Lecture 6  24 Sept 07

Lost time: Investor Game

Lessons: Communication can help in a coordination game

- Scope for leadership

NE = self-enforcing agreement

Not present: dilemma

Strategic Complements

\[ S_2 \]
\[ S_1 \]

Brute Force

2

BU GS SW

2,1 0,0 0,-1

0,0 1,2 0,-1

-1,0 -1,0 -2,-2

"Going to the Movies"

Bourne Ultimatum

Good Shepherd

Snow White

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 \( q_1, q_2 \)
- cost of production: \( c \)
- constant marginal costs
- prices \( p = a - b(q_1 + q_2) \)

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

\[ q_1^* = \frac{a-c}{2b} - q_2^* \]

<< Finding NE, intersection of \( BR_1, BR_2 >>

<< plug in price equation into profit equation >>

\[ u_i(q_1, q_2) = aq_i - bq_i^2 - bq_1q_2 - cq_i \]

differentiate w.r.t. (with respect to) \( q_1 \rightarrow \) set = 0

F.O.C. \[ a - 2bq_1 - bq_2 - c = 0 \]

S.O.C. \[-2b < 0 \]

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

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2. \( q_1^* = \frac{a-c}{b} \)
3. \( q_2^* = \frac{a-c}{b} \)

\[
q_i^* = \frac{a-c}{3b} = q_2^* \quad \text{(Cournot Quantity)}
\]

**Strategic Substitutes**

\[
q_2 \quad \text{BR}_1 \quad \text{NE} \quad \text{BR}_2(\text{BR}_2(q_2^*)) \quad \text{BR}_2(q_2^*)
\]

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. E.g., OPEC + competitive fringe. Britain, Latin America.

<< Compare to Monopoly / Competition: >>

\[
\begin{array}{c|c|c}
\text{Comp} & \text{Total Quantity} & \text{Monop} \\
\hline
\frac{a-c}{b} & \frac{2}{3} (a-c) & \frac{1}{2} \frac{a-c}{b} \\
\hline
\text{Comp} < \text{Cournot} < \text{Monop} & P
\end{array}
\]

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