LECTURE 2.4

REPEATED GAMES

REPEATED INTERACTION

With repeated interaction new equilibria can be supported.

Why?

Agents can cooperate and that cooperation can be sustained through punishment. That punishment and the cost of it might consist of the loss in long run profits from not cooperating as agreed.

Cooperation is more likely:

- The larger are the LR gains c.f. short run advantage
- When monitoring is less costly
- The expected length relationship is longer

SINGLE PERIOD SETTING

Consider two employees assigned to a team, Anna and Bert. Anna and Bert can work or shirk.

Payoffs reflecting the utility from exerting effort, along with the disutility of effort.

		Bert	
		Shirk	Work
Anna	Shirk	$1000, $1000	$3000, $0
	Work	$0, $3000	$2000, $2000

SINGLE PERIOD SETTING

Anna and Bert can work or shirk. Solution is that they both shirk. This is another version of the prisoner's dilemma.

		Bert	
		Shirk	Work
Anna	Shirk	$1000, $1000	$3000, $0
	Work	$0, $3000	$2000, $2000

REPEATED INTERACTION

Now suppose you expect to continue to work together into the future.

To formalise this, suppose you expect to work on the same team again with probability p, so probability working together for n periods is $p^{(n-1)}$.

To keep life easy we will consider that Anna and Bert have only two strategies available to them:

- Always shirk in which case the payoff is:

$$E(\text{future earnings}) = \$1{,}000 + \$1{,}000p + \$1{,}000p^2 + \ldots = \frac{1000}{1-p}$$

- Work hard first period then if they ever shirk, punish them forever by always shirking in the future (grim trigger strategy).

REPEATED INTERACTION

Anna and Bert can work or shirk. What if they each think the other will play grim trigger?

		Bert	
		Always Shirk	**Work then grim trigger**
Anna	**Always Shirk**	\$1000/(1-p), \$1000/(1-p)	\$2000+\$1000/(1-p), -\$1000 +\$1000/(1-p)
	Work then grim trigger	-\$1000 +\$1000/(1-p), \$2000+\$1000/(1-p)	\$2000/(1-p), \$2000/(1-p)

REPEATED INTERACTION

But what if Anna thinks Bert will go grim trigger, may be in her interest to do so. In fact she will do so as long as p>0.5. That is:

$$\frac{2000}{1-p} > 2000 + \frac{1000}{1-p}$$

$$\frac{2000 - 2000 + 2000p}{1-p} > \frac{1000}{1-p}$$

$$p > 0.5$$

SINGLE PERIOD SETTING

If p=1/3, shirking.

		Bert	
		Shirk	Work then grim trigger
Anna	Shirk	$1500, $1500	$3500, $500
	Work then grim trigger	$500, $3500	$3000, $3000

SINGLE PERIOD SETTING

If p=3/4, two Nash equilibria. Initial expectations matter. What should a firm do …?

		Bert	
		Shirk	Work then grim trigger
Anna	Shirk	$4000, $4000	$6000, $3000
	Work then grim trigger	$3000, $6000	$8000, $8000