

Chapter 5

Nash Equilibrium: Bad Fashion And Bank Runs

We first define formally the new concept from last time: Nash equilibrium. Then we discuss why we might be interested in Nash equilibrium and how we might find Nash equilibrium in various games. As an example, we play a class investment game to illustrate that there can be many equilibria in social settings, and that societies can fail to coordinate at all or may coordinate on a bad equilibrium. We argue that coordination problems are common in the real world. Finally, we discuss why in such coordination problems--unlike in prisoners' dilemmas--simply communicating may be a remedy

Nash Equilibrium: A strategy profile $(s_1^*, s_2^*, \dots, s_N^*)$ is a Nash Equilibrium if for each i , her choice s_i^* , is a best response to the other player's choice s_{-i}^* .

Motivation for Nash Equilibrium

1. No regrets. No individual can do strictly better by deviating, holding everyone else's actions.
 2. Self fulfilling beliefs.
- Rationality should not lead us to the conclusion that people necessarily play Nash Equilibrium.
- No strictly dominated strategy could ever be played in a Nash Equilibrium.

Investment Game

Strategies - Invest \$0 or \$10

Payoffs

If you do not invest then \$0

If you invest \$10 then \$5 net profit if $\geq 90\%$ invest.

If you invest \$10 then \$10 net loss if $< 90\%$ invest.

Nash Equilibrium

All invest or no one invest.

- In coordinated games communication can help.
- Nash Equilibrium can be self enforcing agreements.