Professorship for Economics
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Behavioral Economics

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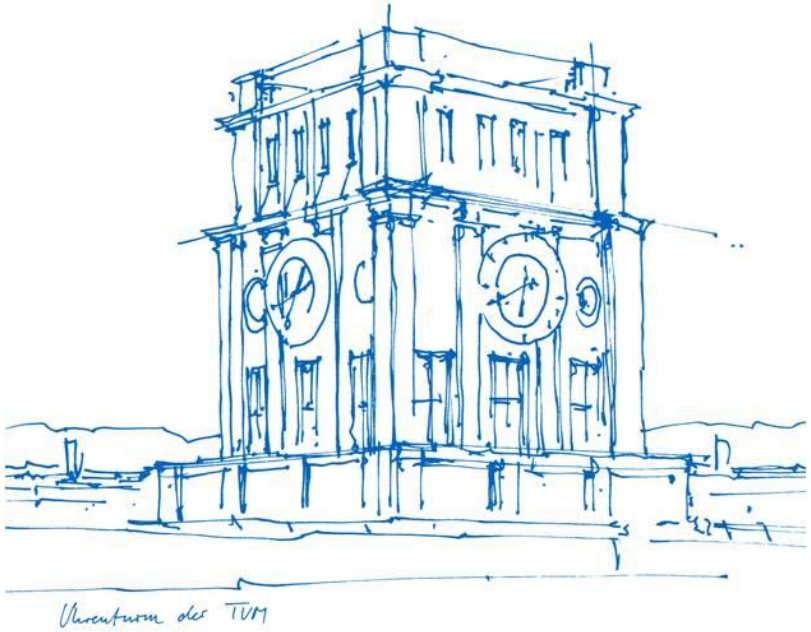


Semester Plan

I. What is Behavioural Economics
II. Principles of Experimental Economics
III. The Standard Economic Model: Consumer Theory
IV. Reference dependence & departures from the standard model
V. Decisions Under Risk and Uncertainty (I)
VI. Decisions Under Risk and Uncertainty (II)
VII. Intertemporal Choice
VIII. Interaction with others: Game Theory
IX. Interaction with others: Beh. Game Theory & Social Pref/ces
X. Behavioral Economics and Policy

Last Week

IX. Interaction with others: Beh. Game Theory & Social Pref/ces

A. Limited strategic thinking

- P-beauty contest, Level-k reasoning, Cognitive Hierarchy

B. Multiple equilibria and coordination

- Focal points, Schelling's salience, Pareto & risk dominance

C. Social preferences

- Social dilemmas, Conditional Cooperation, Intentions

Today

IX. Interaction with others: Beh. Game Theory & Social Pref/ces

A. Limited strategic thinking

- P-beauty contest, Level-k reasoning, Cognitive Hierarchy

B. Multiple equilibria and coordination

- Focal points, Schelling's salience, Pareto & risk dominance

C. Social preferences

- Social dilemmas, Conditional Cooperation, Intentions

D. Measuring social preferences in the Ultimatum Game and its variations

- Ultimatum Game, Dictatorship Game, Trust Game

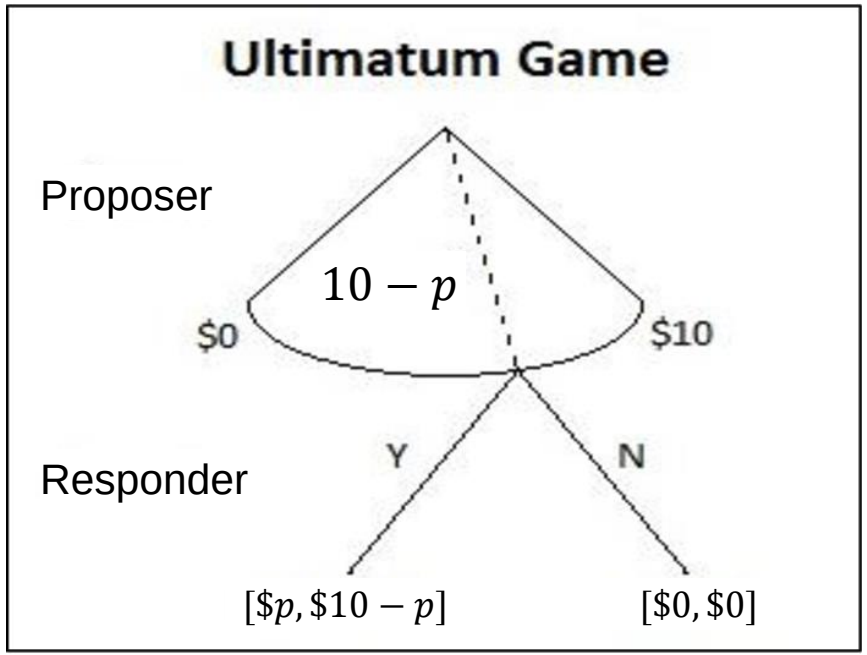
Ultimatum game (Guth, Schmittberger, and Schwarze, 1982)

- One player, the proposer, is endowed with a sum of money.
  - Let's assume that the sum of money is $10.
- The proposer is tasked with splitting it with another player, the responder.
  - Let's assume that the division is only in integers: (0,1,2…,10).
- The Proposer decides how much to keep for himself: $\$p$ and suggests a "take it or leave it" offer to the responder: $\$(10 - p)$
- The responder may accept (*Y*) it or reject (*N*) it.
  - If the responder accepts, the money is split per the proposal
  - If the responder rejects, both players receive nothing.
- Both players know in advance the consequences of the responder accepting or rejecting the offer.

Ultimatum game: Why study it

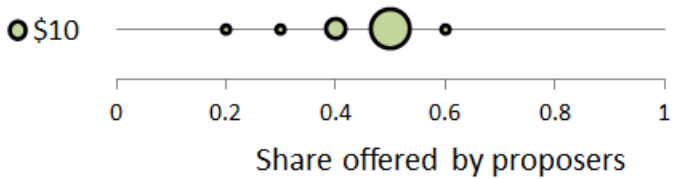
- Important economics applications: bargaining, negotiations, conflict resolution, court settlements, etc…
- Simple variations of the game can help us study concepts like charitable giving (“dictator game” variant) or labor relations (“gift-exchange” variant).
- Puts important assumptions about strategic decision making in the microscope:
  - Are players “rational”?
  - Are they solely motivated by maximising own payoffs?
  - Do they use backwards induction?
- Can be used to capture differences in cross-societal characteristics (notions of fairness, sharing, etc.)

Ultimatum game: formal analysis



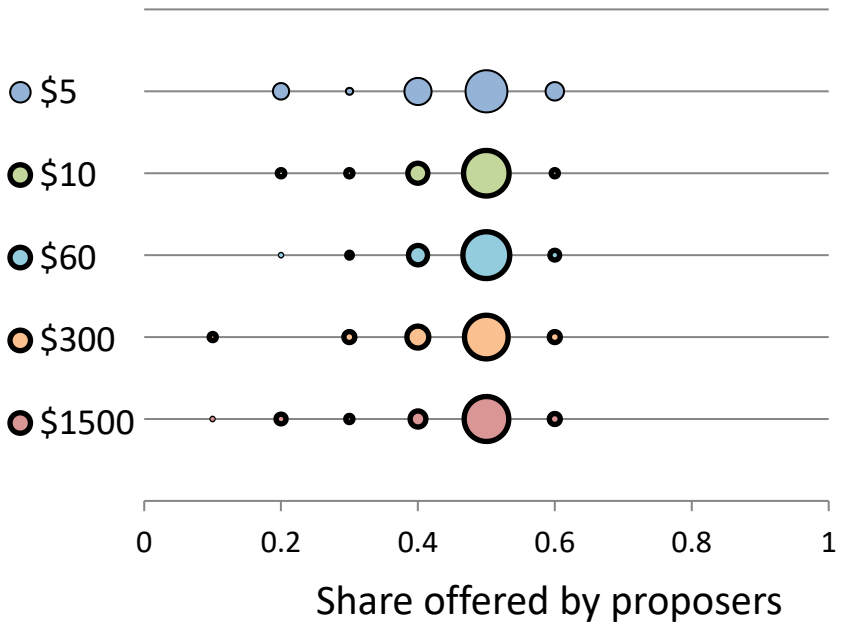
- Finding the SPNE with backwards induction:
  - The Responder would accept any positive over as if he rejects he ends up with \$0.
  - The Proposer anticipates this and offers the smallest possible positive amount. That is, he keeps $p = \$9$ to himself, offers $10 - p = \$1$ to the Responder and the Responder accepts.
    - In theory, $\$p = 10$ followed by "Yes" is also a SPNE, but notice that the Responder should be indifferent between rejecting and accepting in this case.
- There are more NE in which the Responder has a strategy of the form: "Reject if offer is less than…\$y" with y>1. But, these NE are based on a "non-credible threat".

Ultimatum game: empirical results



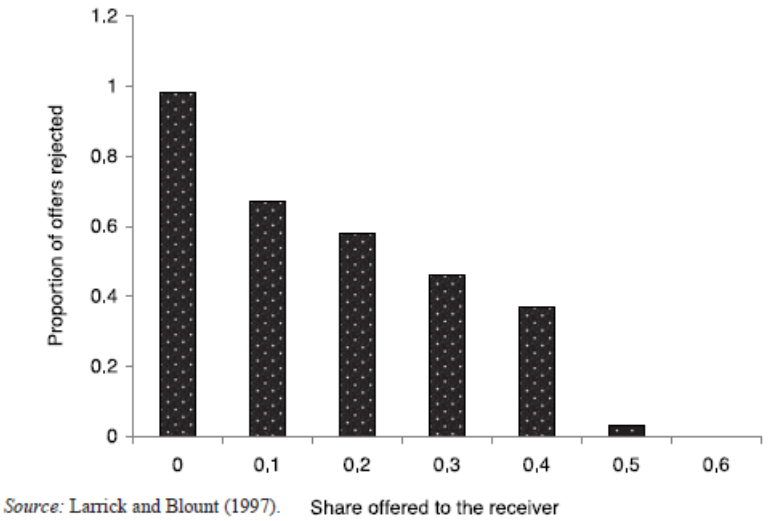
- Source: Forsythe et al. (1994), Slonim and Roth (1998)
- Size of the bubble -> proportion of subjects
- Proposers do not offer $0. In fact, most suggest a 50-50 split. Why?
  - Explanation 1: inexperience with the game and/or lack of sufficient motivation (low stakes)
  - Explanation 2: fear of rejection (strategic concerns)
  - Explanation 3: notions of fairness and altruism

Ultimatum Game: Why give so much? Explanation 1



- The share that proposers gave in ultimatum experiments where the amount of money given to proposer ranged from $5 to $1500
- Most people offer a 50-50 split
- **Stake size has no effect in these experiments for the amount proposers gave**.
- However, responders were less likely to reject when the stakes were higher:
  - $60 – 17.1% rejection rate
  - $300 – 12.1% rejection rate
  - $1,500 – 8.8% rejection rate
- **Repetition does not affect** Proposers' behaviour **much** (Roth et al, 1991, Bolton and Zwick, 1995, Knez and Camerer, List and Cherry, 2000)

Ultimatum Game: Why give so much? Explanation 2



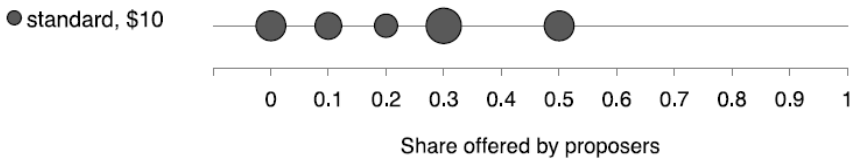
Source: Larrick and Blount (1997).

- The proportion of offers rejected in an Ultimatum Game.
- Offers of a 0.5 share ore better are rarely rejected.
- But: offers of a less than 0.5 are often rejected
- **Conclusion**: People are willing to sacrifice their own monetary payoff to decrease that of others & payoff maximisation is not their sole objective.
- Proposers are right to be afraid. But is this all there is to it?

Dictator “game”

- Variation of the Ultimatum Game where player 2 is passive: has to accept the offer.
- The term “’game’” is in quotation marks because, strictly speaking, a game requires strategic interaction.
- How much do people give in dictator game and why?
- If dictators choose positive offers then there is more than the strategic interpretation for the UG results
- Applications: charity giving, tipping on restaurants (that you don’t plan to come back to), etc…

Dictator “game”: empirical findings



Sources: Forsythe et al. (1994), Hoffman et al. (1994), Hoffman et al. (1996), Camerer (2003).

- Many people give $0.
- But, many people make offers (donate) more than $0.
- Strategic concerns in UG cannot be the only explanation.
- Genuine concerns for fairness and altruism

Ultimatum Game: Fehr-Schmidt preferences (I)

$$u_{(a_i,\beta_i)}(x_i, x_j) = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i max\{x_i - x_j, 0\}$$

- $a \geq 0$: envy.
- $\beta \geq 0$: guilt
- $\alpha \geq \beta$: envy more consequential than guilt

Assume that P, the Proposer, keeps p to himself.

- Then R, the responder receives $10 - p$.
- How much does P keep?
- Does R accept or reject?

Step 1: How much does the (naïve) Proposer offer?

- 'naïve': without strategic consideration of the Responder's acceptance threshold.
- Given that β ≤ α, there is never any incentive to give more than \$5, so $p \geq 5$
- Therefore, the Proposer maximises:

$$max u_{(a_P,\beta_P)}(p) = p - \alpha_P * 0 - \beta_P(2p - 10)$$
$$s.t\ 5 \leq p \leq 10$$

- The derivative wrt p is $1 - 2\beta_P$.
- Therefore, when $1 - 2\beta_P > 0 \Rightarrow \beta_P < 0.5$, $p = \$10$
  - Proposer keeps everything to himself.
- When $1 - 2\beta_P \leq 0 \Rightarrow \beta_P \geq 0.5, p = \$5$
  - Proposer splits the pie evenly

Ultimatum Game: Fehr-Schmidt preferences (II)

$$u_{(a_i,\beta_i)}(x_i, x_j) = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i max\{x_i - x_j, 0\}$$

- $a \geq 0$: envy.
- $\beta \geq 0$: guilt
- $\alpha \geq \beta$: envy more consequential than guilt

Assume that P, the Proposer, keeps p to himself.

- Then R, the responder receives $10 - p$.
- How much does P keep?
- Does R accept or reject?

Step 2: What's the acceptance threshold?

- If the Responder accepts she receives:

$$10 - p - a_R(2p - 10)$$

  - Assuming that the Proposer will never offer more than half.
- If the Responder rejects she receives: \$0.
- Therefore, the Responder accepts if

$$p < 10\left(\frac{1 + \alpha_R}{1 + 2\alpha_R}\right)$$

- So, if the Responder does not care if her earnings are less than the Responder ($a_R = 0$), she would accept any offer.
- **But**, if $a_R = 1$ (for example) she will reject any offer less than $1/3$ of the 'pie'.

Ultimatum Game: Fehr-Schmidt preferences (III)

- The naïve Proposer either:
  - splits the sum equally (when his guilt parameter is $\beta \geq 0.5$) or
  - offers nothing (when his guilt parameter is $\beta < 0.5$.
  - You can think of the naïve Proposer as the dictator in the dictator game, where the Responder cannot reject.
- The Responder who cares about getting less than the Proposer, will reject some offers (how big depends on her level of envy, α).
- The strategic Proposer that has $\beta \geq 0.5$ has nothing to worry about. He would split the offer equally and the split will be accepted (most likely). This prediction is corroborated from the data.
- The strategic Proposer that has $\beta < 0.5$ want to offer the minimum amount that will be accepted. His problem is that he doesn't know the inequality aversion of the Responder. So he has to form an expectation and take a decision under risk…

Ultimatum Game methodology: strategy vs. game method

- In the Ultimatum Game we observe two types of data: $p from the Proposer and “Yes/ No” from the Responder.
- Problem: we can never know whether or not the Responders would have rejected/ accepted a lower/higher offer. In other words, we don’t know what is their threshold for accepting an offer.
- One way around this is the strategy method (Selten, 1967), where responders are asked what they would do in any possible contingency. So, receivers have to say what they would do if they got offered $0, $1, $2, and so on.
- In theory, the strategy method should be equivalent to the “game method” approach (where responder only sees the one, actual offer). But, whether or not it is behaviorally equivalent, is an open question.
- Another open question is with respect to its ‘external validity’/ which methodology is more ‘realistic’.
  - Game method: we get to see, for example, the waiter’s service before we decide the tip.
  - Strategy method: wage contracts might specify what will happen for a variety of different possible effort levels

Dictator game methodology: single vs. double blind

One concern with the dictator game is that if contributions are observed Proposers might be motivated by reputation effects.

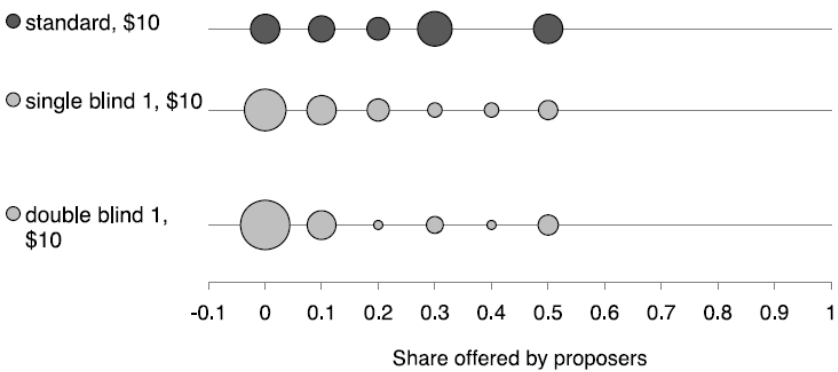
Single blind: anonymity of Proposer to Responder but not to Experimenter.

- All Proposers put their offers in an envelope anonymously.
- Responders pick an envelope at random.
- But, Experimenter has to look in the envelope (to make the payment accordingly).

Double blind: anonymity of Proposer to Responder and to Experimenter.

- Monitoring of offers by student monitor – not the researcher
- two dummy envelopes containing $0 are also put in the box: receiver who gets $0 cannot know whether it was from the proposer or bad luck.

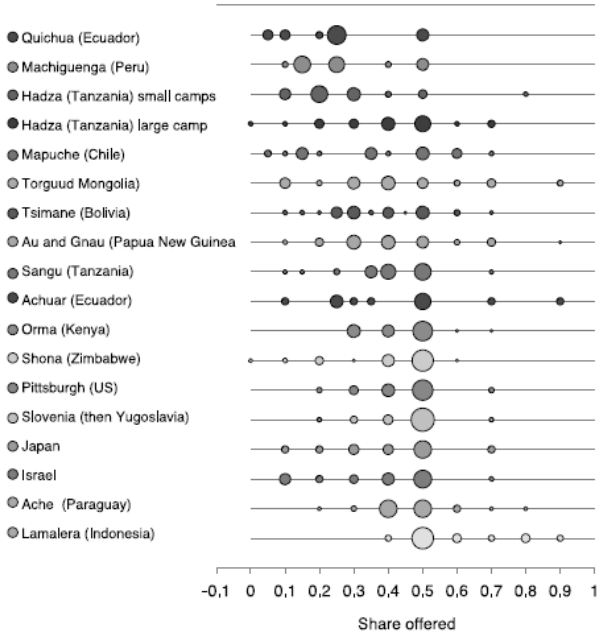
Dictator game methodology: single vs. double blind



Sources: Forsythe et al. (1994), Hoffman et al. (1994), Hoffman et al. (1996), Camerer (2003).

- The further we go down the line, the great the social distance between Proposer and Receiver
  - Anonymity is better preserved, less room for reputation concerns.
- Greater social distance leads to smaller donations but a significant proportion of Proposers still give money, even in the double blind variation.

Ultimatum Game: Cross-societal findings



Ultimatum game offers across different cultures.

Source: Henrich et al. (2004), Roth et al. (1991).

- Highest offers: Lamalera. Whale-hunting village on Indonesian island where cooperation and sharing is integral.
- Lowest offers: Machiguenga/Peruvian Amazon where people live in single family units and cooperation outside kinship is rare.
- The UG seems to capture well local ecology, social complexity and settlement size.

Trust game: description

- Consider an investor (player 1) and a proposer (player 2).
- Both players are given $10.
- The investor is told that he can give as much of this $10 as he likes to the proposer.
- Any amount he gives will be tripled in value before being given to the proposer.
- The proposer can then give as much money as she likes back to the investor.

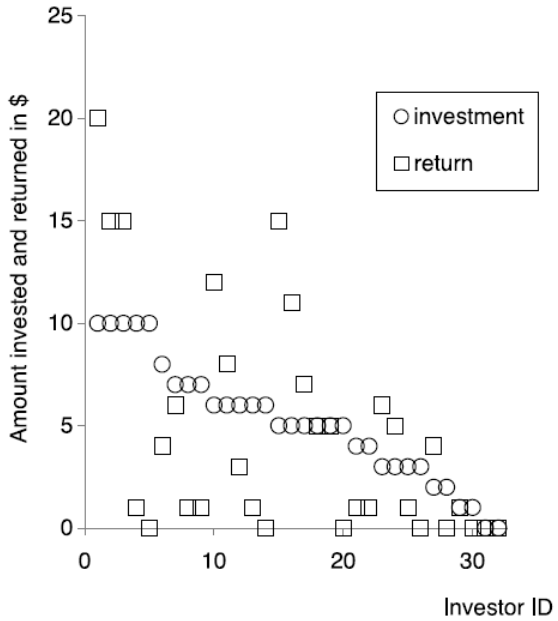
Trust game: formal prediction

- What is the SPNE of the game? Using backwards induction:
  - As in the dictator game, a proposer who cares only about he own payoff should not give any money back to the investor.
  - Investors, therefore, should not give money to proposers.

- Obviously, this outcome is socially inefficient. If the investor had trusted the Proposer and given all his $10 then the proposer would have $40 and so could easily pay back (with interest!) the investor on his investment.

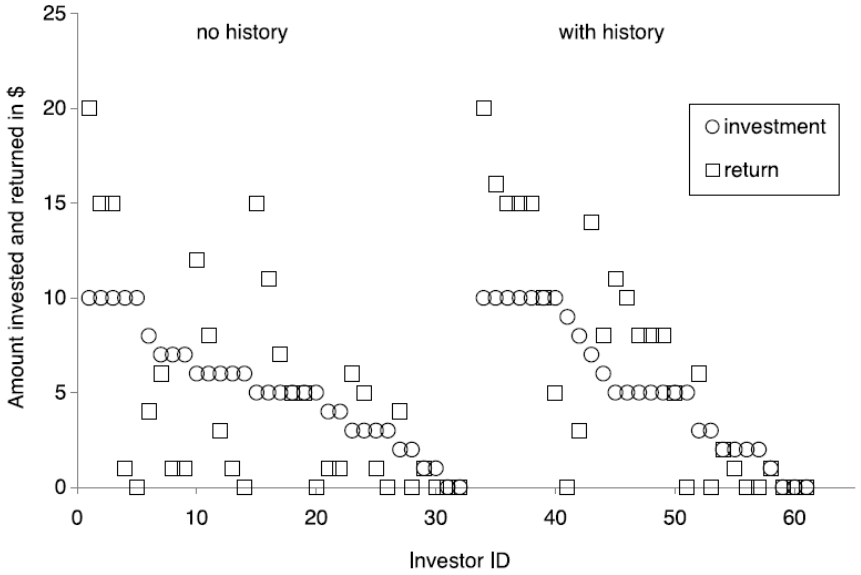
- Applications: study behavior on investment (e.g. in start-ups) but also employment and salary offers (example: level of salary in anticipation of level of effort).

Trust game: empirical observations (no history)



- Source: Berg, Dickhaut and McCabe (1994)
- Most investors invest something.
- Many proposers do not “reciprocate” (they don’t give anything back)
- But, the majority gives something back.

Trust game: empirical observations (with history)



- In the “with history” experiment, investors and proposers were shown the graph with “no history” so as participants knew what had happened in the previous experiment
- Things could have gone either way:
  - Investors could have been put off investing by seeing how many proposers kept all the money.
  - But, they chose to focus on the positive investing and returning -> Increase in money being returned -> More efficient social outcomes!