Price elasticity of demand

Measure responsiveness with percentages and connect it to total revenue.

1 / Use the midpoint method

Price elasticity compares the percentage change in quantity demanded with the percentage change in price. Its magnitude has no units: above 1 is elastic, below 1 is inelastic, and exactly 1 is unit elastic.

$$E_d = \left| \frac{(Q_2 - Q_1)/[(Q_1 + Q_2)/2]}{(P_2 - P_1)/[(P_1 + P_2)/2]} \right|$$

Average endpoints make the result identical in either direction. The two factors of 100 cancel when percentage changes are divided.

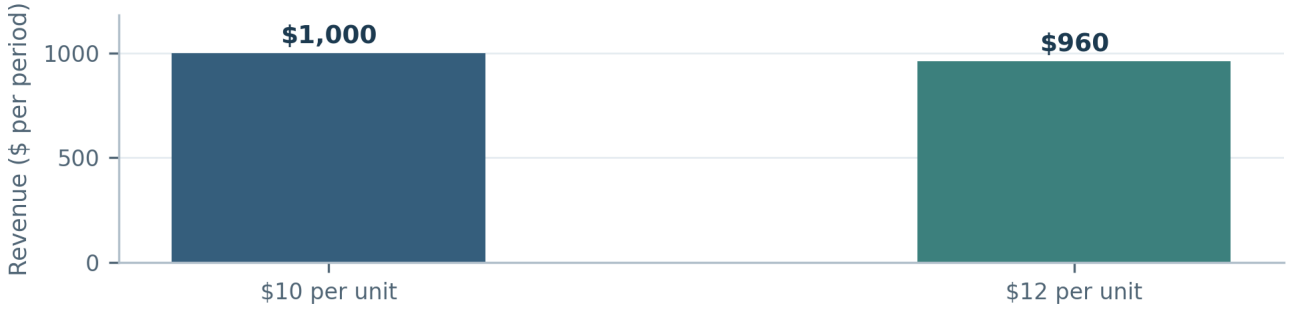
2 / Work through a price increase

Assume demand remains unchanged. Price rises from $10 to $12 per unit, while quantity demanded falls from 100 to 80 units per period.

$$\%\Delta Q = \frac{-20}{90} \times 100 = -22.22\%, \qquad \%\Delta P = \frac{2}{11} \times 100 = 18.18\%$$

$$E_d = \frac{11}{9} \approx 1.22, \qquad TR = P \times Q$$

Demand is elastic across this interval. Revenue falls from **$1,000 to $960 per period** even though price rises.



3 / Read the result carefully

Along an unchanged demand curve, a higher price lowers revenue over an elastic interval and raises revenue over an inelastic interval. A unit-elastic interval leaves revenue unchanged. A price decrease reverses the first two relationships.

Slope is not elasticity. For Q = 200 - 10P, point elasticity is 10P/Q: 1 at P = 10, Q = 100, but 1.5 at P = 12, Q = 80. The midpoint value describes the interval, not either endpoint.

Further reading: OpenStax, Principles of Microeconomics 3e, 5.1 - measuring elasticity; 5.3 - elasticity and revenue.