

Exercise 2.A:

$$p = a - bQ$$

2.A.1) Given a demand function by $p = a - bQ$, derive the formula for the elasticity of demand, and show that the third property holds

2.A.2) Given the market supply $p = c + dQ$ where $d \geq 0$, show that

- (i) elasticity of supply is always greater than 1 if $c > 0$,
- (ii) elasticity of supply is always equal to 1 if $c = 0$,
- (iii) elasticity of supply is always less than 1 if $c < 0$.

2.A.1

$$p = a - bQ$$

$$\epsilon_p = \frac{\Delta Q}{\Delta p} \times \frac{p_0}{Q_0} = -b \times \frac{a - bQ_0}{\frac{a - p_0}{b}} = -b \times a - bQ_0 \times \frac{b}{a - p_0} = \frac{-b^2(a - bQ_0)}{a - p_0} \neq$$

$$\begin{cases} p_0 = a - bQ_0 \\ Q_0 = \frac{a - p_0}{b} \end{cases}, \quad \frac{\Delta Q}{\Delta p} = -b$$

$$p = a - bQ, \quad p_0 = a - bQ_0, \quad Q_0 = \frac{a - p_0}{b}$$

$$\epsilon_p = \frac{\Delta Q}{\Delta p} \times \frac{p_0}{Q_0} = -c \times \frac{a - bQ_0}{\frac{a - p_0}{b}} = -c \times a - bQ_0 \times \frac{b}{a - p_0} = \frac{-c^2(a - bQ_0)}{a - p_0} \neq$$

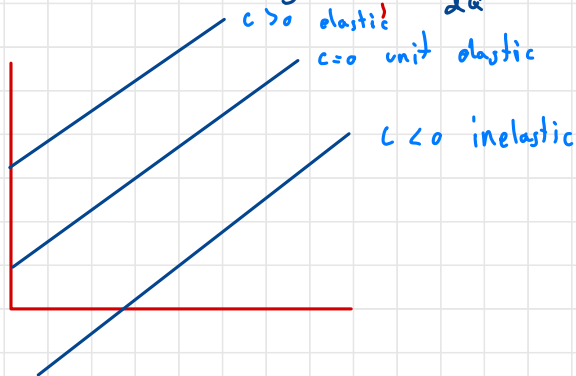
2.A.2

$$p = c + d \cdot a$$

$$\epsilon_s^s = \frac{\frac{\Delta a}{a}}{\frac{\Delta p}{p}} = \frac{\frac{\Delta a}{\Delta p} \cdot \frac{p}{a}}{\frac{\Delta p}{p}} = \frac{\Delta a}{\Delta p} \cdot \frac{p}{a} = \frac{1}{d} \left(\frac{c + d \cdot a}{a} \right) = \frac{1}{d} \left(\frac{c}{a} + d \right) = \frac{c}{d \cdot a} + 1$$

$$\therefore \epsilon_{a,p}^s = \frac{c}{d \cdot a} + 1$$

if $a > 0 \rightarrow a \rightarrow \text{large}$ $\frac{c}{d \cdot a} \rightarrow \text{smaller}$: if $c = 0$, $\epsilon_{a,p}^s = 1$



$$c > 0, \epsilon_{a,p}^s > 1$$

$$c < 0, \epsilon_{a,p}^s < 1$$