

$$P = 100 - Q$$

$$Q = Q_1 + Q_2$$

$$c = 20$$

decision

$$Q = 30$$

$$Q = 15$$

$$\boxed{\pi_i = P \cdot Q_i - c Q_i}$$

$$Q = 15 \Rightarrow \begin{aligned} \pi_A &= 70 \cdot 15 - 20(15) \\ \pi_A &= 1050 - 300 \\ \pi_A &= 750 = \pi_B \end{aligned}$$

$$Q = 15 + 15 = 30$$

$$P = 100 - 30 = 70$$

$$\begin{aligned} Q &= 30 + 30 = 60 \\ P &= 100 - 60 = 40 \end{aligned}$$

$$\begin{aligned} \pi_A &= 40 \cdot 30 - 20(30) \\ \pi_A &= 1200 - 600 \\ \pi_A &= 600 = \pi_B \end{aligned}$$

$$\begin{aligned} Q_A = 15 \\ Q_B = 30 \end{aligned} \} Q = 45$$

$$\begin{aligned} P &= 100 - 45 \\ P &= 55 \end{aligned}$$

$$\begin{aligned} \pi_A &= 55 \cdot 15 - 20(15) \\ \pi_A &= 825 - 300 \\ \pi_A &= 525 \end{aligned}$$

$$\begin{aligned} \pi_B &= 55 \cdot 30 - 20(30) \\ \pi_B &= 1650 - 600 \\ \pi_B &= 1050 \end{aligned}$$

$$P = a - bQ$$

$$cmg_i = c$$

$$Q = Q_1 + Q_2$$

$$P = a - b(Q_1 + Q_2)$$

$$P = a - bQ_1 - bQ_2$$

$$\pi_1 = P \cdot Q_1 - cQ_1$$

$$\pi_1 = (a - bQ_1 - bQ_2) Q_1 - cQ_1$$

$$\frac{\partial \pi_1}{\partial Q_1} = a - 2bQ_1 - bQ_2 - c = 0$$

$$2bQ_1 = a - c - bQ_2$$

$$Q_1 = \frac{a - c - bQ_2}{2b}$$

FMR<sub>1</sub>

Función de mejor respuesta de la empresa 1.

$$Q_2 = \frac{a - c - bQ_1}{2b}$$

FMR<sub>2</sub>

Resolva sistema de ecuaciones

$$FMR_1 \rightarrow FMR_2$$

$$2bQ_2 = a - c - bQ_1$$

$$2bQ_2 = a - c - \cancel{b} \left( \frac{a - c - bQ_2}{\cancel{2b}} \right)$$

$$2bQ_2 = a - c - \frac{a}{2} + \frac{c}{2} + \frac{bQ_2}{2}$$

comp. por fuerza

$$P = cmg.$$

$$P = a - bQ = c$$

$$Q = \frac{a - c}{b}$$

$$2bQ_2 - \frac{bQ_2}{2} = \frac{a}{2} - \frac{c}{2}$$

$$\frac{3bQ_2}{2} = \frac{a - c}{2}$$

$$Q_2 = \left( \frac{a - c}{2} \right) \left( \frac{2}{3b} \right)$$

$$Q_2^* = \frac{a - c}{3b} = Q_1^*$$

monopolio

$$Img = cmg.$$

$$Inv = (a - bQ)Q$$

$$Inv = aQ - bQ^2$$

$$Img = a - 2bQ$$

$$Q = 2 \left( \frac{a - c}{3b} \right)$$

$$a - 2bQ = c$$

$$Q = \frac{a - c}{2b}$$

$$Q_{cp} > Q_{oc} > Q_m$$

$$cT_i = 10Q_i$$

$$P = 70 - Q \quad \nearrow Q = Q_1 + Q_2$$
$$P = 70 - (Q_1 + Q_2)$$
$$P = 70 - Q_1 - Q_2$$

$$\bar{\Pi}_1 = (70 - Q_1 - Q_2)Q_1 - 10Q_1$$
$$\bar{\Pi}_1 = 70Q_1 - Q_1^2 - Q_1Q_2 - 10Q_1$$
$$\bar{\Pi}_1 = 60Q_1 - Q_1^2 - Q_1Q_2$$

$$\frac{\partial \bar{\Pi}_1}{\partial Q_1} = 60 - 2Q_1 - Q_2 = 0$$
$$2Q_1 = 60 - Q_2$$

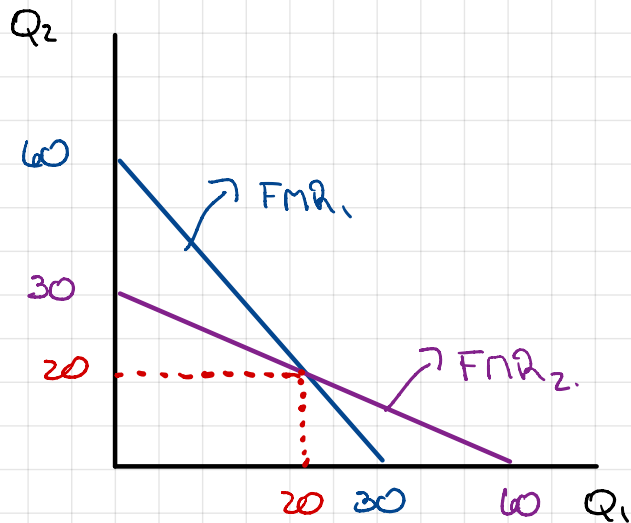
$$Q_1 = \frac{60 - Q_2}{2} \quad \text{FMR}_1$$

$$\text{FMR}_2 = Q_2 = \frac{60 - Q_1}{2}$$

$$2Q_1 = 60 - \left[ \frac{60 - Q_1}{2} \right]$$
$$2Q_1 = 60 - (30 - 0.5Q_1)$$
$$2Q_1 = 60 - 30 + 0.5Q_1$$
$$1.5Q_1 = 30$$
$$Q_1 = 20 \quad Q_2 = 20$$

$$P = 70 - Q$$
$$P = 70 - 40$$
$$P = 30$$

$$\bar{\Pi} = PQ - cT$$
$$\bar{\Pi} = 30 \times 20 - 10(20)$$
$$\bar{\Pi}_1 = 600 - 200$$
$$\bar{\Pi}_1 = 400$$



$$\text{FMR}_1 \Rightarrow Q_1 = \frac{60 - Q_2}{2}$$

$$Q_1 = 0 \Rightarrow 0 = \frac{60 - Q_2}{2}$$

$$0 = 60 - Q_2$$
$$Q_2 = 60$$

$$Q_2 = 0 \Rightarrow Q_1 = \frac{60 - 0}{2} \Rightarrow Q_1 = 30$$

$$\text{FMR}_2 \Rightarrow Q_2 = \frac{60 - Q_1}{2}$$

$$Q_1 = 0 \Rightarrow Q_2 = 30$$

$$Q_2 = 0 \Rightarrow Q_1 = 60$$

$$Q_1 = a - p_1 + b p_2$$

costs c.  
 $\bar{c} = c Q_i$

$$Q_2 = a - p_2 + b p_1$$

$$\pi_1 = p_1 (a - p_1 + b p_2) - c (a - p_1 + b p_2)$$

$$\pi_1 = a p_1 - p_1^2 + b p_1 p_2 - ca + c p_1 - b c p_2$$

$$\frac{\partial \pi_1}{\partial p_1} = a - 2 p_1 + b p_2 + c = 0$$

$$2 p_1 = a + b p_2 + c$$

$$p_1 = \frac{a + b p_2 + c}{2}$$

FNR<sub>1</sub>

$$p_2 = \frac{a + b p_1 + c}{2}$$

FNR<sub>2</sub>

$$p_2 = 0$$

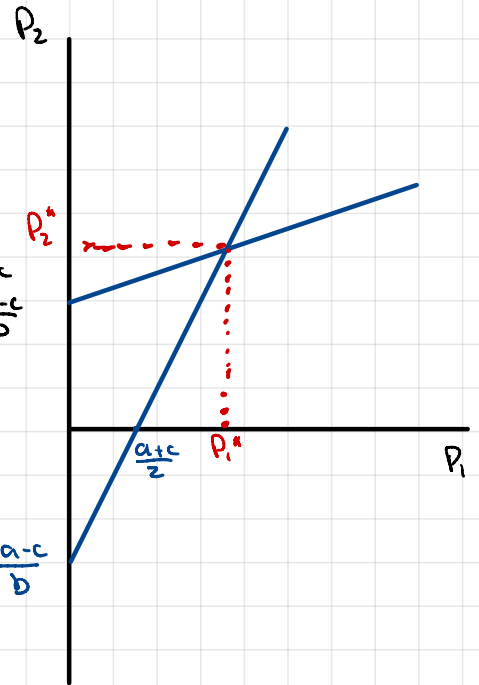
$$p_1 = \frac{a+c}{2}$$

$$p_1 = 0$$

$$0 = \frac{a + b p_2 + c}{2}$$

$$-b p_2 = \frac{a+c}{2}$$

$$p_2 = \frac{-a-c}{b}$$



$$FNR_1 \Rightarrow FNR_2$$

$$2 p_2 = a + c + b \left( \frac{a + b p_2 + c}{2} \right)$$

$$2 p_2 = a + c + \frac{b a}{2} + \frac{b^2 p_2}{2} + \frac{b c}{2}$$

$$2 p_2 - \frac{b^2 p_2}{2} = a + c + \frac{b a}{2} + \frac{b c}{2}$$

$$p_2 \left( 2 - \frac{b^2}{2} \right) = a + c + \frac{b a}{2} + \frac{b c}{2}$$

$$p_2 \left( \frac{4 - b^2}{2} \right) = a \left( 1 + \frac{b}{2} \right) + c \left( 1 + \frac{b}{2} \right)$$

$$p_2 \left( \frac{4 - b^2}{2} \right) = (a + c) \left( 1 + \frac{b}{2} \right)$$

$$= (a + c) \left( \frac{2 + b}{2} \right)$$

$$p_2 \left( \frac{(2+b)(2-b)}{2} \right) = (a + c) \left( \frac{2+b}{2} \right)$$

$$p_2 = (a + c) \left( \frac{2+b}{2} \right) \left( \frac{2}{(2+b)(2-b)} \right) \Rightarrow p_2 = \frac{a + c}{2 - b}$$

$$p_1 = \frac{a + c}{2 - b}$$

$$p_2 = \frac{a + c}{2 - b}$$

$$Q_1 = 8 - 2P_1 + 2P_2$$

$$Q_2 = 6 - 2P_1 + 2P_2$$

$$CT = Q_i$$

$$\frac{\pi_1}{\pi_1} = P_1(8 - 2P_1 + 2P_2) - (8 - 2P_1 + 2P_2)$$

$$\frac{\pi_1}{\pi_1} = \underline{8P_1} - 2P_1^2 + 2P_1P_2 - 8 + \underline{2P_1} - 2P_2$$

$$\pi_1 = 10P_1 - 2P_1^2 + 2P_1P_2 - 8 - 2P_2$$

$$\frac{\partial \pi_1}{\partial P_1} = 10 - 4P_1 + 2P_2 = 0$$

$$4P_1 = 10 + 2P_2$$

$$P_1 = \frac{10 + 2P_2}{4} \quad FNR_1$$

$$P_1 = 0 \Rightarrow P_2 = -5$$

$$P_2 = 0 \Rightarrow P_1 = 2.5$$

$$FNR_1 \Rightarrow FNR_2$$

$$4P_2 = 8 + 2 \left( \frac{10 + 2P_2}{4} \right)$$

$$4P_2 = 8 + 5 + P_2$$

$$3P_2 = 13$$

$$P_2^* = \frac{13}{3}$$

$$P_1 = \frac{10 + 2 \left( \frac{13}{3} \right)}{4}$$

$$P_1^* = \frac{14}{3}$$

$$\frac{\partial \pi_2}{\partial P_2} = 8 - 4P_2 + 2P_1 = 0$$

$$4P_2 = 8 + 2P_1$$

$$P_2 = \frac{8 + 2P_1}{4} \quad FNR_2$$

$$P_2 = 0 \Rightarrow -4 = P_1$$

$$P_1 = 0 \Rightarrow 2 = P_2$$

$$\text{in } P_1 \Rightarrow Q_1 = 8 - 2P_1 + 2P_2$$

$$Q_1 = 8 - 2 \left( \frac{14}{3} \right) + 2 \left( \frac{13}{3} \right)$$

$$Q_1^* = \frac{22}{3} \approx 7.33 \dots$$

$$\text{in } P_2 \Rightarrow Q_2 = 6 - 2P_2 + 2P_1$$

$$Q_2 = 6 - 2 \left( \frac{13}{3} \right) + 2 \left( \frac{14}{3} \right)$$

$$Q_2^* = \frac{20}{3} \approx 6.6$$

