

### Problem set 3

#### 1) Key concepts

- General idea behind the folk theorems for repeated games
  - They concern what payoffs can be sustained in a SPNE in these repeated games.
- Previously, we looked at how Nash reversion can be used to sustain certain payoffs. These payoffs needed to be higher than their minimum payoff in a Nash equilibria.
- But the set can be even larger:
  - Intuitively, the minimum payoff which I can guarantee myself is when others min-max me. This means that they are choosing the action which gives me the lowest payoff (*min*) given that I am choosing the best response to that action (*min*). This relates to the set of Individually rational payoffs.
  - Strategies by players which give payoffs strictly individually rational can then be sustained by reverting to min-max strategies as punishments for deviators. By definition, these will give the deviator strictly lower payoffs. These min-max strategies may be possibly be forever or for some finite period.
  - BUT: since the min-max strategy of punishers is not generally not a best response for them, punishers might not want to follow them. (In contrast, those being punished are best responding)
  - The idea then is to punish them if they do not follow through with the punishment by min-maxing them.
  - However, sometimes being punished is still being better than punishing others: in these cases, would need to reward them for following through with punishment.
- So, these strategies usually take the form of
  - a set of main strategies which generates the higher payoffs
  - a set of punishment strategies which either punish someone who deviates from the main strategy or from a punishment strategy (possibly finite).
  - Possibly some finite period where punishers are rewarded.
- Nash reversion strategies can apply to both finitely and infinitely repeated games. Why?
- Min Max strategies: Usually used for infinitely repeated games

#### 2) Key concepts

- Solving for Bayesian Nash equilibria (in simultaneous games)
  - Strategies for player consist of what they would do for each type
  - Use priors to calculate the expected payoffs of a player who ex-ante does not know their type. (TEDIOUS!)
  - Use the highlight method.