

Chapter 8 Price Elasticity of Supply

Price Elasticity of Supply is the percentage change of the quantity supplied per 1 percentage change in price

$$\eta_s = \frac{\% \Delta Q_s}{\% \Delta P} = \frac{\text{Percentage change of } Q_s}{\text{Percentage change of } P}$$

- η_s measures how sensitive the supply is to a change in price.

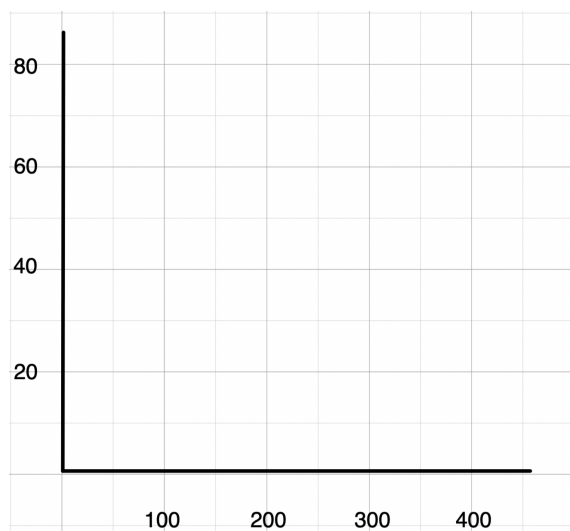
Example If the price increases by 10% ($\% \Delta P = 10\%$), the quantity supplied increases by 25% ($\% \Delta Q_D = -25\%$)

$$\eta_s = \frac{\% \Delta Q_s}{\% \Delta P} = \frac{25}{10} = 2.5$$

- Positive sign reflects the Law of Supply
- η_s does not have unit
- $\eta_D = 2.5$ means that if the price increases by 1%, the quantity supplied increases by 2.5%

Example

$$\text{Supply: } P = 10 + \frac{1}{10} Q_s$$



Consider two points, *A* and *B* on the supply

$$A = (100, 20), Q_1 = 100, P_1 = 20$$

$$B = (150, 25), Q_2 = 150, P_2 = 25$$

From $A \rightarrow B$,

$$\Delta Q_S =$$
$$\Delta P =$$

$$\% \Delta Q_S =$$
$$\% \Delta P =$$

$$\eta_S = \frac{\% \Delta Q_S}{\% \Delta P} =$$

- η_S from A to B is given by:

$$\eta_S = \frac{1}{\text{Slope}} \frac{P_1}{Q_1}$$

where P_1 and Q_1 are price and quantity supplied at A .

- Is η_S the same for $B \rightarrow A$?

$$\eta_S = \frac{\% \Delta Q_S}{\% \Delta P} =$$

- η_S from $B \rightarrow A$ is given by:

$$\eta_S = \frac{1}{\text{Slope}} \frac{P_2}{Q_2}$$

where P_2 and Q_2 are price and quantity supplied at B .

Arc Elasticity of Supply

$$\text{From } A \rightarrow B, \eta_S = \frac{1}{\text{Slope}} \frac{P_1}{Q_1} = 2.$$

$$\text{From } B \rightarrow A, \eta_S = \frac{1}{\text{Slope}} \frac{P_2}{Q_2} = 1.67$$

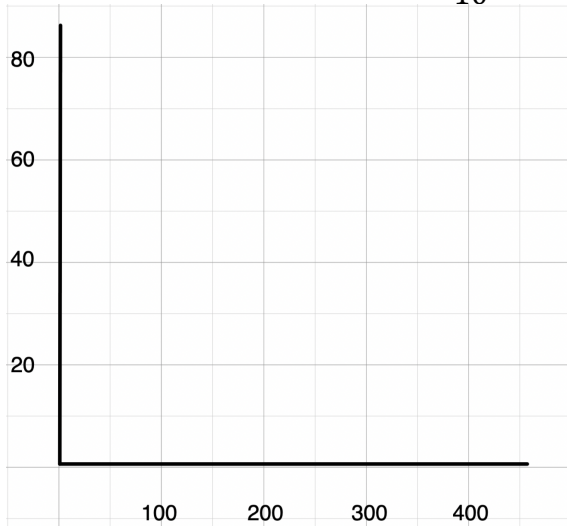
If we want to find, η_S between A and B (without specifying from where to where) we use **Arc Elasticity by Midpoint method**.

$$\text{Average Price} = \bar{P} = \frac{P_1 + P_2}{2}$$

$$\text{Average Quantity} = \bar{Q} = \frac{Q_1 + Q_2}{2}$$

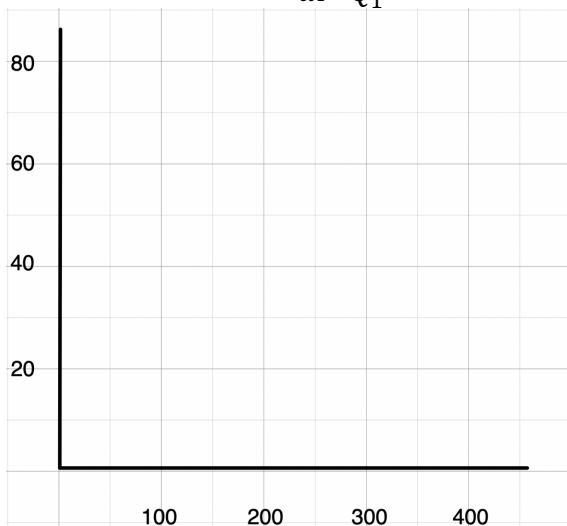
$$\eta_s = \frac{1}{\text{Slope}} \frac{\bar{P}}{\bar{Q}} = \frac{1}{\text{Slope}} \frac{\bar{P}}{\bar{Q}} = \frac{1}{\text{Slope}} \frac{P_1 + P_2}{Q_1 + Q_2} =$$

$$\text{Supply: } P = 10 + \frac{1}{10} Q_s$$



Point Elasticity of Supply at a point $A = (Q_1, P_1) = (100, 20)$.

$$\begin{aligned} \eta_s &= \left(\frac{1}{\text{Slope at } A} \right) \frac{P_1}{Q_1} \\ &= \frac{1}{\frac{dP}{dQ_s}} \frac{P_1}{Q_1} \\ &= \frac{dQ_s}{dP} \frac{P_1}{Q_1} = \end{aligned}$$



Elastic and Inelastic Supply

Supply is Elastic when $\eta_S > 1$

Supply is Inelastic when $\eta_S < 1$.

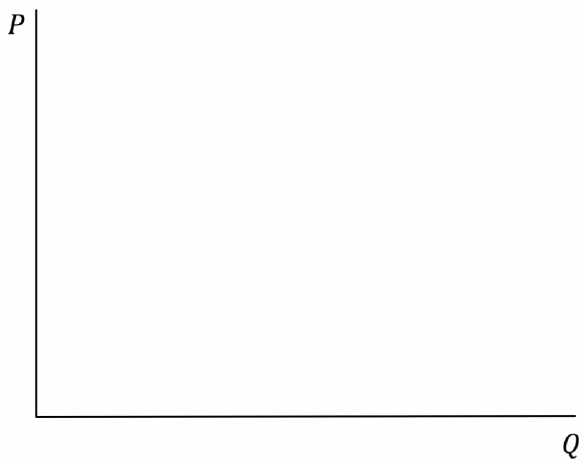
Point Elasticity of along a Linear Supply Curve

1. η_S when Supply has positive intercept.

2. η_S when Supply has negative intercept.

3. η_S when Supply has zero intercept.

Point Elasticity of a Nonlinear Supply curve



Extreme Cases

1. Supply is Perfectly Elastic



2. Supply is Perfectly Inelastic

