



ExpEc I. Preliminaries

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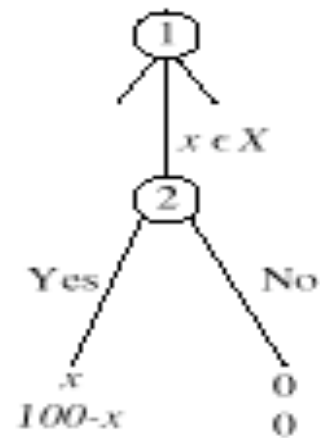
Roma, 7/6/2010

Example # 1: the Ultimatum Game (UG)

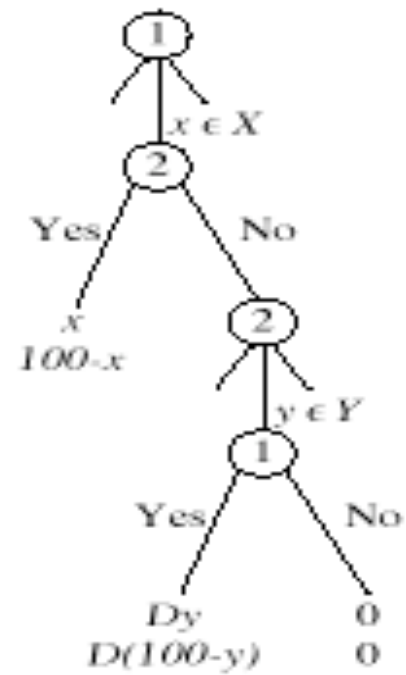
- Player 1 makes a take-it-or-leave-it proposal to player 2 of how to split, e.g., £10.
- Player 2 can only accept or reject the offer x .
- If player 2 accepts, the proposed allocation is implemented:
 - Payoff of player 2: x
 - Payoff of player 1: $10 - x$.
- If player 2 rejects, both earn zero.
- This experimental protocol is named as the *Ultimatum Game* (Güth, Schmittberger & Schwarze, 1982)
- This is one of the most researched game (see Camerer 2003, chap. 2 for a survey).

Sequential mini-games (Bimore *et al.* 2002)

1



2

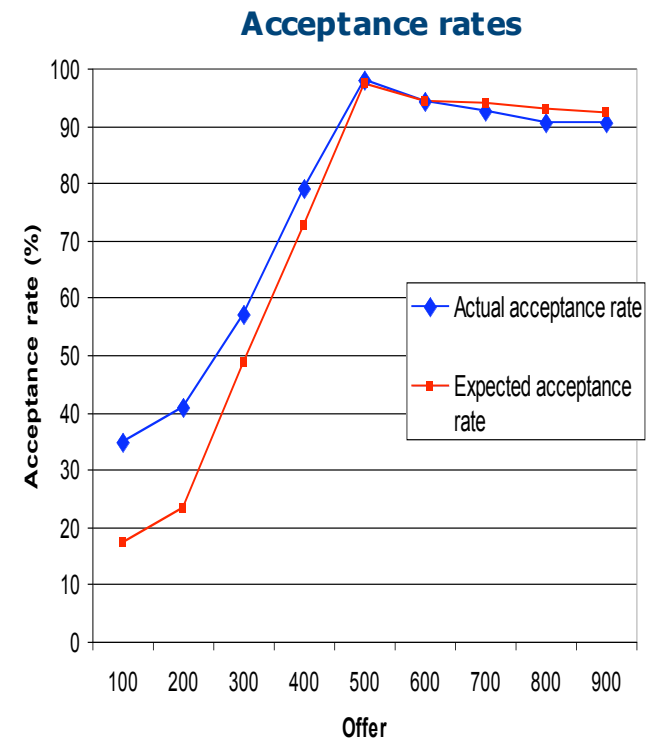
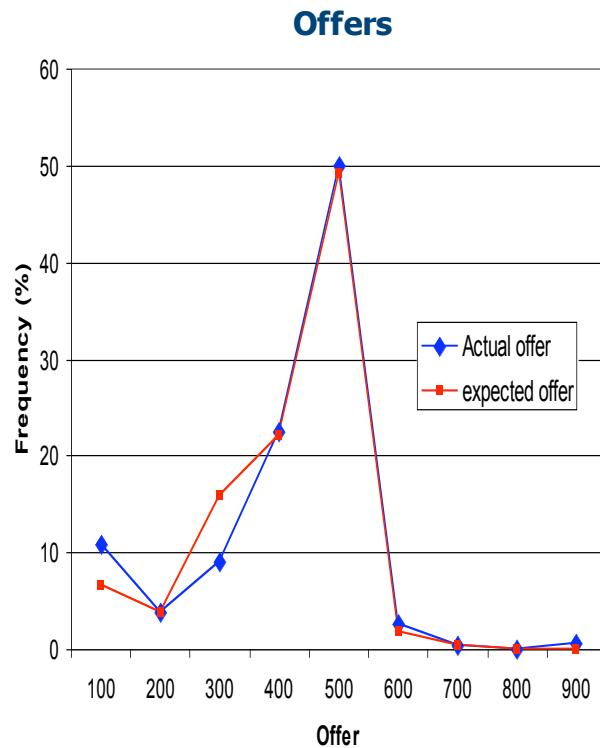


Güth *et al.*'s (1982) original results on the UG

- Perfect equilibrium prediction: player 1 asks for and gets (essentially) 100% of the pie.
- Observed results: the average demand of players 1 was for under 70%, both for players playing the game for the first time and for those repeating the game a week later.
- Notice that each subject played a single game in each session.
- **Conclusions**
- It seems that subjects often rely on what they consider a fair or justified result, **punishing those players asking for “too much”**.

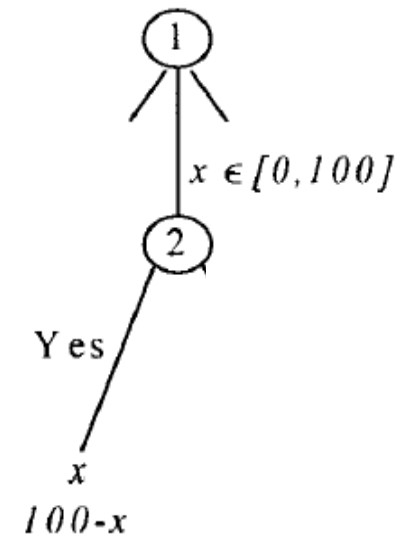
Experimental results on the UG

- Güth, Schmidt & Sutter (GER, 2003)
- “Newspaper experiment” n=1035 readers of the “Berliner Zeitung”



Example # 2: the Dictator Game (DG)

- In the DG a subject is given a fixed endowment, y .
- The Dictator can transfer any quantity x , from 0 to y , to the Recipient
- In this respect, one can think of the DG as an UG in which the Recipient is forced to accept the Proposer's offer.
- In the DG there is **no strategic uncertainty**.
- This is why it has been used to measure **pure altruistic concerns**

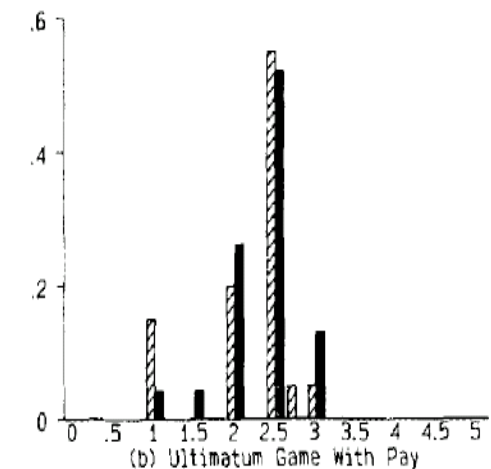
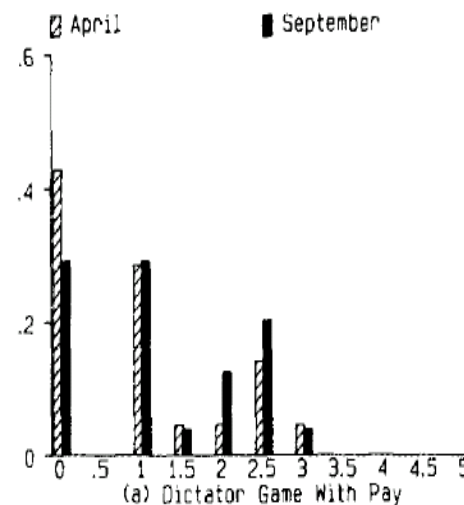


Fairness in simple bargaining games

Forsythe, Horowitz, Savin & Sefton (GEB, 1994)

- Why do people offer positive amounts in the UG?
- Fairness vs. strategic thinking
- Idea: compare Ultimatum game with Dictator game (second mover cannot reject the offer).

- **The identification problem:** altruism in the UG can be explained by
 1. Beliefs on the Responder's "spitefulness"
 2. Social (inequality averse) preferences on the Proposer's behalf



Market games with “proposer competition”

(Roth et al., *AER* 1991)

Stage 1: $n-1$ proposers simultaneously suggest a fraction of the pie $s_i \in [0, 1]$.

Stage 2: Player n (“responder”) accepts or declines the highest offer s^h .

Payoffs:

In case of a rejection 0 for all.

In case of acceptance

- responder gets s^h
- the successful proposer gets $1 - s^h$
- all other proposers get 0.
- This protocol can be thought of an UG with **competition among Proposers**

Results

1. Responders accept all $s^h > 0.5$.
2. After a few rounds there are lots of proposals with $s = 1$.
3. Fast convergence to the equilibrium result in all 4 countries (Israel, Japan, Slovenia, USA).

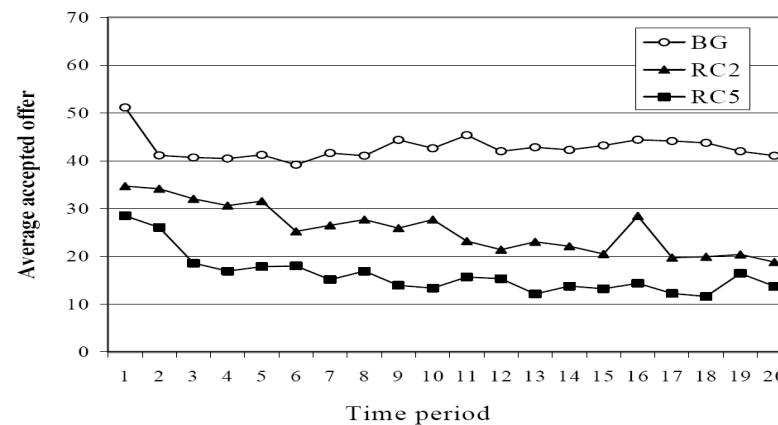
A Market Game with Responder Competition

Fehr, Fischbacher & Fong (2003)

- There is 1 Proposer and 5 Responders.
- The Proposer proposes how to share 100 money units with the Responders.
- Each Responder decides whether to accept or reject the proposal without knowing how the other 4 Responders decided.
- If nobody accepts all participants earn zero. If more than one Responder accepts one of them is randomly drawn and receives the proposed amount. The Proposer receives the rest.
- There are twenty periods with random matching.

Results

Figure 1: Average accepted offer in bargaining and market experiments



- In this case, competition reduces the Responder's bargaining power.
- Acceptance levels decrease as time proceed (learning effects)
- Acceptance levels decrease with the number of competing proposers
- **Conclusion:** market conditions can alter our perception of fairness.

Example # 3: Voluntary Contribution Mechanism (VCM)

- Groups with n members
- Each member has endowment of z "tokens"
- Two investment alternatives: A and B
- c_i investment in B \rightarrow public good; private good: $(z - c_i)$.
- Payoff function for each group member i :

$$\pi_i(c_i, c_{-i}) = (z - c_i) + a \sum_{j=1}^n c_j$$

- **Public good:** sum of all investments c_j in B. Subjects receive a fixed share of B **independently of their individual contribution**
- Each group member decides (independently and simultaneously) about c_i

Opportunistic free-riding in the VCM

- Consider the case in which $1/n < a < 1$.
- We can calculate i 's **marginal return of contribution** in the VCM:

$$\pi_i(c_i, c_{-i}) = (z - c_i) + a \sum_{j=1}^n c_j$$

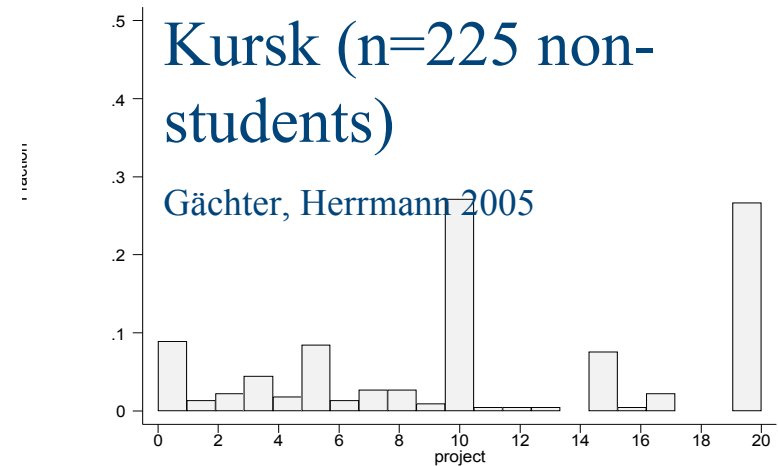
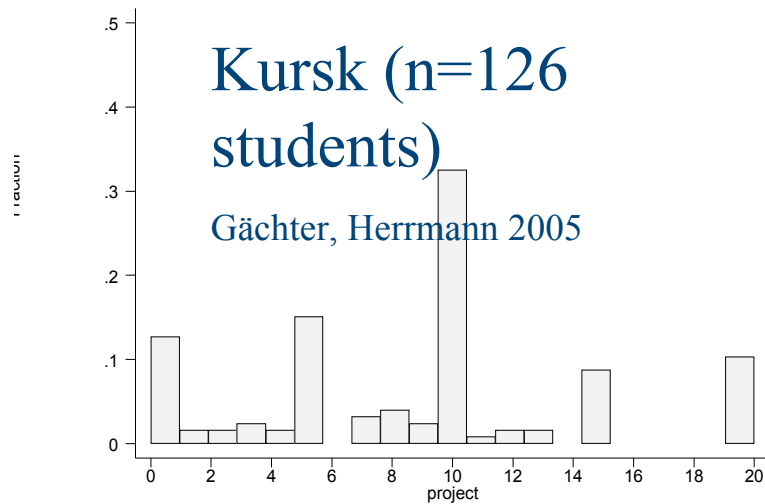
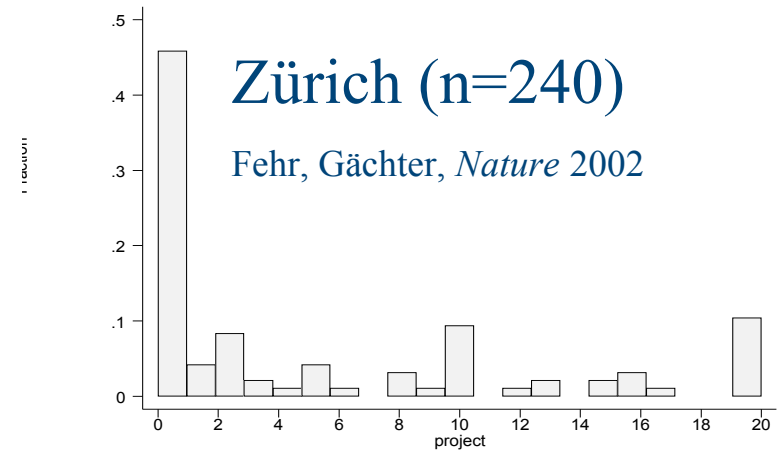
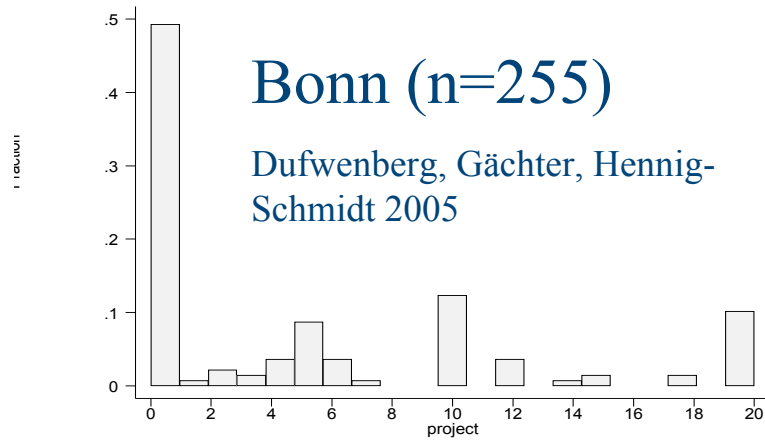
$$\pi_i(c_i, c_{-i}) = (z - c_i) + a \sum_{j=1}^n c_j = (z - c_i) + ac_i + \sum_{j \neq i}^n c_j$$

$$\frac{d\pi_i}{dc_i} = -1 + a < 0$$

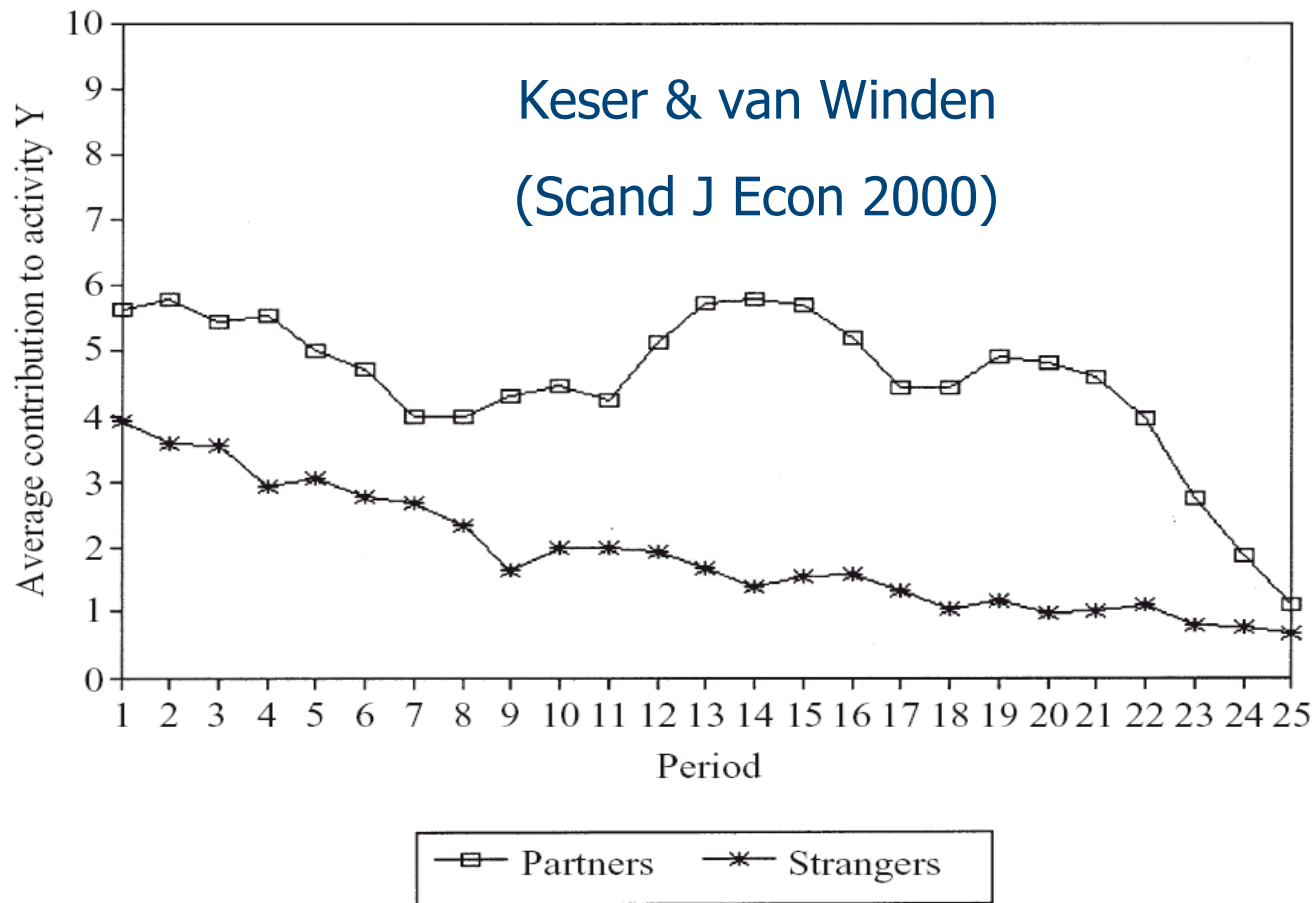
$$\pi_i(0, 0) = z \quad \pi_i(z, (n-1)z) = naz > z$$

- Contributing is not **individually rational**, but is (Pareto) efficient for the collectivity as a whole

Cooperation in one-shot public goods games



Contribution decay in repeated VCGs (Ledyard, 1995)



Explanations

- Altruism, “Warm-glow”, errors
 - Andreoni (AER 1995)
 - Palfrey & Prisbrey (AER 1997)
 - Anderson, Goeree and Holt (J Publ E 1998)
- Reciprocity/conditional cooperation
 - Kelley, Stahelski, *J Personality & Soc Psych* 1970
 - Dawes, McTavish, Shaklee, *J Personality & Soc Psych* 1977
 - Yamagishi, Sato *J Personality & Soc Psych* 1986
 - Sugden (Econ J 1984)

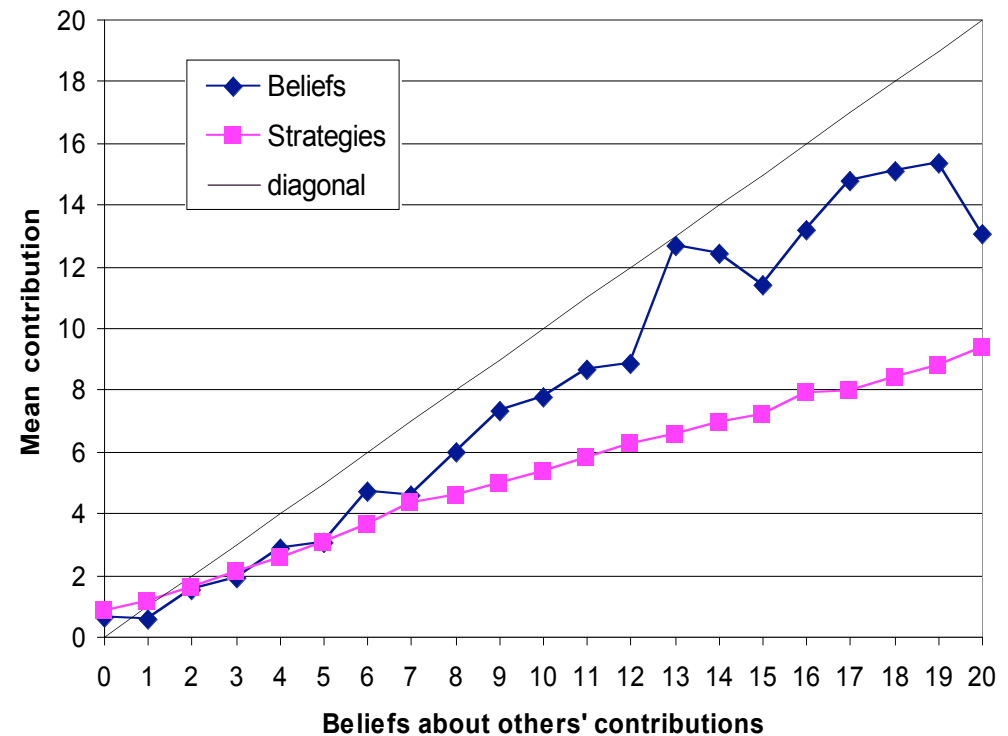


“... we might all of us be willing to contribute to the relief of poverty, *provided* everyone else did. We might not be willing to contribute the same amount without such assurance.”

Milton Friedman *Capitalism and Freedom*,
(1962, p.191)

Conditional cooperation - Fischbacher and Gächter (2005)

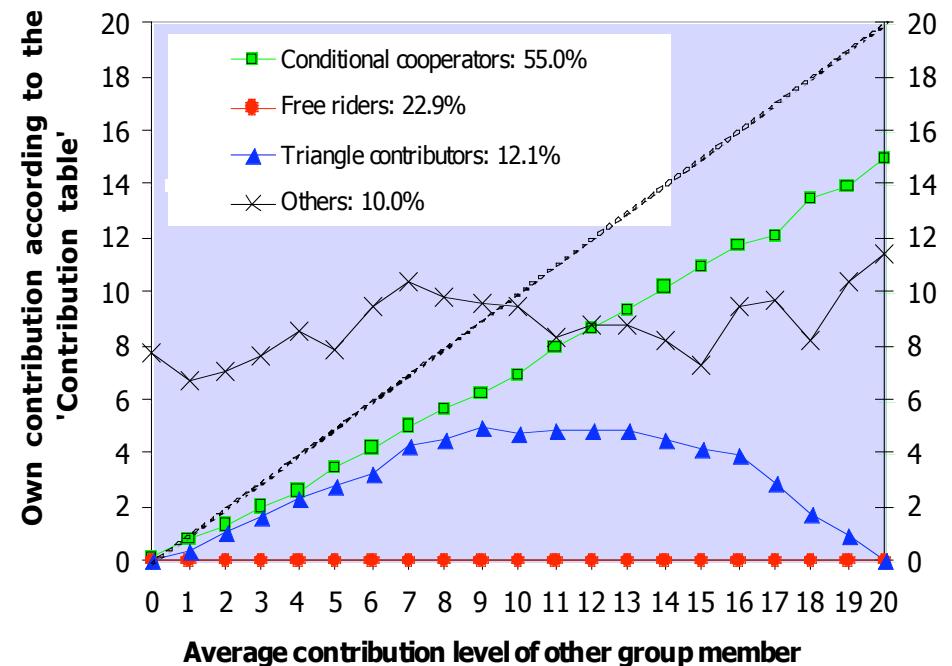
- Subjects are asked to
 1. Elicit their beliefs about the mean contribution of the other group members
 2. Choose their own contribution
- **Results**
- Contribution schedules are increasing in the beliefs
- **Reciprocity?**



Heterogeneous cooperation preferences (N=140)

- Subjects are asked to submit a “contribution schedule” indicating contribution as a function of average others’ contribution
- They are then partitioned into “different categories”, to explore subjects’ **heterogeneous motivations to actions:**

1. Conditional cooperators
2. Free-riders
3. Triangle contributors
4. Others

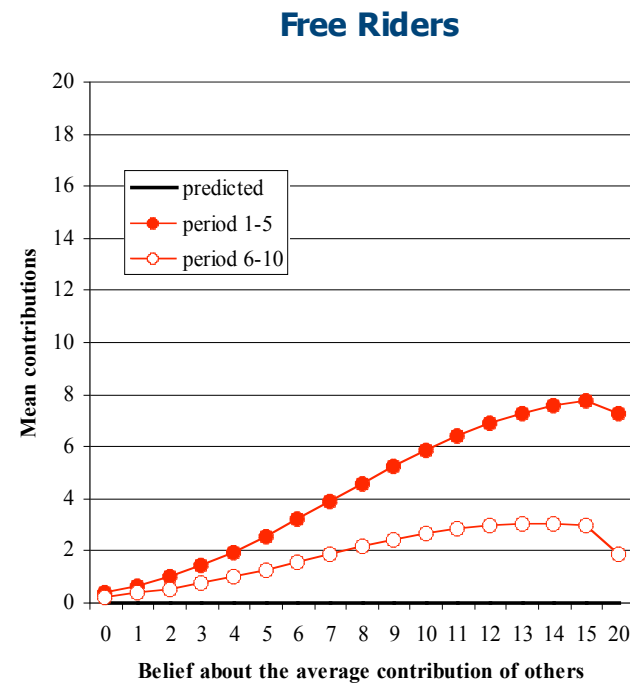
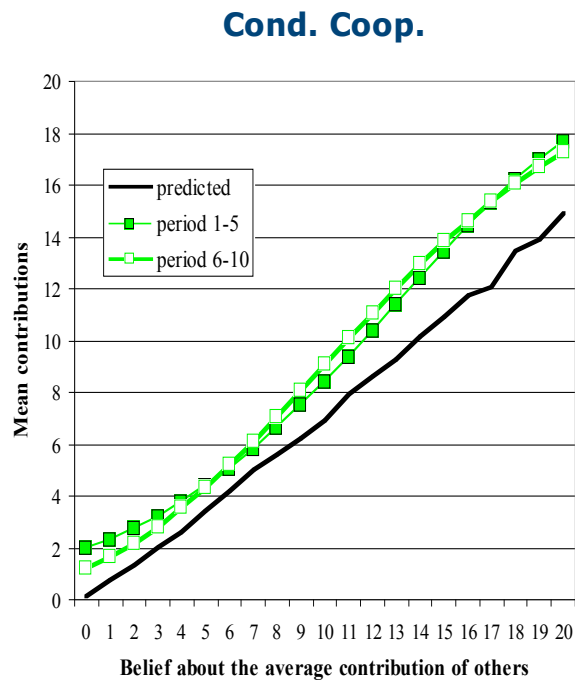


The C-experiments

- Four-person linear public goods game introduced above.
- Random matching in each period (out of a pool of 24).
- 10 repetitions.
- In each period we elicit **beliefs** about the average contribution of the other three group members. Subjects are paid for the accuracy of their estimation.
- **Scoring rules** are often used to disentangle beliefs on the other group members' behavior from motivations to actions (i.e., preferences)

Mean actual contribution for a given belief and predicted

- **Free-riders:** moderate reciprocity, learning effects
- **Cond. Coop.:** strong reciprocity, no learning



Preliminary conclusions

- Subjects' motivations to action are:
- **Heterogenous**, i.e., vary across subjects
- **Context-dependent**, i. e., conditional to the specific institutional arrangement associated with the experimental protocol
- **Dynamic**, i.e. change with experience. This *learning effect* is, again, distributed heterogenously across the subject pool.
- **Reacting to incentives**, but not necessarily aligned with (expected) individual profit maximization.

What is game theory?

- Osborne (2002):

“ ... *Game theory is a set of analytical tools designed to improve our understanding of situations in which decision-makers interact. Two assumptions underlie the theory: each decision-maker pursues a well-defined exogenous objective, and takes into account her knowledge or expectations of the other decision-makers' behavior...*”

Why game theory?

- Binmore (1992):

“... *What is important here is that game theory does not pretend to tell you how to make judgments about the shortcomings of an opponent. In making such judgments, you would be better advised to consult a psychologist than a game theorist. Game theory is about what players will do when it is understood that both are rational in some sense...*”

Behavioral Game Theory

- Camerer (2003):

“ ... Behavior in games is notoriously sensitive to *details of the environment*, so that strategic models carry a heavy informational burden, which is often compounded in the field by an inability to observe all relevant variables ... For many questions, [experimental data are] *the most important source of information we have...* ”

Experimental Economics: Smith's (1992) definition

- Every laboratory experiment is defined by an **environment**, specifying the initial endowments, preferences and costs that motivate exchange. This environment is controlled using monetary rewards to induce the desired specific value.
- An experiment also uses an **institution** defining the language (messages) of market communication (bids, offers, acceptances), the rules that govern the exchange of information, and the rules under which messages become binding contracts. This institution is defined by the experimental instructions which describe the messages and procedures of the market, which are most often computer controlled.
- Finally, there is the observed **behavior** of the participants in the experiments as a function of the environment and institution that constitute the controlled variables.)

Smith/Roth: Motivation for Experimental Economics

- **“Speaking to theorists”:**
 1. Test a theory, or discriminate between theories
 2. Explore the causes of a theory’s failure
- **“Searching for facts”:**
 1. Establish empirical regularities as a basis for new theory.
- **“Whispering in the Ears of Princes”:**
 1. Compare environments/institutions
 2. Evaluate policy proposals/institution design

The End



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