Higher School of Economics
Center for Institutional Studies

Lecture 3. Bounded rationality and Institutions

M.M. Yudkevich

Moscow, Russia, September 11, 2018

Neoclassical Economics and Rational-choice model

Rational Choice model

- Complete knowledge of relevant aspect of his environment
- Well-organized and stable system of preferences
- Perfect computational skills
- Optimization (maximization of utility)

Full and Perfect Information

Stable and fully defined rules of the game (including property rights)

Zero transaction costs

Borders of neoclassical world

- Markets with perfect competition
- Minimal information asymmetry
- Low costs of decision making
- Anonymous interactions
- Efficient legal system

New Institutional Economics: assumptions

- Bounded rationality
- Incomplete and imperfect information
- Many dimensions of goods: price, quantity and quality
- Incomplete specification of rules (including property rights)

$\Rightarrow$ Positive non-production costs

$\Rightarrow$ Demand for rules

Bounded rationality by Herbert Simon

It is costly to obtain and to analyze information

Agents are not able to define targets and to calculate long run effects of their decisions

- Limited cognitive abilities
- Complex environment

Concept of **satisficing** instead of **optimization**

Sequential decision making (revision of targets)

Simon, Herbert A. "A behavioral model of rational choice." *The quarterly journal of economics* (1955): 99-118.

Simon, Herbert A. "Rational choice and the structure of the environment." *Psychological review* 63.2 (1956): 129.

Simon, Herbert A. "Theories of bounded rationality." *Decision and organization* 1.1 (1972): 161-176.

Simon, Herbert A. "From substantive to procedural rationality." *25 Years of Economic Theory*. Springer US, 1976. 65-86.

Beauty Contest game

Many players choose numbers from 0 to 100 at the same time. The average number is calculated and multiplied by 2/3. The player whose number is closest to 2/3 of the average wins a fixed prize

* Beauty contest and Keynes

This game is often called a “beauty contest,” after a passage in John Maynard Keynes’s influential economics book (J. M. Keynes, The General Theory of Employment, Interest and Money (Macmillan, London, 1936). Keynes describes the stock market as a beauty contest in which investors try to figure out what stocks other investors find attractive. Spotting the stocks, which other investors will soon find attractive, earlier enables savvy investors to buy low and sell at a higher price, when the attractiveness of the stocks becomes obvious to all investors and prices rise.

Beauty Contest game

Many players choose numbers from 0 to 100 at the same time. The average number is calculated and multiplied by 2/3. The player whose number is closest to 2/3 of the average wins a fixed prize.

Choose number to win the game

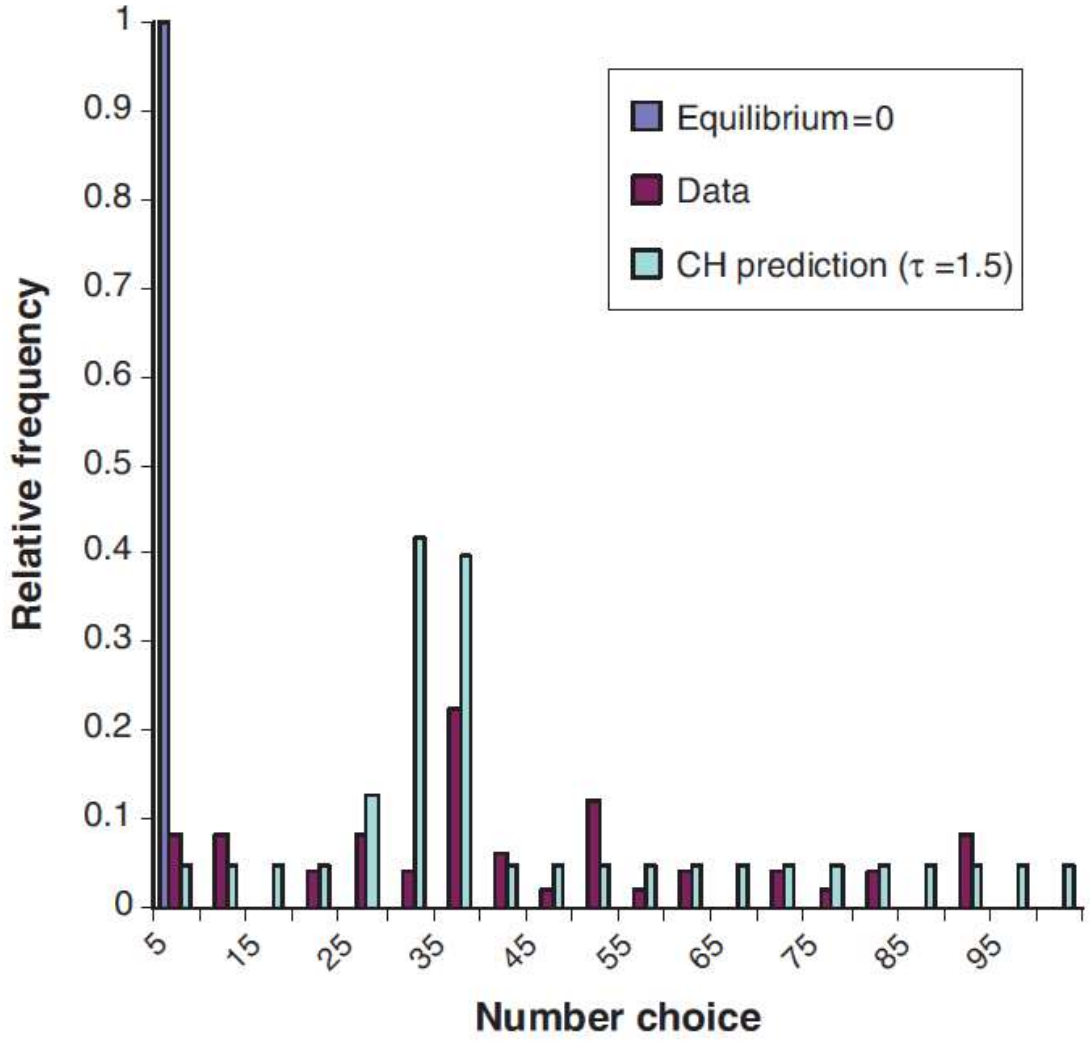
Beauty Contest game

Many players choose numbers from 0 to 100 at the same time. The average number is calculated and multiplied by 2/3. The player whose number is closest to 2/3 of the average wins a fixed prize.

Choose number to win the game.

What was your logic?

Beauty contest



Cognitive hierarchy

The fraction of players who do k steps of thinking is f(k).

0-step players just randomize across their strategies.

k-step players believe, overconfidently, that they are responding to players who do 0 to k - 1 steps of thinking

The average number of steps of thinking equals 1.5

Only 8% of players do more than three steps of thinking.

Example

Two geographically separated individuals, **A** and **B,** value **own good at 10**, and the **other** player's good at **20.**

If the players send their goods to the exchange partner, they both end up with a more highly valued good than if they retain their goods.

Anonymous simultaneous game

Choose your strategy

Example

Two geographically separated individuals, **A** and **B,** value **own good at 10**, and the **other** player's good at **20.**

In the absence of contract-enforcement institutions the situation **represents a PD**: A is better off keeping his good, irrespective of whether B sends his good to A.

Prisoner's dilemma

		Player B	
		Cooperative behavior	Non-cooperative behavior
Player A	Cooperative behavior	b; b	0; a
	Non-cooperative behavior	a; 0	**c; c**

a>b>c>0
a=30,
b=20,
c=10

Prisoners' dilemma with different types of players

2 types of players

- Self-regarding individuals (rational players)
  - form, on average, correct beliefs about events in their environment and about other people's behavior
  - choose those actions that best satisfy their preferences
  - does not care per se for the outcomes and behaviors of other individuals (self-regarding preferences)

- Strong reciprocator
  - other-regarding preferences
  - bear the cost of rewarding or punishing even if they gain no individual economic benefit from their acts

Example

Two geographically separated individuals, **A** and **B,** value **own good at 10**, and the **other** player's good at **20.**

Players are self-regarding – non-cooperative equilibrium

Players are strong reciprocators - cooperative equilibrium

What happens if a strong reciprocator (player B) faces a self-regarding player A and both players know each other's preferences?

Prisoners' dilemma with different types of players

Simultaneously played game

I know that he knows that I know…

- B (strong reciprocator) anticipates A's decision to retain the good and does likewise

Non-cooperative equilibrium like in classical PD game

Prisoners' dilemma with different types of players

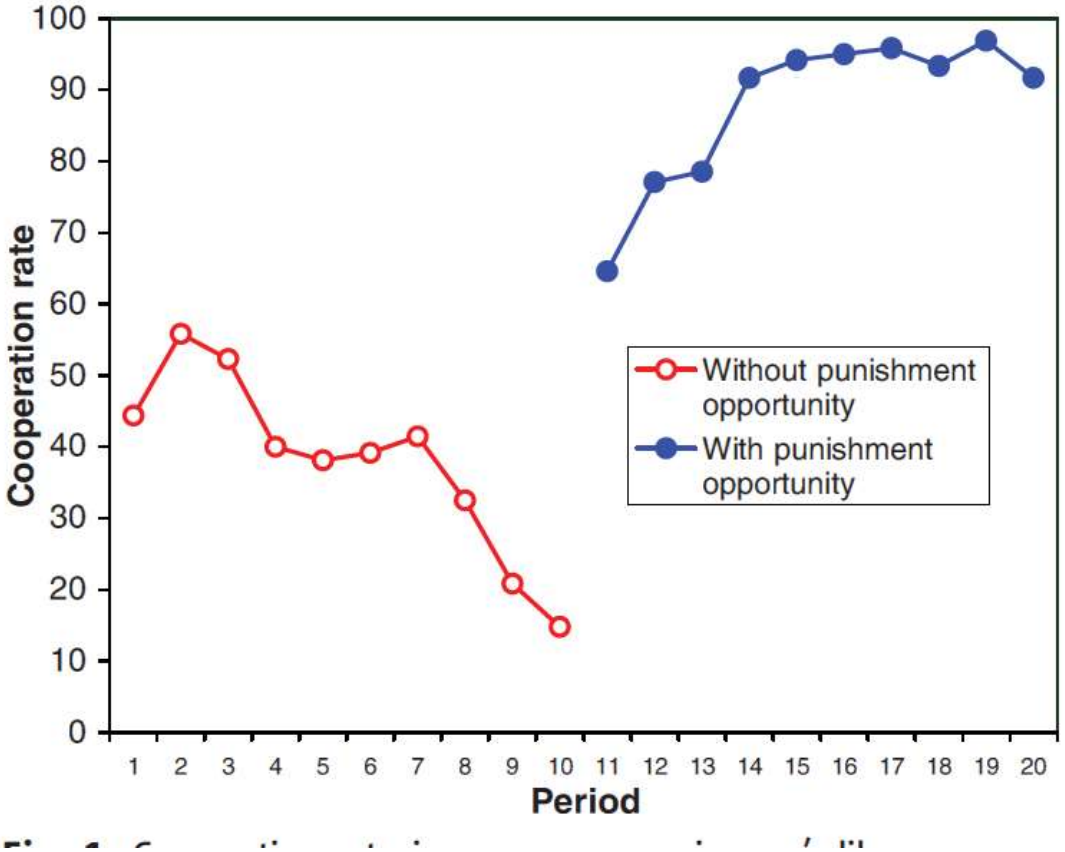
Sequential played game

- First step by B (strong reciprocator)
  - A choses to retain the good
- First step by A (self-regarding)
  - A choses to cooperate and send the good

Information about type of the player is unknown.

- Players know only probability to meet a certain kind of player.
- If probability is higher than 0.5, they will cooperate.

Cooperation and Punishment



Ultimatum game: classic definition

Two players are allotted a sum of money.

The first player (**Proposer)** offers some portion of the money to the second player (**Responder)**.

If the Responder accepts, she gets what was offered, and the Proposer gets the rest.

If the Responder rejects the offer, both players get nothing.

Ultimatum game

Average – 30-40%

Mode - 50%

Function of relatively small stakes?

- Rise up to 100$, same results

Cultural Effect (nationality)

- Jerusalem, Ljubljana, Pittsburg, Tokyo
- Israel: mode = 40
- USA: mode = 50

Informational distribution matters

- Different values of the chips in different informational distribution increase average interval from 30% (the Responder has the higher rate, and only she knows) up to 64% (both players know that the Proposer has the higher value)

Ultimatum game in trade

A buyer offers a price **P** to a seller, who can sell an indivisible good.

The **buyer** values the good at **100** and the **seller** values it at **0**.

The buyer can make exactly one offer to the seller, which the latter can accept or reject.

Trade takes place only if the seller accepts the offer.

Strong reciprocators reject unfair offers, however, preferring no trade to trading at an unfair price.

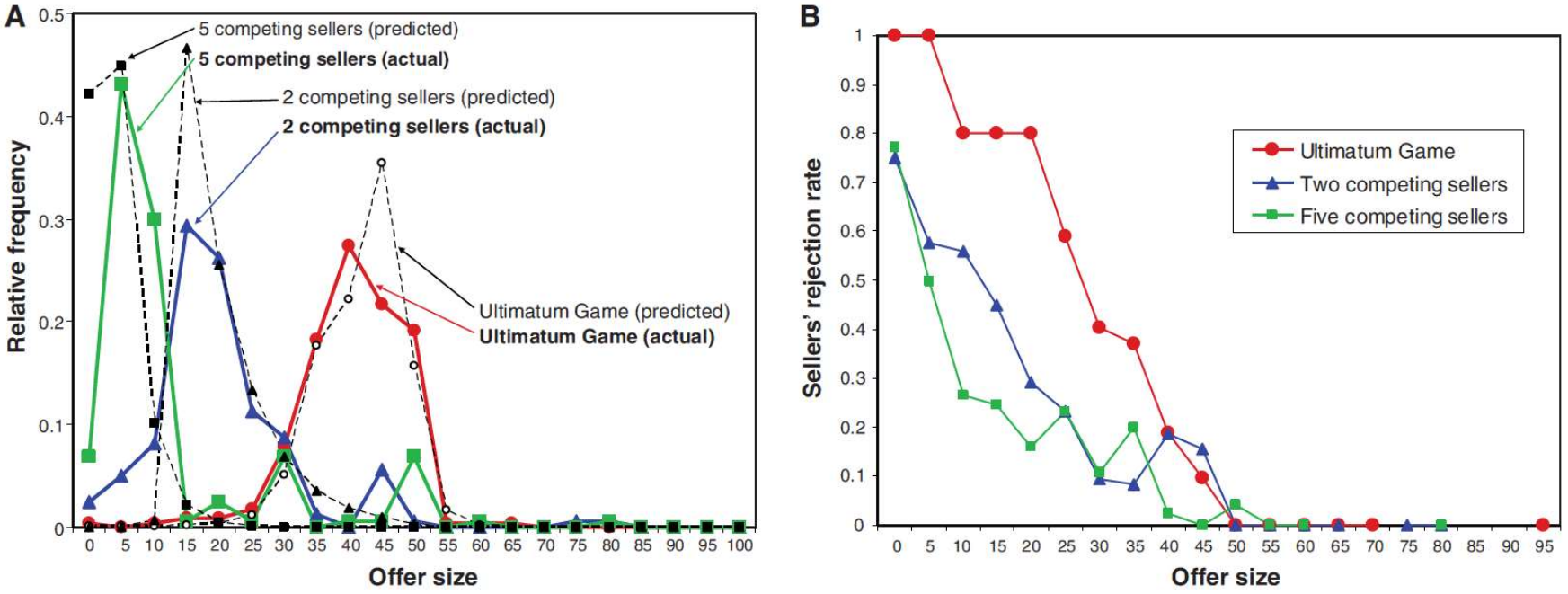
Ultimatum game in trade with competition

Instead of one there are **two sellers** who both want to sell their good.

Again the **buyer** can make only **one offer** which, if **accepted by one of the sellers**, leads to trade.

If both sellers reject, no trade takes place; if both sellers accept, one seller is randomly chosen to sell the good at the offered price.

Ultimatum Game with competition



Institutions and rationality

Institutions occur where bounded rationally individuals make decisions under condition of uncertainty.

«The major role of institutions in a society is to reduce uncertainty by establishing a stable (but not necessary efficient) structure to human interaction».

North (1990)

Functions of institutional environment

Ensuring predictability and stability

- The predictability of the results of action
- Stability of economic interactions
- Estimation of the potential costs and results

Minimizing the cost to maintain the deals

- Minimization of efforts to find partners
- Ensuring the credibility of the commitments

Knowledge transfer

- Formal and informal learning rules

References

Camerer, Colin F., and Ernst Fehr. "When does" economic man" dominate social behavior?" *Science* 311.5757 (2006): 47-52.

Camerer, Colin, and Richard H. Thaler. "Anomalies: Ultimatums, dictators and manners." *The Journal of Economic Perspectives* 9.2 (1995): 209-219.