Lecture 21 26 Nov 07

Repeated Interaction : cooperation

Lesson: In ongoing relationships, the promise of future rewards and the threat of future punishments, may sometimes provide incentives for good behavior today.

But for this to work, it helps to have a future!

- lame duck
- retirement
- economics majors' relationships

} end effects

<< finite game - is there hope of cooperation? ... >>

	A	B	C
A	4, 4	0, 5	0, 0
B	5, 0	1, 1	0, 0
C	0, 0	0, 0	3, 3

we would like to sustain (A, A) "cooperation"

But (A, A) is not NE in one-shot game.

The NE are (B, B) (C, C)

<< also, there are some mixed NE. But this is okay for now. >>

We can't sustain (A, A) in period 2

But consider the strategy:

"play A, then { play C if (A, A) was played; play B otherwise }"

Is this a SPE?

In period 2:
- after (A, A) this strategy induces (C, C) ✓
- after the other choices in period 1, this strategy induces (B, B) ✓

In the whole game:
- A → 4 + [3] = 7 ✓
- if defect → B: 5 + [1] = 6 ✓

temptation to defect today ≤ value of reward - value of punishment tomorrow

$5 - 4 \leq 3 - 1$

$1 \leq 2$ ✓

Lesson: If a "stagegame" has more than one NE then we may be able to use the prospect of playing different equilibria tomorrow to provide incentives (rewards and punishments) for cooperating today.

- There may be a problem of renegotiation

	B: coop	B: defect
A: coop	2, 2	-1, 3
A: defect	3, -1	0, 0

A	B
D	C
D	D

A	B
D	C
C	D
C	D

A	B
D	D
D	D

unraveling from back

	B: coop	B: defect
A: coop	2+[0], 2+[0]	-1+[0], 3+[0]
A: defect	3+[0], -1+[0]	0+[0], 0+[0]

<< However, even a finite game has some hope. Let's see an example... >>

<< continued from above >>

- Bankruptcy ("bail out")

↓ trade off:

ex ante efficiency
ex post efficiency

	C	D
C	2, 2	-1, 3
D	3, -1	0, 0

B	P
D	C
D	C
D	D

E	B
C	C
C	C
C	C
D	C
D	D
D	D

play C then
{ play C if noone has played D
{ play D otherwise

"Grim Trigger Strategy"

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temptation today $\leq$ (value of reward tomorrow − value of punishment)

$3 - 2 \leq \delta[\ \ - \ \ 0\ \ ]$ where $\delta < 1$ because the game may end

(.75) value of (C,C) "forever"

value of (D,D) "forever"

$2 + \delta 2 + \delta^2 2 + \delta^3 2 + \ldots$