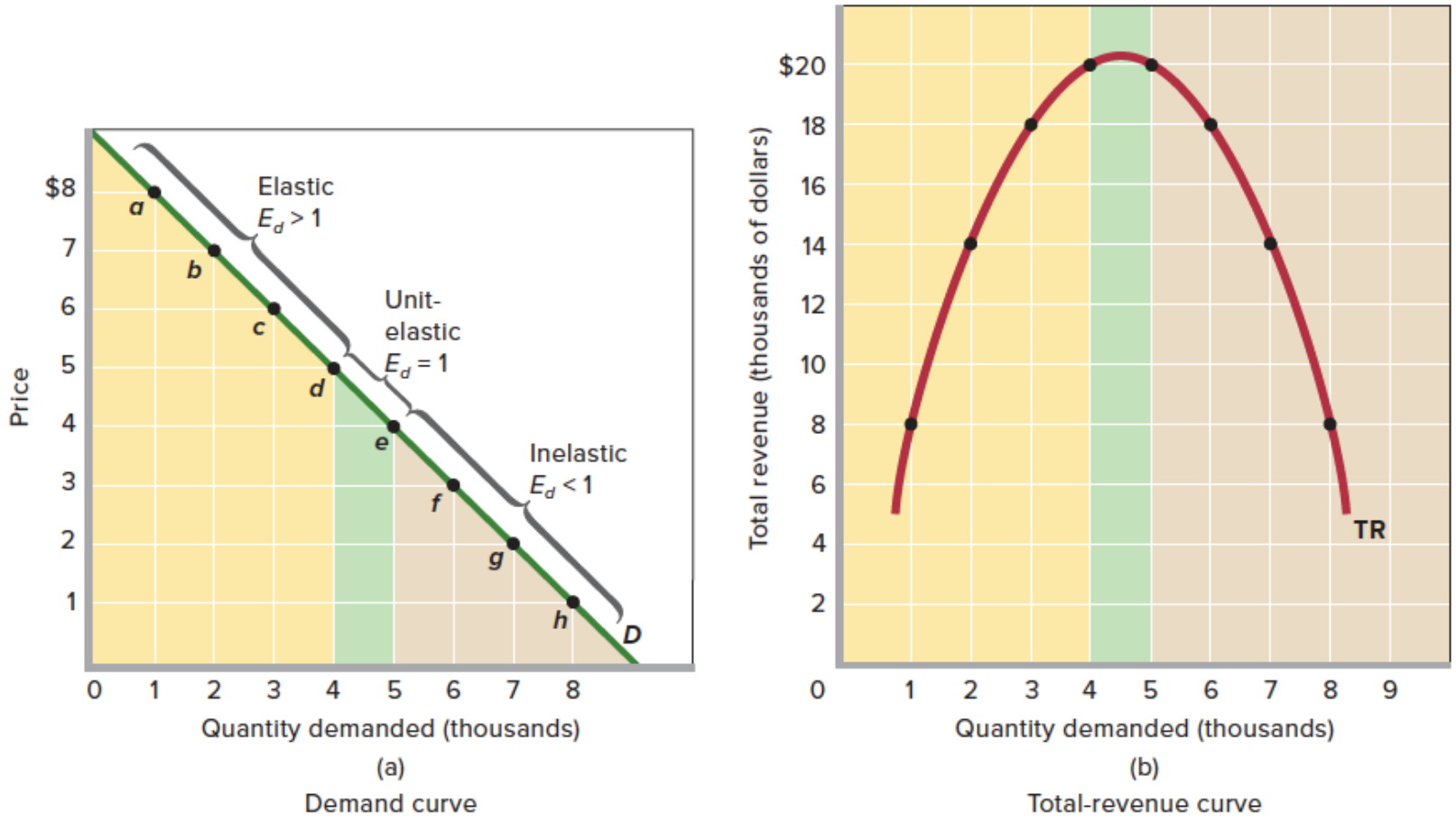


Perfectly elastic demand

Total Revenue Test

- Total Revenue = Price x Quantity
- Inelastic demand
  - P and TR move in the same direction
- Elastic demand
  - P and TR move in opposite directions

The relation between price elasticity of demand and total revenue.



Summary of Price Elasticity of Demand

Price Elasticity of Demand: A Summary

Absolute Value of Elasticity Coefficient	Demand Is	Description	Impact on Total Revenue of a:	
			Price Increase	Price Decrease
Greater than 1 ($E_d > 1$)	Elastic or relatively elastic	Q_d changes by a larger percentage than does price	Total revenue decreases	Total revenue increases
Equal to 1 ($E_d = 1$)	Unit or unitary elastic	Q_d changes by the same percentage as does price	Total revenue is unchanged	Total revenue is unchanged
Less than 1 ($E_d < 1$)	Inelastic or relatively inelastic	Q_d changes by a smaller percentage than does price	Total revenue increases	Total revenue decreases

Determinants of Elasticity of Demand

- Substitutability
  - More substitutes, demand is more elastic
- Proportion of Income
  - Higher proportion of income, demand is more elastic
- Luxuries vs. Necessities
  - Luxury goods, demand is more elastic
- Time
  - More time available, demand is more elastic

Cross Elasticity of Demand

- Measures responsiveness of sales to change in the price of another good
- Substitutes – positive sign
- Complements – negative sign
- Independent goods - zero

$$E_{x,y} = \frac{\text{Percentage change in quantity demanded of product X}}{\text{Percentage change in price of product Y}}$$

Income Elasticity of Demand

- Measures responsiveness of buyers to changes in income
- Normal goods – positive sign
- Inferior goods – negative sign

$$E_i = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

$E_{x,y}$ and E_i

Cross and Income Elasticities of Demand

Value of Coefficient	Description	Type of Good(s)
Cross elasticity: Positive ($E_{wz} > 0$)	Quantity demanded of W changes in same direction as change in price of Z	Substitutes
Negative ($E_{xy} < 0$)	Quantity demanded of X changes in opposite direction from change in price of Y	Complements
Income elasticity: Positive ($E_i > 0$)	Quantity demanded of the product changes in same direction as change in income	Normal or superior
Negative ($E_i < 0$)	Quantity demanded of the product changes in opposite direction from change in income	Inferior

Price Elasticity of Supply

- Measures sellers' responsiveness to price changes
  - Elastic supply, producers are responsive to price changes
  - Inelastic supply, producers are not responsive to price changes

Price Elasticity of Supply

- Formula to compute elasticity
- $E_s > 1$ supply is elastic
- $E_s < 1$ supply is inelastic

$$E_s = \frac{\text{Percentage Change in } \textbf{Quantity Supplied} \text{ of Product X}}{\text{Percentage Change in } \textbf{Price} \text{ of Product X}}$$

Impact of Time on Elasticity

- **The Immediate Market Period**
  - the length of time over which producers are unable to respond to a change in price with a change in quantity supplied.
- **The Short Run**
  - a period of time too short to change plant capacity but long enough to use the fixed-sized plant more or less intensively.
- **The Long Run**
  - a time period long enough for firms to adjust their plant sizes and for new firms to enter (or existing firms to leave) the industry.

Reading Assignment

"Elasticity and Pricing Power: Why Different Consumers Pay Different Prices"

Book 1 Page 134-135