LECTURE 6

13 August 2024

REPEATED GAMES

- What happens if Prisoners' Dilemma was played more than one shot?

		Suspect 2	
		Quiet	*Fink*
Suspect 1	*Quiet*	2, 2	0, 3
	Fink	3, 0	1, 1

- Suppose the game is played twice.

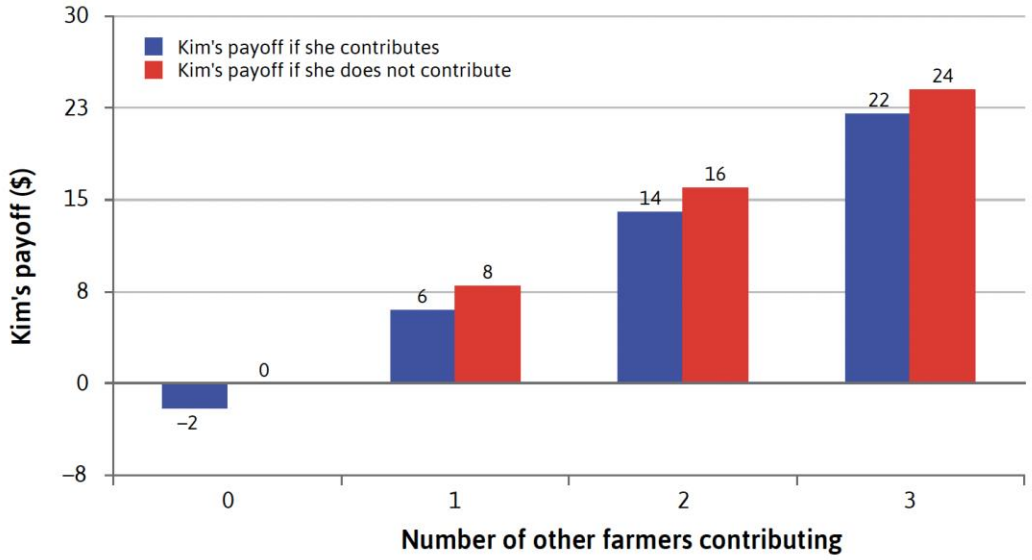
1. Suppose suspect 1 were to play 'Quiet', suspect 2 would think "I could play F the first round, but this ensures suspect 1 would surely play F in the second round and I should also definitely play F in round 2." This would give suspect 2 a total payoff of 4.
2. OR suspect 2 would think "I could play Q the first round, which would prompt player 1 play either Q or F in round 2, and then I should play F in round 2" This gives suspect 2 a total payoff of 5 or 3.
3. Suppose suspect 1 were to play 'Fink', suspect 2 would think "I should play F the first round, and this would lead suspect 1 to play F in the second round when again I should play F." This would give suspect 2 a total payoff of 2
4. Suspect 1 would argue in the same way.
5. The outcome is that in every finite round Fink is played by both players.

- Depending on the number of times the game is repeated there could be cooperation induced between the players.
- Now, what if the Prisoners' Dilemma is repeated infinite times?
- The future payoffs get discounted – shall deal with this in later lectures
- This repeated version of the prisoners' dilemma is something that we encounter regularly, especially with public goods. For instance, when farmers consider adopting the climate friendly Integrated Pest Control program versus using a harmful pesticide.

PROVISION OF PUBLIC GOODS

- Now, lets consider a simple social interaction, such as the provision of public good like an irrigation project.
- Consider there are 4 farmers in an area. The government is willing to build a micro-dam for their use at a subsidized rate according the willingness of the farmers to pay a co-pay of $10. For each person paying the four farmers get a benefit of $8 as more farmers paying implies the government gives better subsidy for construction and ensure better irrigation
- Consider the choices of action one of the four farmers, say Kim have. She could either pay the $10 or not pay the $10 for the dam.
- The payoff Kim would get in different situations are shown in the figure

- Kim’s has a dominant strategy here



- In fact, all the farmers have the same dominant strategy.
- So then, there is a dominant strategy NE in this case where no farmer pays

- In actual world this might not be the outcome as there are communities and traditions that instill people to think for the greater good of the community. For instance, local fishermen.
- This is to say that the degree of cooperation varies depending on the public good we are considering.
- To identify how best to overcome this problem of free riding (a social dilemma) when it comes to provision of public good, we try to elicit social preferences.
- Behavioral experiments: altruism, reciprocity, general aversion to inequality
- How to make a good experiment?

1. Decisions have consequences 2. Common instructions to all participants 3. Replicable experiments 4. Ceteris paribus conditions

PUNISHING FREE RIDERS TO ENSURE COOPERATION

- People can sustain cooperation in a public good provision game, if they could punish free riders somehow.
- When playing a similar game in an experimental setup we observe that in the initial rounds people contribute significantly despite free riding being the dominant strategy.

BARGAINING TO AVOID A LOWER PAYOFF NE – OR MARKET INTERACTIONS

- Montreal Protocol success versus Kyoto Protocol failure – situation where bargaining succeeded and failed
- Who decides which of the NE to go for?

HAWK-DOVE GAME

- *Two animals are fighting over some prey. Each can be passive or aggressive. Each prefers to be aggressive if its opponent is passive, and passive if its opponent is aggressive; given its own stance, it prefers the outcome when its opponent is passive to that in which its opponent is aggressive. Formulate this situation as a strategic game and find its Nash equilibria.*
- Now compare this to the climate change policy adoption and figure out what is the Nash Equilibrium action for countries involved.