How to think about strategic games

Games Of Strategy
Chapter 2
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Terms to Know

- Asymmetric Information
- Constant Sum Game
- Cooperative Game
- Decision
- Equilibrium
- Evolutionary Game
- Expected Payoff
- External Uncertainty
- Game
- Imperfect Information
- Noncooperative Game
- Payoff
Terms to Know

- Perfect Information
- Rational Behavior
- Screening
- Screening Device
- Sequential Moves
- Signal
- Signaling
- Simultaneous Move
- Strategic Game
- Strategic Uncertainty
- Strategy
- Zero-Sum Game
Introductory Games

- Pick a partner and play five games of Tic-Tac-Toe
  - Score yourself 5 points for a win, -5 points for a loss, and 0 for a tie
- Pick a different partner and play Rock, Paper, Scissors five times
  - Score yourself 5 points for a win, -5 points for a loss, and 0 for a tie
Introductory Games Cont.

- Pick a different partner, now play Rock, Paper, Scissors again except that the person who is tallest must show his/her decision first before the shorter person decides what move to make.
  - Once you are done with the first game, switch who goes first and who goes second.
  - The professor will decide in class how many times this game will be played.
  - Score yourself 5 points for a win, -5 points for a loss, and 0 for a tie.
Introductory Games Cont.

- Find a new partner and play five games of Rock, Paper, Scissors, Spock, Lizard
- Score yourself 5 points for a win, -5 points for a loss, and 0 for a tie

Discussion of Games

- What made the games similar?
- What made the games different?
- Did you have a preference of what game was played?
- What were you thinking about during each game?
- Do any of these games have anything to do with Agribusiness?
- Other thoughts?
Strategic Games

- They are built upon interactions between participants
- The participants know they are interacting
- Each participant makes decisions/actions that affect the others
Dimensions of Strategic Games

- Sequential versus simultaneous decisions
- Conflict versus commonality of interests
  - Zero-sum games
  - Constant-sum games
- Once versus repeatedly
- Constant opponent versus changing opponent
Dimensions of Strategic Games Cont.

- Full and/or equal information
  - External uncertainty
  - Strategic uncertainty
  - Perfect information
  - Imperfect information
  - Asymmetric information
  - Signals
  - Signaling
  - Screening
  - Screening devices
Dimensions of Strategic Games Cont.

- Rules fixed or manipulable
- Enforceable agreements
  - Cooperative games
  - Noncooperative games
Strategies

- They are made up of choices available.
- Choices need to take into account every possible contingency.
- They need to be a complete plan of action.
- In the literature a particular strategy for a person i is represented as $s_i$ (lowercase) and we represent the set of all strategies of player i as $S_i$ (uppercase).
In the literature a particular set of strategies for every person except person i is represented as $s_{-i}$ (lowercase) and we represent the set of all strategies for every person except person i as $S_{-i}$ (uppercase).
Payoffs

- This is what each player gets from playing their strategies in a given game
- Payoffs need not be dollar amounts
- They can be anything that allows you to rank outcomes for each player in the game
- Payoffs must measure everything the players care about
Payoffs Cont.

- Payoffs can be associated with probabilistic outcomes causing there to be expected payoffs.
- In the literature, a payoff for a particular player is represented as $u_i(s_i,s_{-i})$. 
Rationality

- Need a complete knowledge of your own interests
- Need flawless calculations of what actions will best serve your interest
- **Important:** “You must not impute your own value systems or standards of rationality to others and assume they would act as you would in that situation.” (p.30)
Common Knowledge of the Rules

- Players in a game should have a common understanding of the game

- Rules consist of:
  - Players
  - Strategies
  - Payoffs
  - Each player is a rational optimizer
Equilibrium

- Simply, no player in a game has an incentive to change her decision assuming the others do not change their decisions, i.e., each player uses their best response to others' strategies.
- Equilibrium could be viewed as good or bad.