Econ 110/PoliSci 135
Section 10 Notes

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1 Announcements

No section or OH next week. (Thanksgiving week) One more section the last week of class; I will cover signaling games then. We will have a review session during RRR week, before the final.

2 Subgame Perfection in Repeated Games

Let's take some time to think about what happens when threats have to be credible. Just like in one-stage games, we formalize this in the notion of subgame perfect equilibria. Remember the definition:

Subgame Perfect Equilbrium A Nash Equilibrium is subgame-perfect if it forms a Nash equilibrium in *every* subgame.

The same definition works in this more complicated setting, but obviously it will be more complicated to verify when we have a SPE. Just be very careful to consider *all* subgames (either one at a time, or by somehow dividing them into categories), and you'll be fine.

The big problem with the grim trigger strategies we've been using before is that they aren't subgame perfect. The way we found a player's minmax strategy said nothing about his own payoffs, which means that it is likely that she has an incentive to deviate in the subgames where she's supposed to punish the other player.

The good news is that there's an equally-simple strategy that we can use instead that *is* subgame-perfect: the Nash Threat trigger strategy. There are two main differences from the "grim triggers". First, the punishment is now always playing a Nash equilbrium. Second, we change the trigger subtly to take care of the subgame that starts when the punishment is first triggered:

Nash Trigger Threat Strategy: Choose a set of stage-game actions, and designate them as "cooperation". A player's Nash Threat strategy is to always play the cooperative action so long as both players have always cooperated. If either player has ever deviated, play the stage game Nash forever.

Because this is a weaker threat than the grim trigger strategy, it will be able to support a smaller set of stage outcomes. On the other hand, because the strategies are subgame perfect, the claim to punish forever is credible.

3 Games of Asymmetric Information

For the past few lectures we've been discussing games of **asymmetric (or incomplete) information**, where one player has private information, and at least one player knows something that the other player doesn't. These games are different from games of **imperfect information** in the following way:

- imperfect information: uncertainty over moves (actions)
- incomplete (asymmetric) information: uncertainty over payoffs

We'll mostly be seeing bargaining games with incomplete information.

3.1 An example: Bargaining with Incomplete Info

Jack has two tickets to the A's game that Anne really wants. Anne decides to make a take-it-or-leave-it offer to Jack who can either accept the offer or reject it. The A's tickets are worth w to Jack, but Anne doesn't know exactly how much w is. She believes that w is uniformly distributed between 50 and 200 bucks.

1. Suppose Anne offers Jack p=120. What is the probability that this offer will be accepted?
2. What is the probability that an offer of p will be accepted
3. What is Anne's expected payoff to offering p?
4. What is Anne's optimal offer?
5. What is the equilibrium probability that Anne succeeds in acquiring the A's tickets?

4 Principal Agent Models

Principal-Agent Models arise when there is a Principle who wants to get something done, but he needs to hire an Agent to actually do the work (ie: an employee). Complications arise when there is a conflict of interest, or when the Principle and Agent's incentives don't line up perfectly. There are two general types of Principle-Agent Models:

- Adverse Selection: hidden type. An example would be trying to buy a used car without knowing whether it is a high quality or low quality used car.
- Moral Hazard: hidden action. An example would be a firm unable to monitor how much effort the employee is putting in.