Contents

Chapter 2

Elasticities

2.1 The Elasticity of Demand

2.1.1 The Price Elasticity of Demand

- A good's price elasticity of demand measures how much the quantity demanded responds to a change in price.
- Demand for a good is elastic if the quantity demanded responds a lot to changes in price.
- Demand is inelastic if the quantity demanded doesn't respond a lot to changes in price.

Determinants of Price Elasticity of Demand

1. Availability of Substitutes: Goods with close substitutes are more elastic.
2. Necessities v. Luxuries: Necessities are more inelastic and luxuries are more elastic.
3. Market Definition: Goods in narrowly defined markets are more elastic, and goods in broadly defined markets are more inelastic.
4. Time Horizon: Goods are more elastic in the long term than the short term.

2.1.2 Computing the Price Elasticity of Demand

- Price elasticity of demand is

$$\eta = \left| \frac{\%\Delta Q_D}{\%\Delta P} \right|$$

- Ex. The price of ice-cream increases by 10%, and the quantity bought decreases by 20%. The price elasticity of demand is:

$$\eta = \left| \frac{-20\%}{10\%} \right| = 2$$

2.1.3 The Midpoint Method

- Problem: The typical percent change calculation depends on the initial point.
- Ex.

$$Point\ A:\ P_A = \$4,\ Q_A = 120$$
$$Point\ B:\ P_B = \$6,\ Q_B = 80$$

$$\%\Delta P_{A\to B} = \frac{P_B - P_A}{P_A} = \frac{6-4}{4} = \frac{1}{2}$$
$$\%\Delta P_{B\to A} = \frac{P_A - P_B}{P_B} = \frac{4-6}{6} = -\frac{1}{3}$$

- Solution: The midpoint method calculates percent change by using the midpoint of the two values in the denominator.
- Ex.

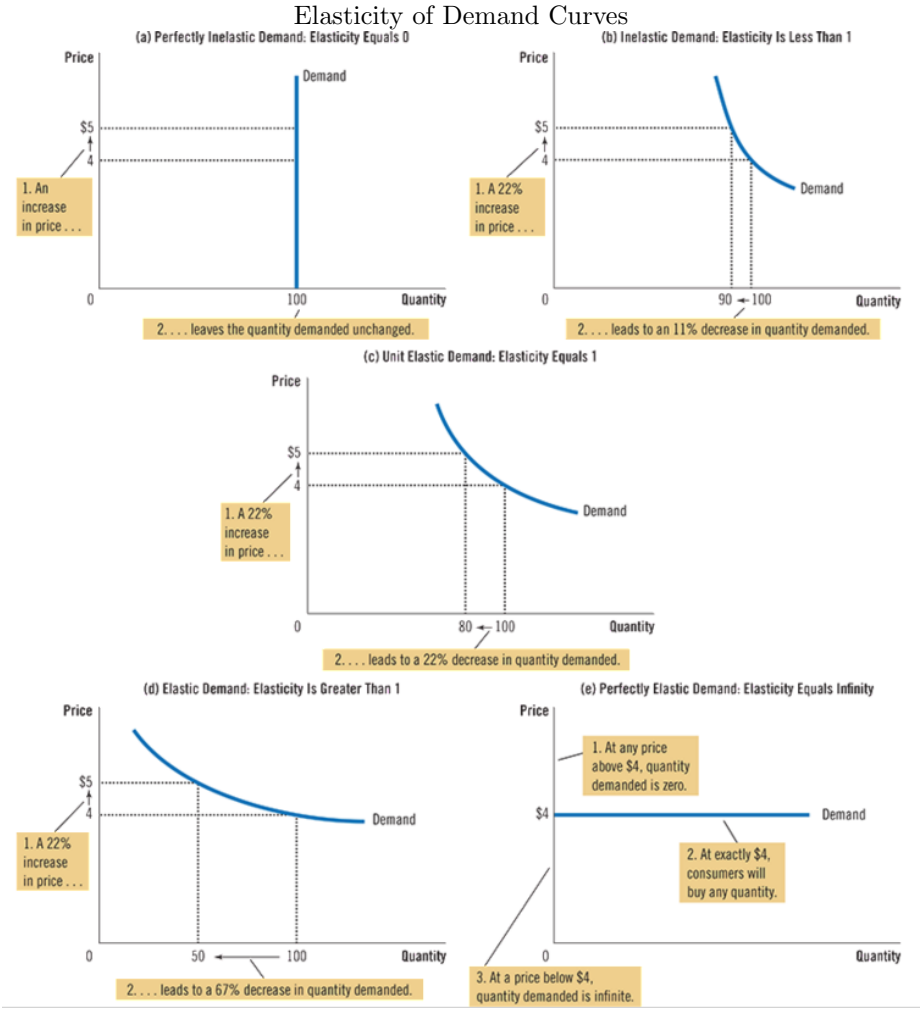
$$\%\Delta P = \frac{P_B - P_A}{\frac{P_A+P_B}{2}} = \frac{6-4}{\frac{4+6}{2}} = \frac{2}{5} = 40\%$$

- To calculate elasticities, use the midpoint method.
- Ex.

$$\eta = \left| \frac{\%\Delta Q}{\%\Delta P} \right|$$
$$\%\Delta Q = \frac{Q_A - Q_B}{\frac{Q_A+Q_B}{2}} = \frac{120-80}{\frac{120+80}{2}} = \frac{2}{5}$$
$$\%\Delta P = \frac{P_A - P_B}{\frac{P_A+P_B}{2}} = \frac{4-6}{\frac{4+6}{2}} = -\frac{2}{5}$$
$$\eta = 1$$

2.1.4 The Variety of Demand Curves

- Demand is elastic when the elasticity is greater than 1.
- Demand is inelastic when the elasticity is less than 1.
- Demand is unit elastic when the elasticity equals 1.
- The flatter a demand curve is, the more elastic it is.



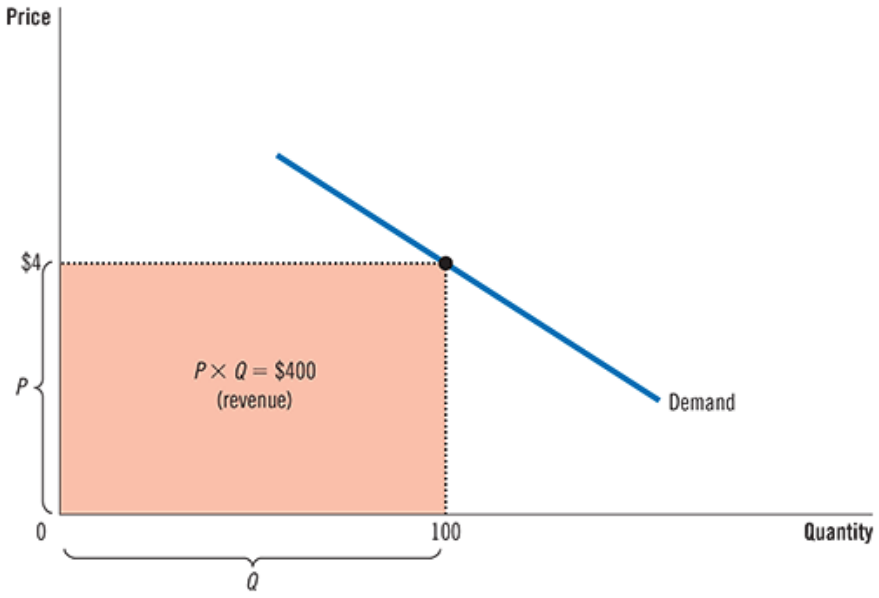
2.1.5 Total Revenue and Price Elasticity of Demand

- Total Revenue in a market is the amount paid by buyers and received by sellers.
- Algebraically,

$$TR = P \times Q$$

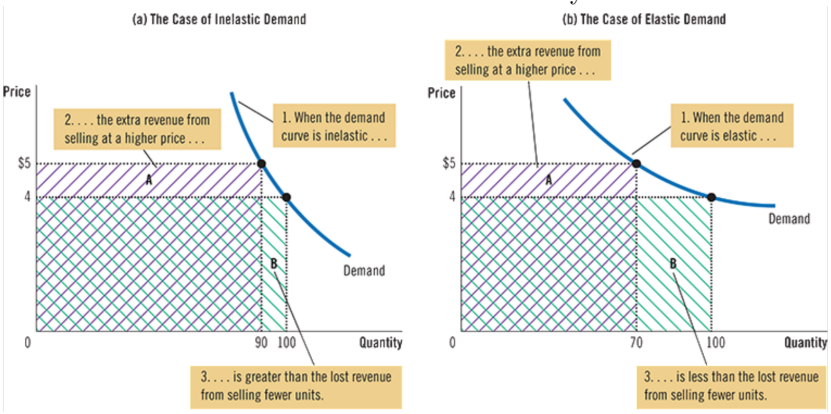
- Graphically,

Total Revenue



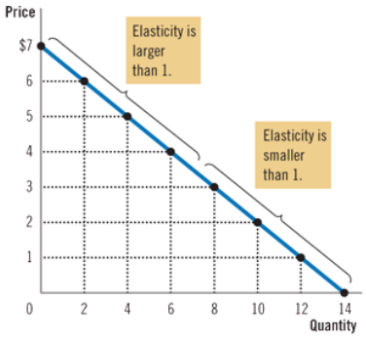
- The price elasticity of demand determines how a price change affects total revenue
- If demand is inelastic, an increase in price increases total revenue
- If demand is elastic, an increase in price decreases total revenue

Total Revenue and Elasticity



2.1.6 Price Elasticity of Demand for Linear Demand Curves

- The elasticity of linear demand curves is non-constant



Price	Quantity	Total Revenue (Price × Quantity)	Percentage Change in Price	Percentage Change in Quantity	Elasticity	Description
$7	0	$0				
			15	200	13.0	Elastic
6	2	12				
			18	67	3.7	Elastic
5	4	20				
			22	40	1.8	Elastic
4	6	24				
			29	29	1.0	Unit elastic
3	8	24				
			40	22	0.6	Inelastic
2	10	20				
			67	18	0.3	Inelastic
1	12	12				
			200	15	0.1	Inelastic
0	14	0				

2.1.7 Other Demand Elasticities

- The income elasticity of demand measures how the quantity demanded changes as consumer income changes.

$$\text{Income elasticity of demand} = \frac{\%\Delta Q_D}{\%\Delta I}$$

  - Normal goods have positive income elasticities of demand.
  - Inferior goods have negative income elasticities of demand.

- The cross-price elasticity of demand measures how the quantity demanded of one good responds to a change in the price of another good.

$$\text{Cross-price elasticity of demand} = \frac{\%\Delta Q_{D,X}}{\%\Delta P_Y}$$

  - Substitutes have positive cross-price elasticities of demand.
  - Complements have negative cross-price elasticities of demand.

2.2 The Elasticity of Supply

2.2.1 The Price Elasticity of Supply

- A good's price elasticity of supply measures how much the quantity supplied responds to a change in price.
- Supply for a good is elastic if the quantity supplied responds a lot to changes in price.
- Supply for a good is inelastic if the quantity supplied doesn't respond a lot to changes in price
- Price elasticity of supply depends on how flexibly sellers can change the amount they produce.
  - E.g. Beachfront land has inelastic supply.
  - E.g. Manufactured goods like books have elastic supply.
  - Sellers have more flexibility in the long run than the short run.

2.2.2 Computing the Price Elasticity of Supply

- Price elasticity of supply is

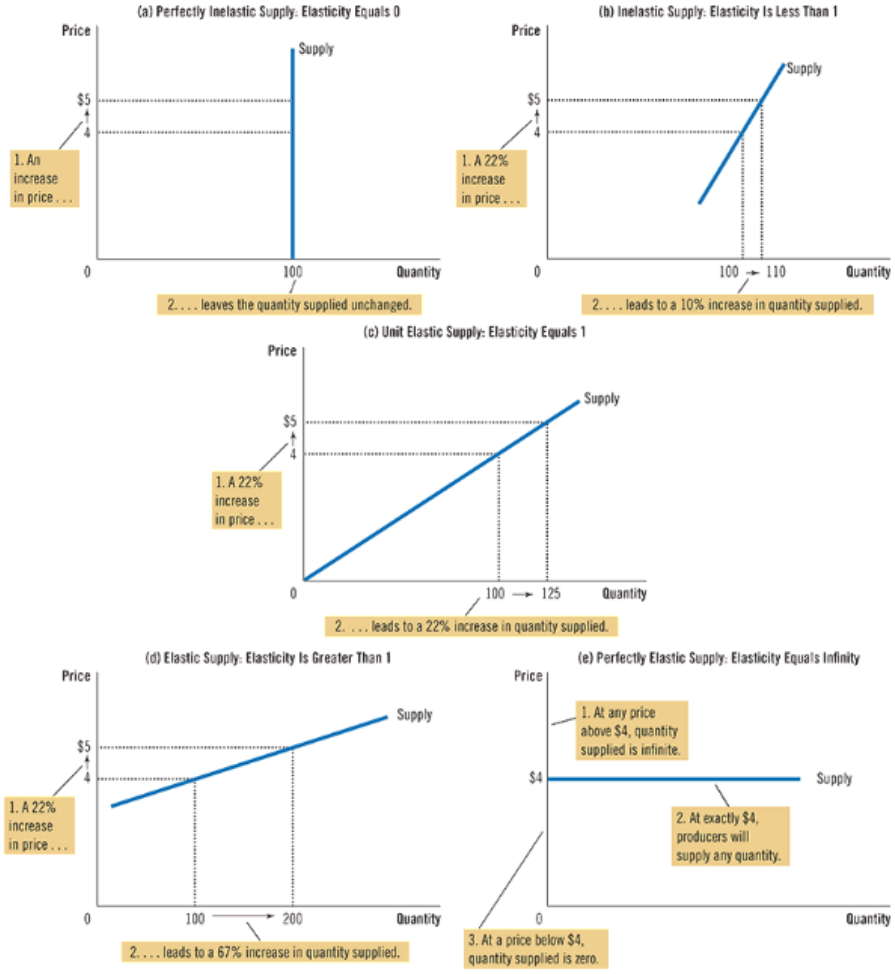
$$\text{Price elasticity of supply} = \frac{\%\Delta Q_S}{\%\Delta P}$$

- As with price elasticity of demand, we use the midpoint method to calculate percent changes.

2.2.3 The Variety of Supply Curves

- The flatter a supply curve is, the more inelastic it is.
- The elasticity of supply is not necessarily constant.

Elasticity of Supply Curves



Non-Constant Elasticity