MW24.2 Experimental Economics (SS2020)
Ultimatum Bargaining

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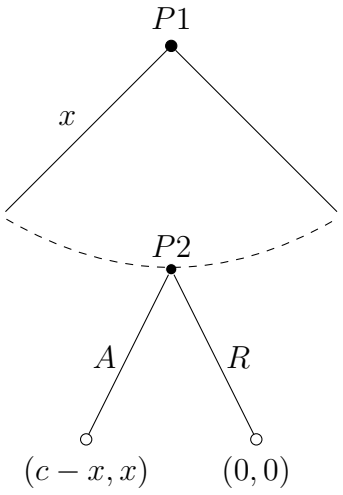
Ultimatum Game

* Two players are splitting a pie of size c. The first player (also, the proposer or sender) *offers* the share x, s.t. $0 \leq x \leq c$, to the second player (also, the responder or receiver) who in turn, can either *accept* (A) or *reject* (R) the offer. The payoffs are $(c - x, x)$ if the offer is accepted and $(0, 0)$ if the offer is rejected [Güth et al., 1982].



* SPNE: $\{x^* = \epsilon;\ A\}$ where ϵ is the lowest (positive) amount possible

* usual experimental findings:
  - average offer $\sim 40\%$
  - modal offer $\sim 40 - 50\%$
  - few offers of $\leq 20\%$ ($\sim 50\%$ rejected)

exa) Buyer with willingness-to-pay of 15 and seller with a production cost of 5 essentially, splitting the surplus of 10 between the two of them.

* the game represents the *final* stage of a bargaining process

$\Rightarrow$ is the SPNE "fair"?

$\Rightarrow$ what is a "fair" offer?

Güth et al. [1982]

* ultimatum game with various pie sizes and subject experience levels

⇒ virtually all offers above one DM, average offer $\sim 35\%$

⇒ few rejections (albeit more by experienced subjects) [Tables 4–5]

* consistency check:

  — submit the offer/demand both as the proposer and recipient

  ⇒ most exhibit more modest demands by offering 45% on average [Table 7]

  ⇒ 15/37 consistent profiles; 5/37 conflicting profiles

  ⇒ 7/15 consistent profiles suggest the equal split

Related Games

1. Dictator game [Forsythe et al., 1994]

$\sim$ ultimatum sans the recipient move [technically, individual decision problem]

* if subjects are motivated by *fairness*, the distributions of offers/transfers should be the same between the two games

⇒ transfers are positive but *lower* in the dictator game

⇒ "fairness" is more pronounced when it's free [Fig. 1]

** usually, it is found that $\sim 60\%$ subjects transfer $\sim 20\%$ of their endowment

2. Two-stage bargaining [Goeree and Holt, 2000]

$\sim$ ultimatum game played *twice* with the players *switching the roles*

$\sim$ usually, the pie shrinks from X to Y

$\sim$ SPNE *outcome* is $\{X - Y, Y\}$

* compare SPNE and *egalitarian* predictions across seven treatments by varying the pie size in the second stage and fixed subject payments (endowments) [Table 1]

⇒ first stage offers turn out to be *negatively* related to the pie size in the second stage (also note the standard deviation) [Fig. 1]

⇒ 75% of initial offers accepted (as they tended to equalize the earnings)

⇒ data are roughly consistent with a model where people care about relative earnings

Ultimatum Bargaining

* tension between selfishness and "fairness" motives
* potential explanation of subject behavior:
  - altruism
  - reciprocity
  - inequality aversion

  } other-regarding concerns
  - difficulty understanding the game (e.g., demand effects, focal points)

⇒ rather susceptible to procedural details

Demand effect ∼ Bardsley [2008][1]

⇒ 22/33 subjects give in the dictator game

⇒ 15/32 subjects give in the "taking" game

Demand effect ∼ Cherry et al. [2002]

* giving in dictator games could be due to the subjects dealing with "house money" and the experimenter watching
* 3 main treatments: baseline, earned, and double blind earned endowment

⇒ transfers go down drastically [Fig. 1–2]

Focal points ∼ Binmore et al. [1985]

"...because they don't know how to play the game"

* two-stage bargaining; $c_1 = 100$ and $c_2 = 25$
* Game A recipients play as proposers in Game B

⇒ modal offers of ∼ 50% (Game A) and ∼ 25% (Game B) [Fig. 1]

⇒ recipients that saw low offers in Game A send low offers as proposers in Game B [Table 1] → it's not about fairness!

(!) the original instructions read[2]:
"...You will be doing us a favour if you simply maximized your winnings"

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[1] Nicholas Bardsley. Dictator game giving: altruism or artefact? *Experimental Economics*, 11 (2):122–133, 2008
Also, see the lecture on the experimenter demand effect.

[2] Again, see the lecture on the experimenter demand effect.

Classification of Other-Regarding Preferences

$u_i = u_i(\pi_i, \pi_{-i}, a_i, a_{-i}) \sim$ general utility function of player i, where:
π_i is own payoff, π_{-i} are opponent payoffs, a_i is own action, and a_{-i} are opponent actions

* $u_i = \pi_i \rightarrow$ (purely) selfish

* $u_i = u_i(\pi_i, \pi_{-i})$ s.t. $\frac{\partial u_i}{\partial \pi_{-i}} > 0 \rightarrow$ altruistic (if also $\frac{\partial u_i}{\partial \pi_i} = 0 \rightarrow$ purely altruistic)

* $u_i = u_i(\pi_i, \pi_{-i})$ s.t. $\frac{\partial u_i}{\partial \pi_{-i}} < 0 \rightarrow$ spiteful (if also $\frac{\partial u_i}{\partial \pi_i} = 0 \rightarrow$ purely spiteful)

* $u_i = \sum_j \pi_j \rightarrow$ *efficiency* (i.e., social welfare) maximizer

* $u_i = min_j\{\pi_j\} \rightarrow$ *maxmin* preferences

* $u_i = u_i(\pi_i - \pi_1, ..., \pi_i - \pi_{i-1}, \pi_i - \pi_{i+1}, ..., \pi_i - \pi_n)$ s.t. $u_i(\cdot)$ is increasing in all of its arguments $\rightarrow$ *absolutely* competitive preferences

* $u_i = u_i(\pi_i/\pi_1, ..., \pi_i/\pi_{i-1}, \pi_i/\pi_{i+1}, ..., \pi_i/\pi_n)$ s.t. $u_i(\cdot)$ is increasing in all of its arguments $\rightarrow$ *relatively* competitive preferences

* $u_i = \pi_i - \alpha_i \cdot \frac{1}{n-1} \cdot \sum_{j \neq i} max\{\pi_j - \pi_i, 0\} - \beta_i \cdot \frac{1}{n-1} \cdot \sum_{j \neq i} max\{\pi_i - \pi_j, 0\}$
s.t. $\beta_i \leq \alpha_i$ and $0 \leq \beta_i < 1$
$\rightarrow$ *inequality aversion* [Fehr and Schmidt, 1999, Bolton and Ockenfels, 2000][3]
where α_i and β_i are *disadvantageous* and *advantageous* inequality (inequity) aversion parameters, respectively

Generalization of most of the above:

$$u_i = (1 - \rho_i) \cdot \pi_i + \delta_i \cdot \sum_{j \neq i} \pi_j + (\rho_i - \delta_i) \cdot min_j\{\pi_j\}$$

— selfish: $\rho_i = \delta_i = 0$

— efficiency maximizer: $\rho_i = \delta_i = \frac{1}{2}$

— purely altruistic: $\rho_i = \delta_i = 1$

— maxmin: $\rho_i = 1$, $\delta_i = 0$

— purely spiteful: *NA*

— abs. comp. ($n = 2$): $\rho_i = \delta_i \rightarrow -\infty$

— Fehr and Schmidt [1999] inequality aversion ($n = 2$): $\rho_i = \beta_i$, $\delta_i = -\alpha_i$

** Reciprocity: $\frac{\partial u_i}{\partial \pi_j}$ depends on the observed a_j (and its interpretation)
No universally accepted theory. See, e.g., Charness and Rabin [2002][4]

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[3] Ernst Fehr and Klaus M. Schmidt. A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114(3):817, 1999
Gary E Bolton and Axel Ockenfels. Erc: A theory of equity, reciprocity, and competition. *The American Economic Review*, 90(1):166–193, 2000

[4] Gary Charness and Matthew Rabin. Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, 117(3):817, 2002

Suggested Literature

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- Werner Güth, Rolf Schmittberger, and Bernd Schwarze. An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior & Organization*, 3(4):367 – 388, 1982
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- Jacob K. Goeree and Charles A. Holt. Asymmetric inequality aversion and noisy behavior in alternating-offer bargaining games. *European Economic Review*, 44(4–6):1079 – 1089, 2000
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- K. Binmore, A. Shaked, and J. Sutton. Testing noncooperative bargaining theory: A preliminary study. *The American Economic Review*, 75(5):1178–1180, 1985

* Nagore Iriberri and Pedro Rey-Biel. Elicited beliefs and social information in modified dictator games: What do dictators believe other dictators do? *Quantitative Economics*, 4(3):515–547, 2013