Lecture 6 24 Sept 07

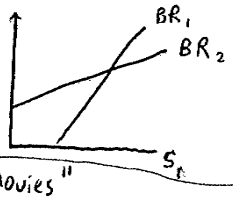
Last time : Investor Game

Lessons : communication can help in a coordination game
- scope for leadership

NE = self-enforcing agreement

Not prisoners dilemna

Strategic Complements



	l	r
	1,1	0,0
	0,0	1,1

"Going to the Movies"

	BU	GS	SW
Bourne Ultimatum	2,1	0,0	0,-1
Good Shepherd	0,0	1,2	0,-1
Snow White	-1,0	-1,0	-2,-2

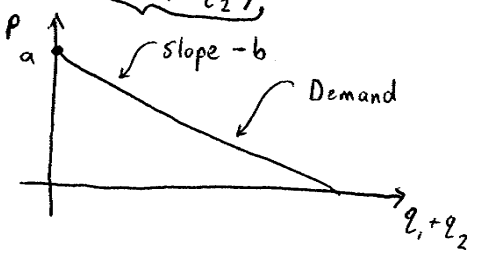
1 — 2 — X — X

Nash Eq. = {(BU, BU), (GS, GS)}

BATTLE OF THE SEXES

"Cournot Duopoly" (ch.6 of Dutta textbook)

- players 2 firms
- Strategies quantities they produce of identical products q_i, q_{-i}
- Cost of production : cq constant marginal costs
- prices $p = a - b(q_1 + q_2)$,



- payoffs : firms aim to maximize profit

$$u_1(q_1, q_2) = [p]\,q_1 - cq_1$$

profits revenues cost

<< plug in price equation into profit equation >>

$$u_1(q_1, q_2) = aq_1 - bq_1^2 - bq_1q_2 - cq_1$$

differentiate wrt (with respect to) $q_1 \rightarrow$, set = 0

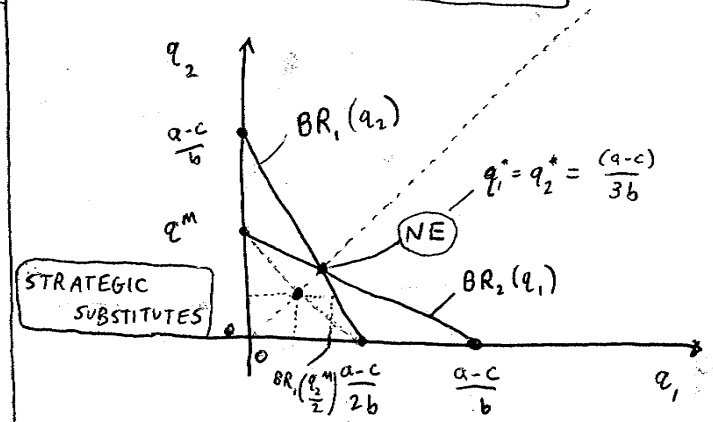
<< $du_1/dq_1 = 0$ >>

F.o.c. $a - 2bq_1 - bq_2 - c = 0$

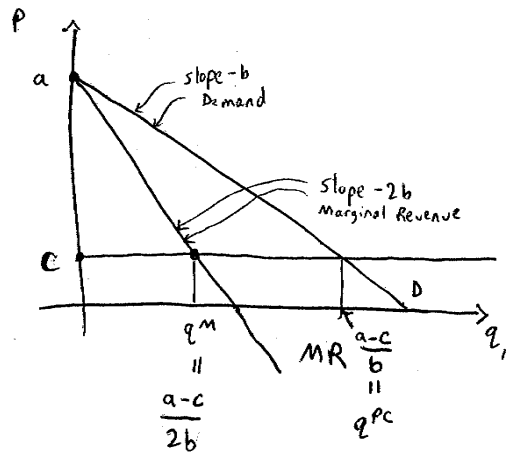
S.o.c. $-2b < 0$ ✓

$$\hat{q_1} = BR_1(q_2) = \frac{a-c}{2b} - \frac{q_2}{2}$$

$$\hat{q_2} = BR_1(q_1) = \frac{a-c}{2b} - \frac{q_1}{2}$$



$$BR_1(0) = \frac{a-c}{2b}$$



<< when $BR_1 = 0$? >> $\frac{a-c}{2b} - \frac{q_2}{2} = 0 \Rightarrow q_2 = \frac{a-c}{b}$

<< Finding NE, intersection of $BR_1 = BR_2$ >>

$q_1^* = q_2^*$

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

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

⋮

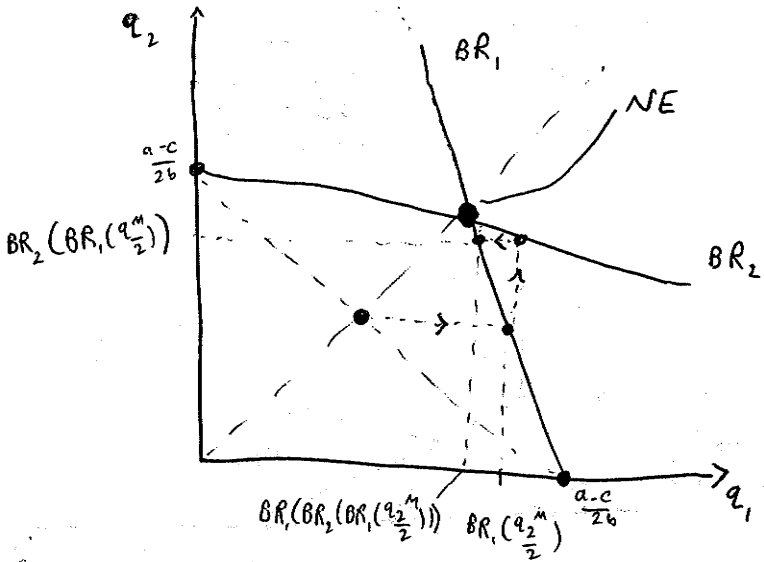
$$2q_1^* = \frac{a-c}{b} - q_1^*$$

$$3q_1^* = \frac{a-c}{b}$$

$$q_1^* = \frac{a-c}{3b} = q_2^*$$

COURNOT QUANTITY

STRATEGIC SUBSTITUTES



① << agreement breaks down from cheating, the graph heads back towards NE
this won't always happen, but it does here >>

② << problem - may induce other entrants if you sustain profits
eg. OPEC + competitive fringe
↗ Britain, Latin America >>

<< Compare to Monopoly / Perfect Competition : >>

	Cournot Total Quantity		
Comp $\frac{(a-c)}{b}$	$\frac{2}{3}\frac{(a-c)}{b}$	> Monop $\frac{1}{2}\frac{a-c}{b}$	: Q ⇓
Comp <	prices Cournot	< monop	: P