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Sequential Game.

	LL	LR	RL	RR
T	3, 2	3, 2	1, 1	1, 1
B	0, 0	2, 3	0, 0	2, 3

Subgame Perfect Equilibrium.

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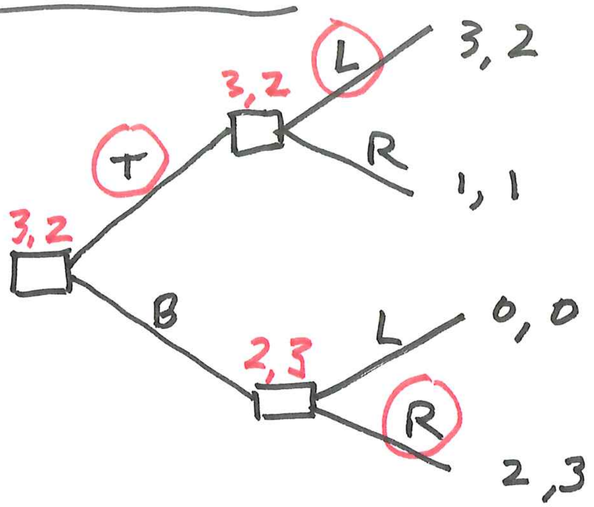
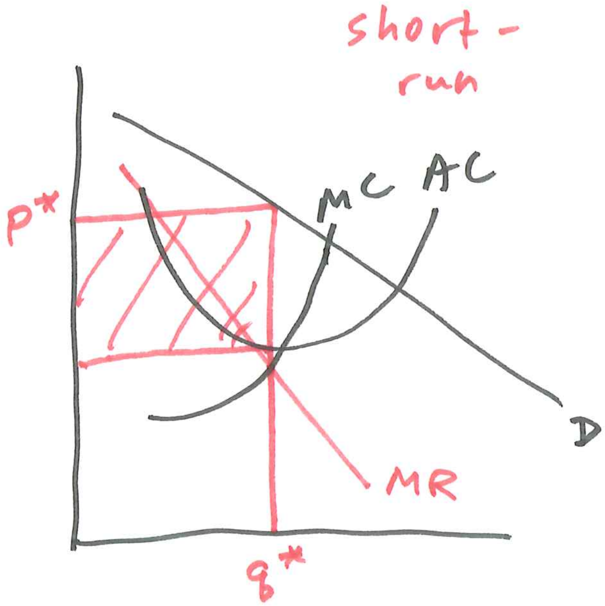
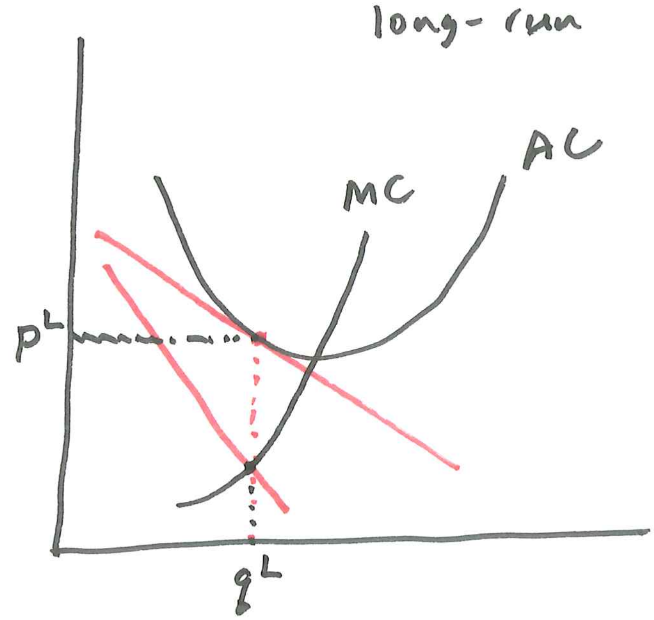
Extensive Form.



Monopolistic or Imperfect Competition.

- Product differentiation





If $AC = AR$ and $\frac{dAC}{dq} = \frac{dAR}{dq} \longrightarrow MR = MC$

Cournot Model.

- Homogeneous products (no differentiation)
- Firms set <u>quantities</u>
- Beliefs: Firms believe others will keep their q's fixed

$$\Pi_i = p(Q)\cdot q_i - C_i(q_i)$$

$$\frac{\partial \Pi_i}{\partial q_i} = \cancel{p(q_i)} \; p(Q) + \frac{P\, q_i}{Q}\cdot\frac{dp}{dQ}\cdot\frac{Q}{P} - C_i' = 0$$

$$p\left(1 + \frac{\theta_i}{\varepsilon_d}\right) = C_i' = MC_i$$

If $\theta_i = 0 \longrightarrow p = MC$

If $\theta_i = 1 \longrightarrow p\left(1 + \frac{1}{\varepsilon_d}\right) = MC$

<u>Special case</u>: Linear demand, constant costs

Demand: $p = a - bQ$: $C_i = c\,q_i$ for all i

$$\Pi_i = q_i\cdot\{a - b\{q_i + \tilde{q}_i\}\} - c\,q_i$$

$$\frac{\partial \Pi_i}{\partial q_i} = a - \underbrace{b q_i} - b\tilde{q}_i + \underbrace{q_i(-b)} - c = 0$$

$$2b\,q_i = a - c - b\tilde{q}_i$$

Firm i's Best-Response Function

$$\boxed{q_i = \frac{a-c}{2b} - \frac{\tilde{q}_i}{2}}$$

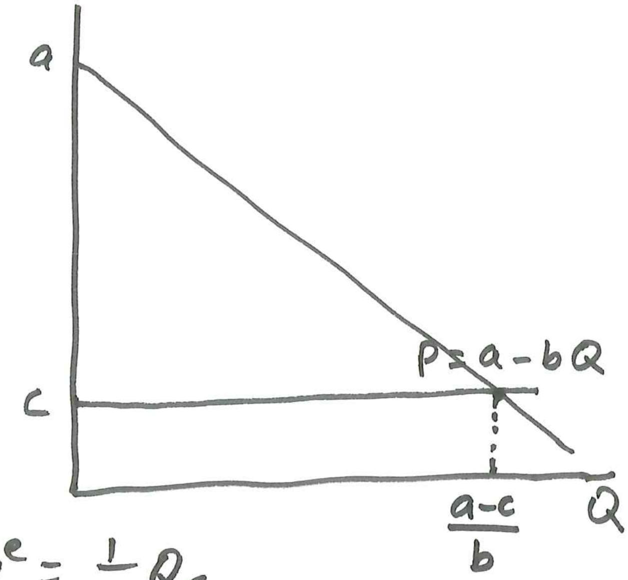
$$q_i = \frac{a-c}{2b} - \frac{(n-1)\,q_i}{2}$$

$$\left(1 + \frac{n-1}{2}\right) q_i = \frac{a-c}{2b}$$

$$q_i^e = \frac{1}{n+1}\left(\frac{a-c}{b}\right)$$

$c = a - bQ$

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



$$q_i^e = \frac{1}{n+1} Q_c$$

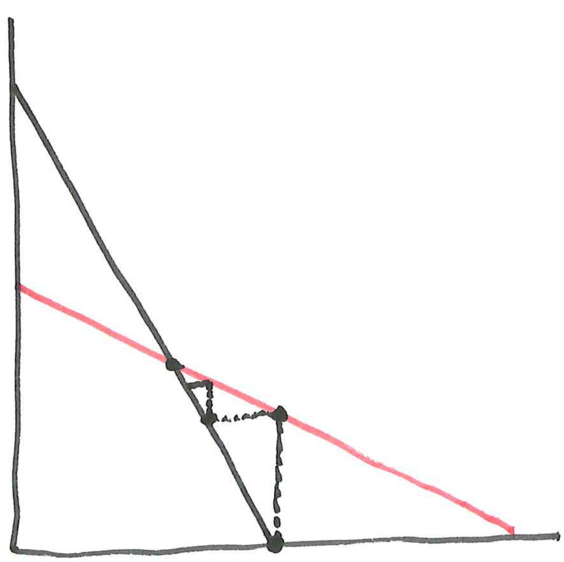
$$Q^e = \sum_{i=1}^{n} q_i^e = \frac{n}{n+1} Q_c$$

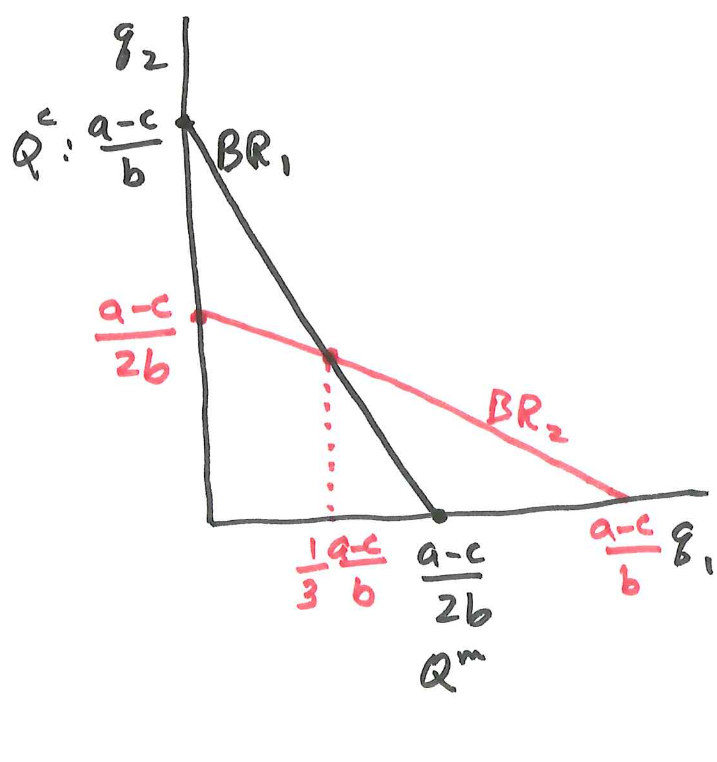
2 firms, $Q^e = \frac{2}{3} Q_c$, $q^e = \frac{1}{3} Q_c$

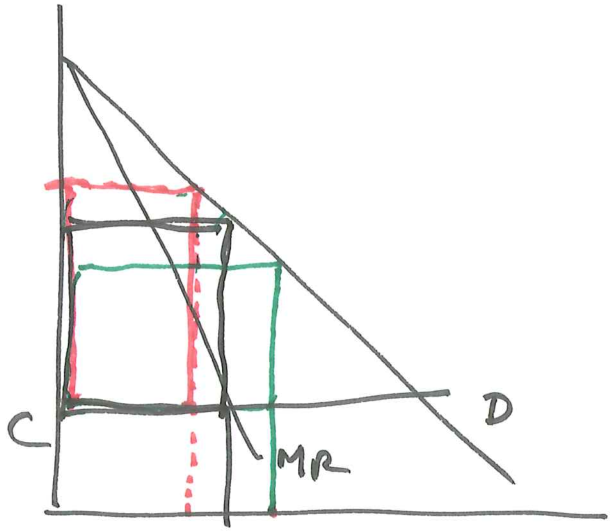
3 〃 $Q^e = \frac{3}{4} Q_c$, $q^e = \frac{1}{4} Q_c$

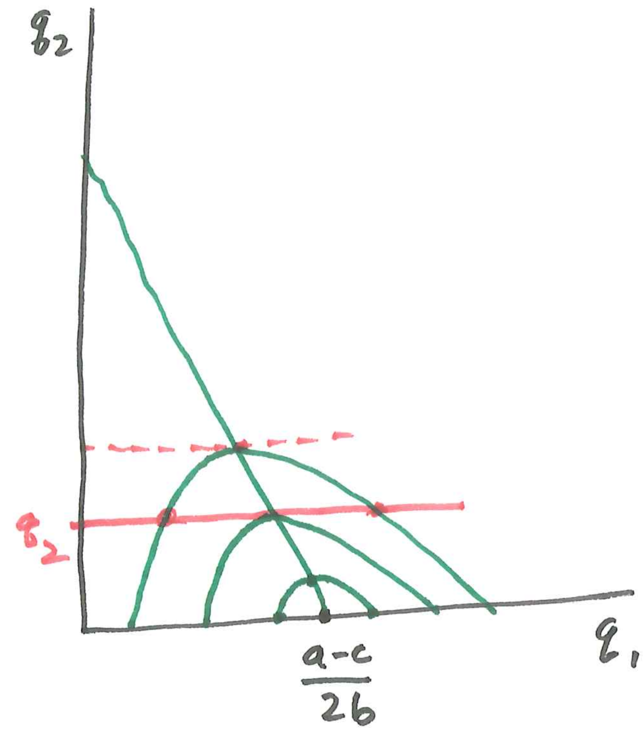
<u>Duopoly</u>: Firm 1's BR:

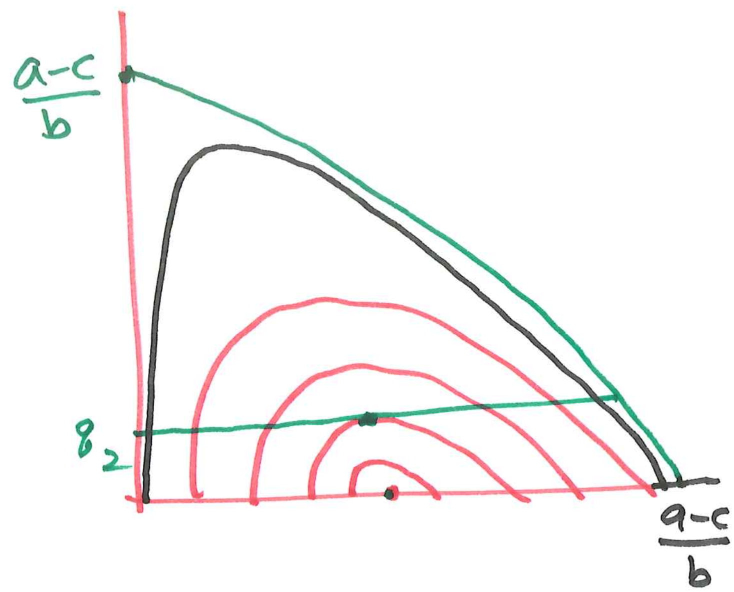
$$q_1 = \frac{a-c}{2b} - \frac{q_2}{2}$$






C
D
MR


q_2
q_2
q_1
$\frac{a-c}{2b}$


$\frac{a-c}{b}$
q_2
$\frac{a-c}{b}$

Stackelberg Model.

Leader - Follower Model.

$\swarrow$ not myopic $\qquad$ $\searrow$ myopic

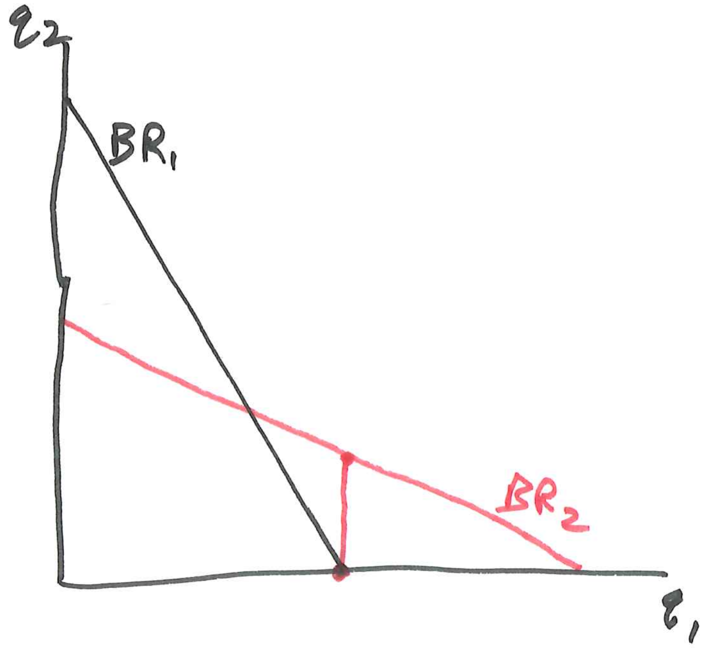
$$BR_2 : \quad q_2 = \frac{a-c}{2b} - \frac{q_1}{2}$$

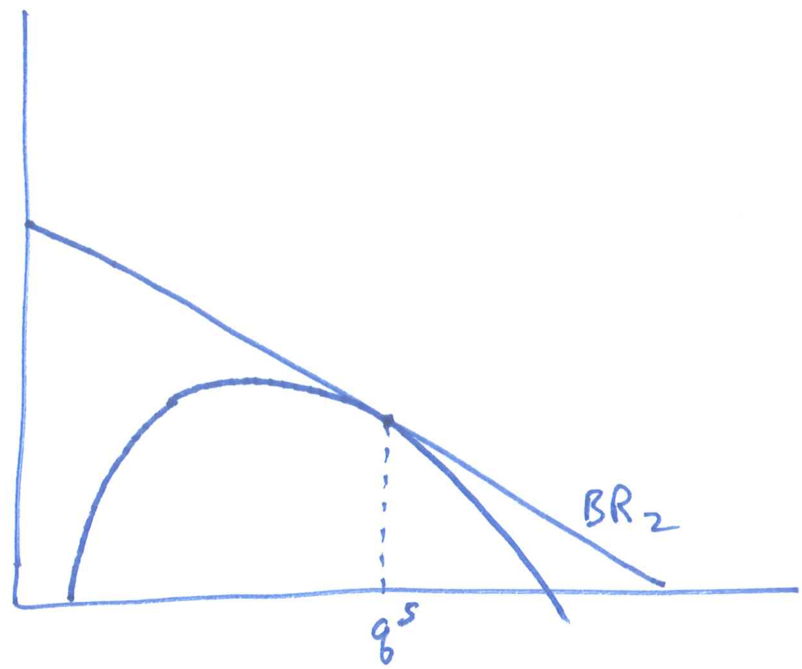
$$\Pi_1 = q_1 \left(a - b \left\{ q_1 + \frac{a-c}{2b} - \frac{q_1}{2} \right\} \right) - c q_1$$

$$\frac{d\Pi_1}{dq_1} = a - \underbrace{b q_1} - \frac{a-c}{2} + \cancel{\underbrace{\frac{b q_1}{2}}} + q_1 \cancel{\underbrace{\left(-b + \frac{b}{2} \right)}} - c = 0$$

$$b q_1 = a - c - \frac{a-c}{2} = \frac{a-c}{2}$$

$$q_1 = \frac{a-c}{2b}$$





Pre-Empting Entry: