Chapter 8 Price Elasticity of Supply

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

$$\eta_S = \frac{\%\Delta Q_S}{\%\Delta P} = \frac{Percentage\ change\ of\ Q_S}{Percentage\ change\ of\ P}$$

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

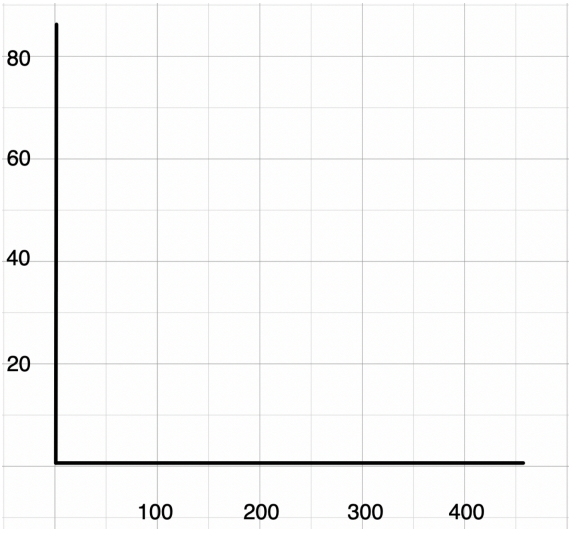
Example If the price increases by 10% ($\%\Delta P = 10\%$), the quantity supplied increases by 25% ($\%\Delta Q_D = -25\%$)

$$\eta_S = \frac{\%\Delta Q_S}{\%\Delta P} = \frac{25}{10} = 2.5$$

- 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

$$Supply\colon\ P = 10 + \frac{1}{10}Q_S$$



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:

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

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:

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

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

Arc Elasticity of Supply

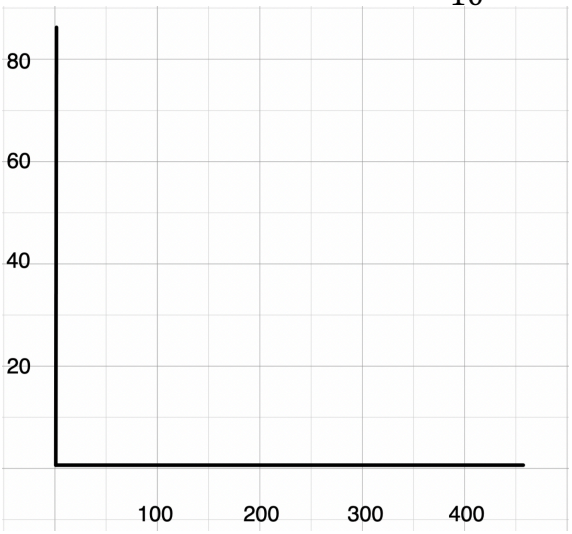
From $A \rightarrow B$, $\eta_S = \frac{1}{Slope}\frac{P_1}{Q_1} = 2.$
From $B \rightarrow A$, $\eta_S = \frac{1}{Slope}\frac{P_2}{Q_2} = 1.67$

If we want to find, η_S between A and B (without specifying from where to where) we use

Average Price $= \bar{P} = \frac{P_1+P_2}{2}$
Average Quantity $= \bar{Q} = \frac{Q_1+Q_2}{2}$

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

$$Supply\colon\ P = 10 + \frac{1}{10}Q_S$$



This is called ***Arc Elasticity by Midpoint method***.

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

$$\eta_S = \left(\frac{1}{Slope\ at\ A}\right)\frac{P_1}{Q_1}$$
$$= \frac{1}{\frac{dP}{dQ_S}}\frac{P_1}{Q_1}$$
$$= \frac{dQ_S}{dP}\frac{P_1}{Q_1} =$$

Elastic and Inelastic Supply

Supply is Elastic when $\eta_S > 1$
Supply is Inelastic when $\eta_S < 1$.

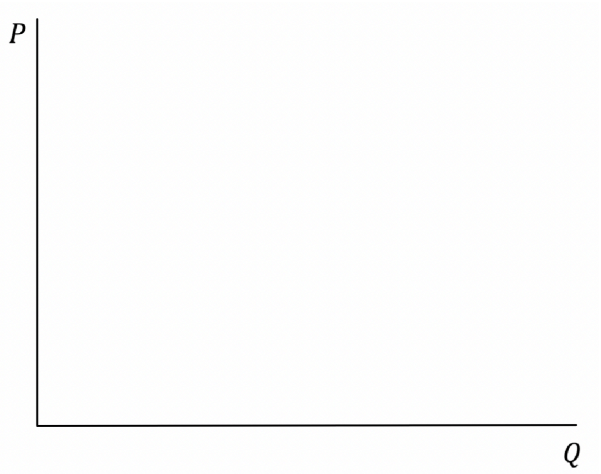
Point Elasticity of along a Linear Supply Curve

1. η_S when Supply has positive intercept.

2. η_S when Supply has negative intercept.

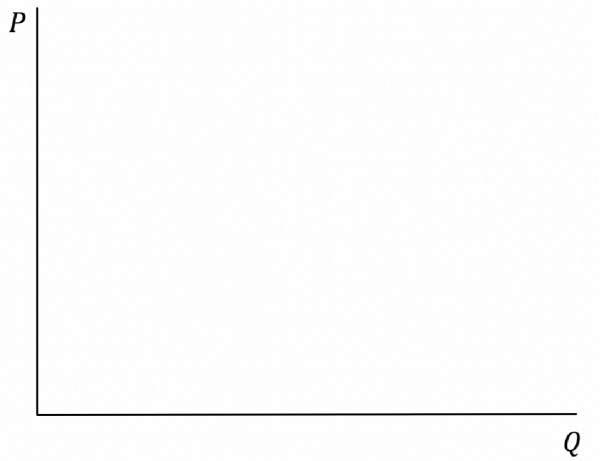
3. η_S when Supply has zero intercept.

Point Elasticity of a Nonlinear Supply curve



Extreme Cases

1. Supply is Perfectly Elastic



2. Supply is Perfectly Inelastic