Equity and Efficiency Tradeoffs in Other-Regarding Preferences

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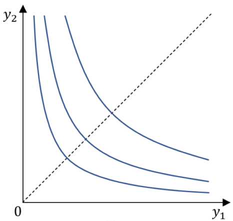
Motivation

- The tradeoff between equity and efficiency is fundamental in any policy evaluation.
- Individuals differ in how they weigh equity and efficiency.
- While behavioral economics studied other-regarding preferences (Fehr and Charness, 2025), the **equity-efficiency tradeoff** has proved difficult to identify empirically.
- Pinning down these views matters for predicting support for public good provision (charitable donations, democratic participation, etc.) and for interpreting welfare-relevant tradeoffs (Eden and Piacquadio 2025).

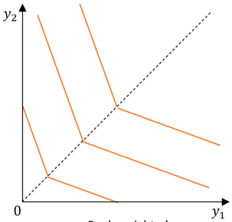
What we do

- Develop distributional statistics to describe other-regarding preferences.
- We use these statistics to identify the equity-efficiency tradeoff in an incentivized lab experiment.
- Estimate, compare, and test alternative models.

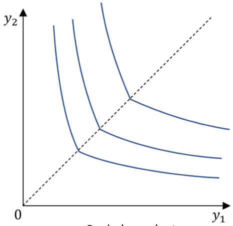
Impartial distributional preferences



Additive

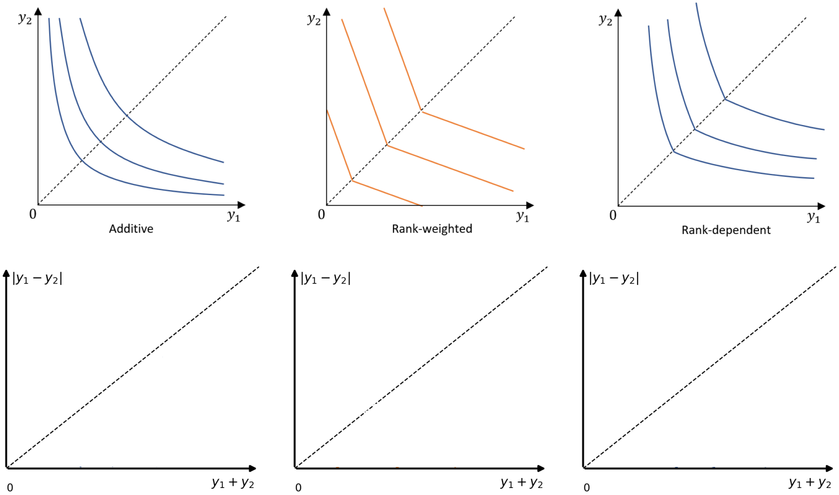


Rank-weighted

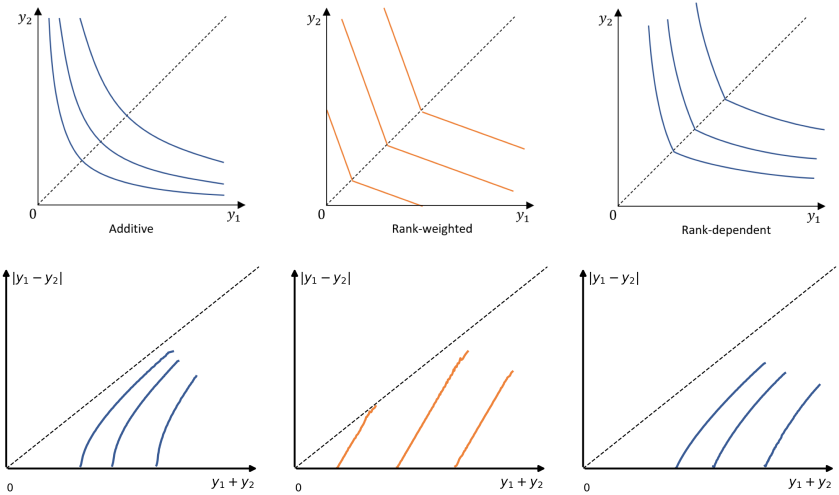


Rank-dependent

Impartial distributional preferences



Impartial distributional preferences



Theory - Distributional statistics

- Let $\boldsymbol{y}$ be the vector of incomes of the decision maker i and two others j and k.
- Person i's preferences be described by $U(\boldsymbol{y})$, differentiable $\boldsymbol{y}$.
- The **equity-efficiency tradeoff** of i at y is:

$$IEE_i^{j,k}(y) \equiv \frac{|U_j - U_k|}{U_j + U_k}.$$

Interpretation: The tradeoff between a marginal decrease in inequality among others and a marginal increase in their incomes.

Theory - Distributional statistics

- The **(marginal) willingness to give** of i at y is:

$$WG_i(y) \equiv \frac{U_j + U_k}{U_i}.$$

Interpretation: the marginal increase in income for individual i that is needed to compensate for a marginal decrease in the income of the others so that the utility level remains the same.

Theory - Distributional statistics

- The **(marginal) willingness to redistribute** (between j and k) of i at y is:

$$WR_i^{j,k}(y) \equiv \frac{|U_j - U_k|}{U_i}$$

Interpretation: the marginal increase in the own income that is needed to compensate for a marginal decrease in equality among j and k—defined as a progressive transfer between these individuals.

Theory - Distributional statistics

- Key insight:

$$IEE_i^{j,k}(y) = \left. WR_i^{j,k}(y) \middle/ WG_i(y) \right. .$$

- Importantly, $WG_i(y)$ and $WR_i^{j,k}(y)$ can be truthfully revealed from incentivized experiments.
- Thus, $IEE_i^{j,k}(y)$ can be *indirectly* revealed through incentivized experiments!

Theory - Preference structures

- **Selfish preferences:**

$$U^S(y) = y_i$$

- **Fehr-Schmidt preferences:**

$$U^{FS}(y) = y_i - \alpha \sum_{j \neq i} \max\{y_j - y_i, 0\} - \beta \sum_{j \neq i} \max\{y_i - y_j, 0\},$$

  where $\alpha \geq \beta$ and $0 \leq \beta < 1$ (Fehr and Schmidt 1999).
- **Charness-Rabin preferences:**

$$U^{CR}(y_1, y_2, ...y_N) = (1 - \lambda)y_i + \lambda(\delta \min_{j \in N}[y_j] + \frac{1 - \delta}{N} \sum_{j \in N} y_j),$$

  where $\delta, \lambda \in (0, 1)$ (Charness and Rabin 2002).

Theory - Preference structures

- **Anonymous social preferences:**

$$U^{ASP}_{\gamma,\eta}(y) = \left[\sum_{j \in N} \phi \left(\frac{1+N-r_j}{N}\right)^{\gamma} (y_j)^{1-\eta}\right]^{\frac{1}{1-\eta}},$$

where $r_j \in \{1, 2, .., N\}$ denotes the rank of j in increasing order, $\gamma, \eta \geq 0$ and $\phi^{-1} \equiv \sum_{j \in N} \left(\left(1+N-r_j\right)/N\right)^{\gamma}$.

- **Nested social preferences:**

$$U^{nest}(y) = \left[\alpha_i (y_i)^{\rho} + (1-\alpha_i)\left(U^{ASP}_{\gamma,\eta}(y)\right)^{\rho}\right]^{\frac{1}{\rho}},$$

where $\alpha_i \in [0, 1]$ and $\rho \geq 0$.

Experimental design - Overview

- We ask each subject to make 90 decisions in a three-person distributional environment.
- 30 decisions in a two-person environment.
- Randomly vary prices and "initial endowment" of each subject's income.
- Payout scheme with tokens and role uncertainty. ▸ Payoff instructions
  - Early controls indicate that it hasn't played a major role. (Iriberri and Rey-Biel 2011)
- Training exercises and comprehension check of payout scheme.

Experimental design - Environment (3p)

Very simple structure:
Let $i = 1$, then the decision maker chooses $y_1 \in [\underline{y_1}, \overline{y_1}]$ subject to

$$y_2 = m_2 - p_2 y_1$$
$$y_3 = m_3 - p_3 y_1$$

We vary intercepts, prices, and domain of y_1.

Experimental design - Environment (3p)

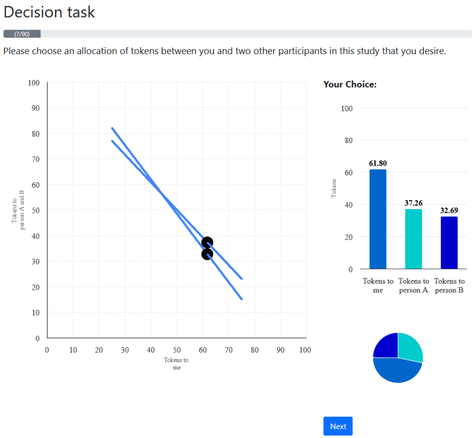


Figure 1: Example of a general budget.

Experimental design - Environment (3p)

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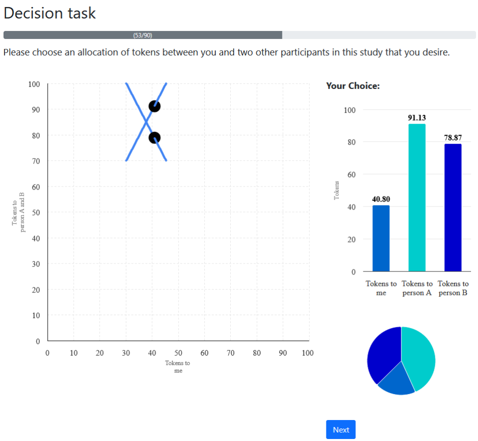


Figure 2: Example of symmetric budget.

Experimental design - Environment (3p)

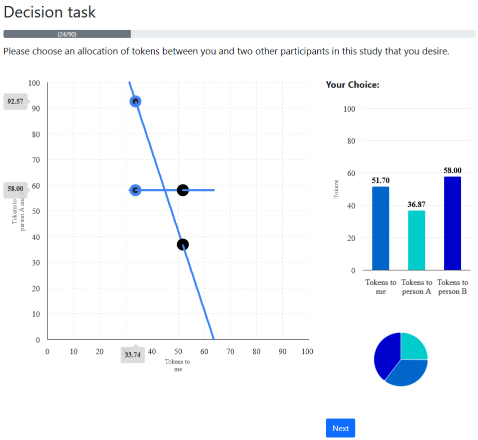


Figure 3: Example of flat budget.

Experimental design - Environment (3p)

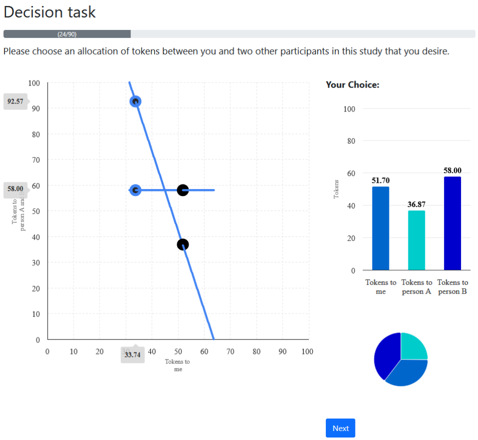


Figure 3: Example of flat budget.

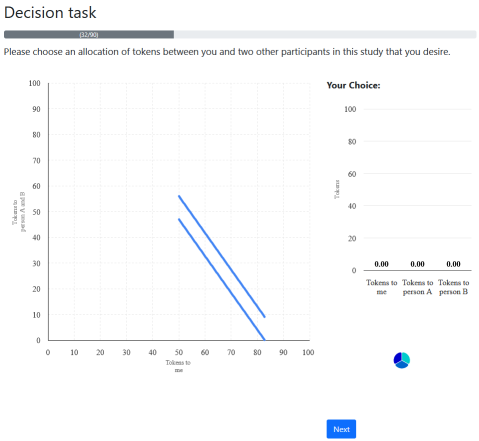


Figure 4: Example of parallel budget.

Experimental design - Environment (spectator)

- Subject i is told that she will receive 25, 50, or 75 tokens independently of the decision.
- Then she chooses $y_3 \in [0, \frac{m_2}{p_3}]$ under the condition that

$$y_2 = m_2 - p_3 y_3.$$

- We vary $m_2, p_3 \in \mathbb{R}_+$ randomly.

Experimental design - Environment (spectator)

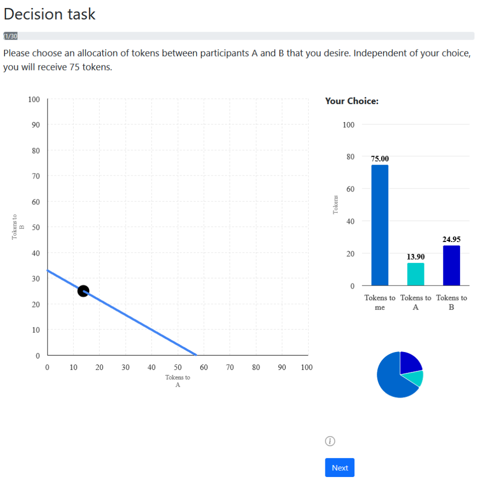


Figure 5: Example of spectator task.

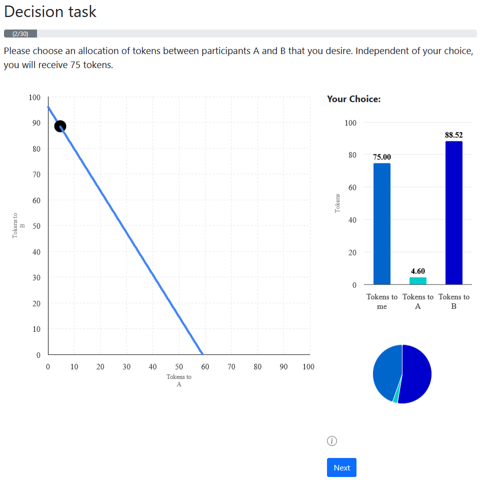


Figure 6: Example of spectator task.

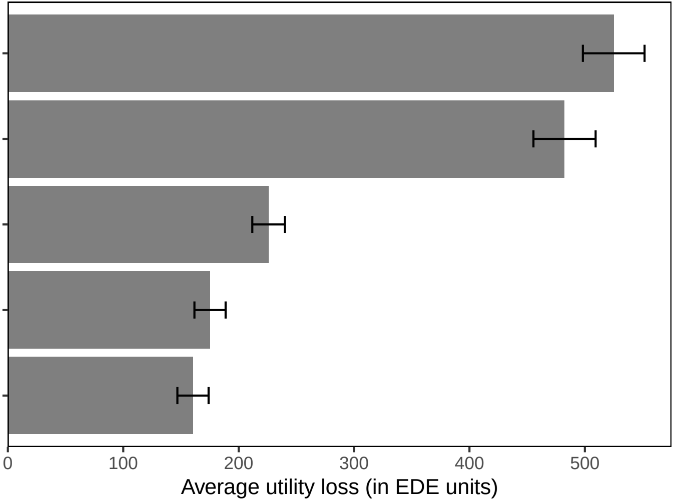
Estimation method - Overview

- We test the performance of Selfish, Charness-Rabin, Fehr-Schmidt, Anonymous, and ”Nested CES” preferences.
- Use a grid search algorithm to find the preference structure and parameter combination that yields the smallest aggregated utility loss.
- To assess performance we apply a misspecification index using the equally-distributed equivalent (Bos and Piacquadio, in prep). ▸ EDE

Experimental setting

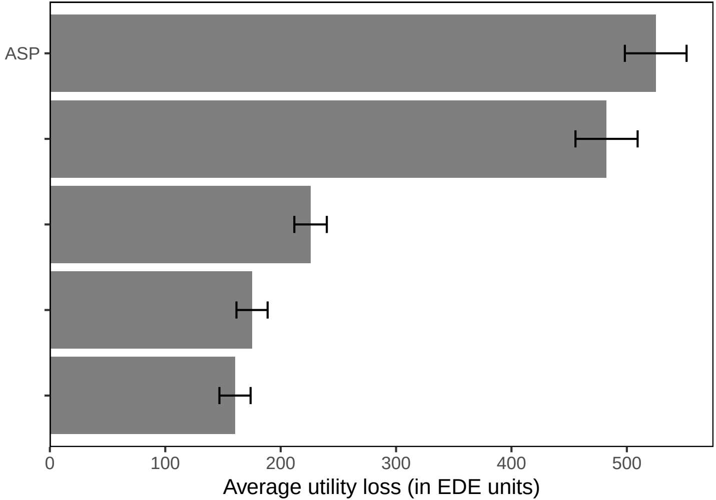
- Run from July – October 2025 in Hamburg + Magdeburg
- Recruited 357 participants (216 + 141)
- Mean time 31min ($p25 = 23$min, $p75 = 38$min)
- Mean payout 23.98 EUR

Preliminary results - Average model performance



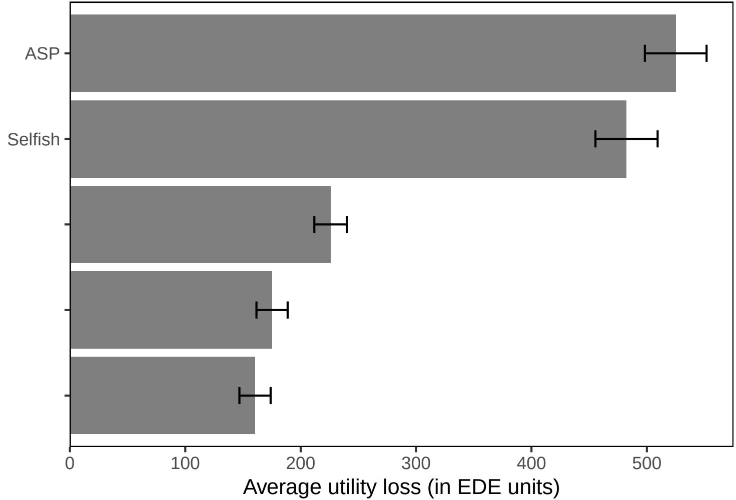
N = 156.
Errorbars show standard errors.

Preliminary results - Average model performance



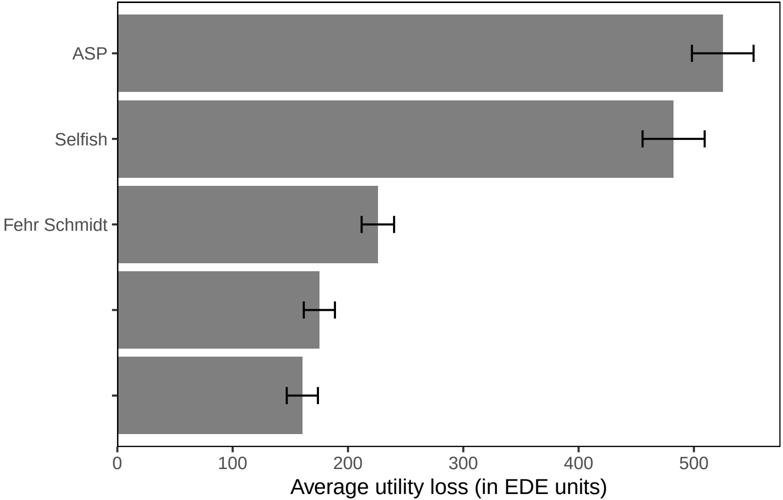
N = 156.
Errorbars show standard errors.

Preliminary results - Average model performance



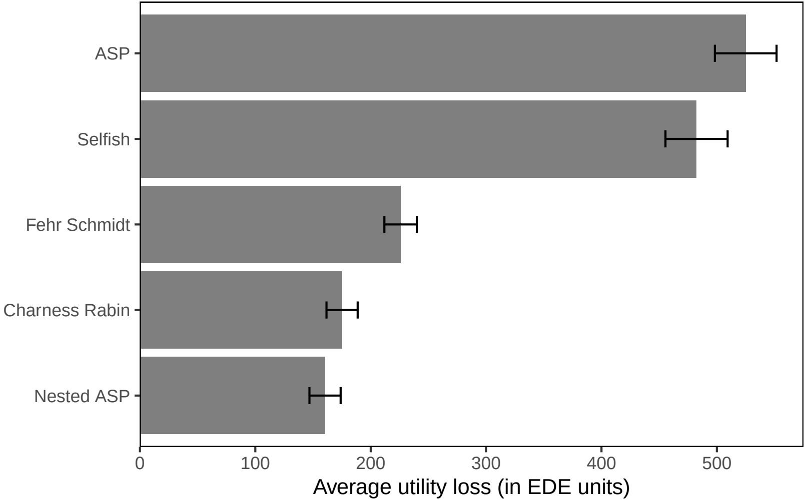
N = 156.
Errorbars show standard errors.

Preliminary results - Average model performance



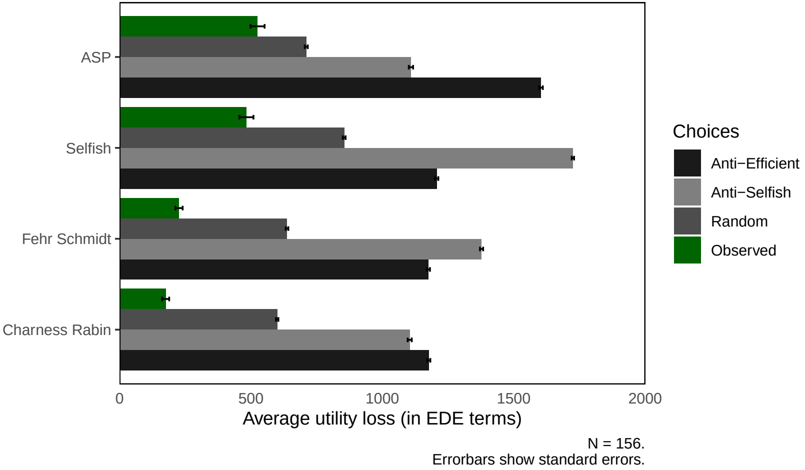
N = 156.
Errorbars show standard errors.

Preliminary results - Average model performance

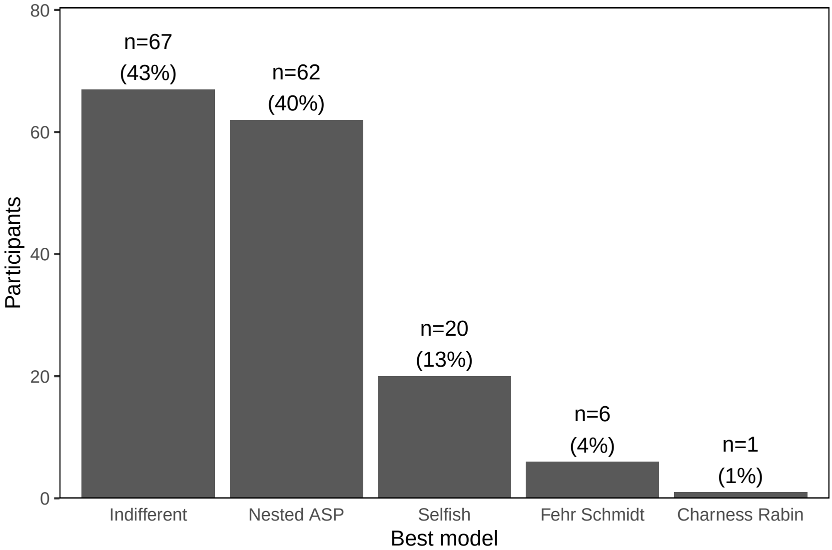


N = 156.
Errorbars show standard errors.

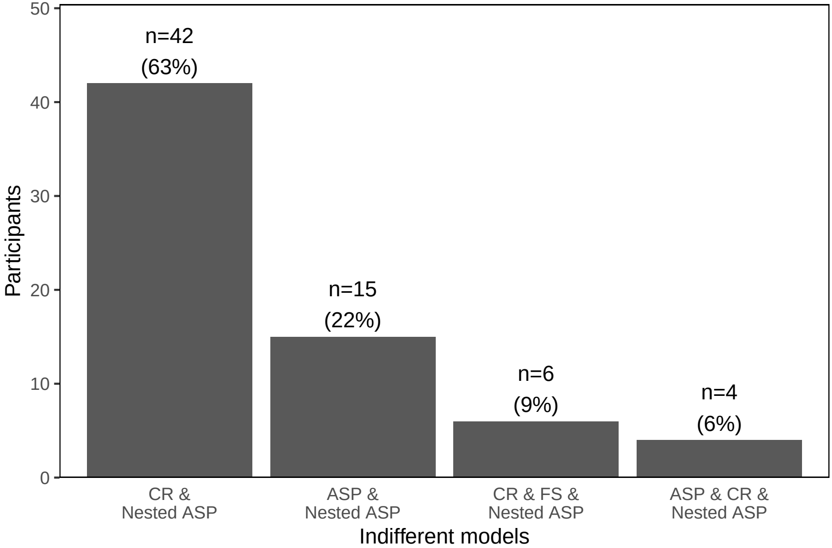
Preliminary results - Benchmark against random choices



Preliminary results - Best model

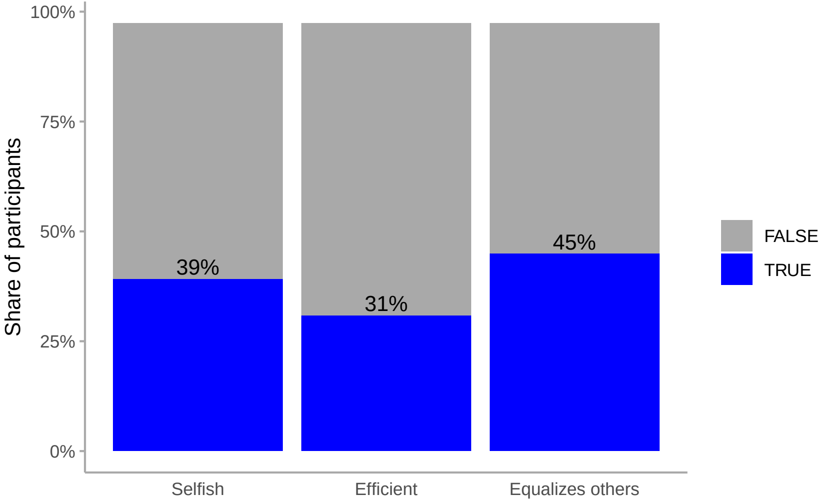


Preliminary results - Indifference



Preliminary results - Text analysis

"Please briefly share with us your reflections on how you made your choices in this part."



N = 156.
Uninformative responses are unclassified.

Conclusion

- We develop distributional statistics and reveal them through a 3-person incentivized experiment
- We test models of other-regarding preferences
- The horse-race results suggest that equity-efficiency is often traded off based on the rank-dependent model, with large heterogeneity in parameters.

References I

Charness, Gary and Matthew Rabin (2002). "Understanding social preferences with simple tests". In: *The Quarterly Journal of Economics* 117.3, pp. 817–869.

Eden, Maya and Paolo Piacquadio (2025). *The Ethical Mirror*. CEPR Discussion Paper DP20624. Paris and London: Centre for Economic Policy Research (CEPR). URL: https://cepr.org/publications/dp20624.

Fehr, Ernst and Klaus M. Schmidt (1999). "A Theory of Fairness, Competition, and Cooperation". In: *The Quarterly Journal of Economics* 114.3, pp. 817–868.

Iriberri, Nagore and Pedro Rey-Biel (2011). "The role of role uncertainty in modified dictator games". In: *Experimental Economics* 14.2, pp. 160–180.

Appendix - Payoff instructions

Part 1 – Payoffs

Your payoffs from part 1 are determined as follows.

At the end of the study, you are randomly assigned to a group with two other participants. One choice made by one of the participants in the group is drawn at random and realized:

- The participant who made the decision gets the tokens they allocated to themselves.
- The others are randomly assigned as participant "A" or participant "B" and receive tokens accordingly.

No participants are informed of the identity of the rest of the group.

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Appendix - Payoff comprehension

Comprehension check

On the last page, we described how the payoffs are determined. Please select the option that best summarizes how the payoffs are determined:

- ◯ After the session, one decision made by one participant in the session is chosen. Everyone are randomly assigned to one of the roles and receive tokens accordingly.
- ◯ Groups of three are formed at random and one decision made by one participant in the group is randomly chosen and carried out. If one of your decisions is chosen, you will receive the tokens that you assigned to yourself in that round. If a decision of one of the others is chosen, you will either be participant "A" or "B" and receive the corresponding tokens that the other person assigned you in that round.
- ◯ Groups of three are formed at random, and one decision from each is randomly drawn and carried out. Your payoff consists of the tokens you assigned to yourself and what was assigned to you by the two other participants in your group.

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Appendix - Explicit IEE

ASP/Nested:

$$IEE_i^{j,k} = \frac{\left(\frac{1+N-r_k}{N}\right)^{\gamma} y_k^{-\eta} - \left(\frac{1+N-r_j}{N}\right)^{\gamma} y_j^{-\eta}}{\sum_{-i}\left(\frac{1+N-r_{-i}}{N}\right)^{\gamma} y_{-i}^{-\eta}}$$

Fehr-Schmidt:

$$IEE_i^{j,k}(y) = \begin{cases} \frac{\alpha+\beta}{n_k\beta - n_j\alpha} & \text{if } y_k < y_i < y_j \\ 0 & \text{Otherwise} \end{cases}$$

Charness Rabin:

$$IEE_i^{j,k}(y) = \begin{cases} 0 & \text{if } \min_{j\in N}[y_j] = y_i \\ IEE_i^{j,k}(y) = \frac{\delta}{\delta+(N-1)(1-\delta)} & \text{Otherwise} \end{cases}$$

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Appendix - EDE

- Equally-distributed equivalents (ede):

$$\text{ede}_i(y) = k \qquad \Leftrightarrow \qquad U^l(y) = U^l(k, k, k),$$

  Interpretation: The level of income needed, if distributed equally, to give the same utility as the current distribution.
- All utility specifications above are transformed to be in ede terms.
- Example: $U^{FS}(3, 2, 2) = 1 = U^{FS}(1, 1, 1)$ for $\alpha = 1$ and $\beta = 0.5$.

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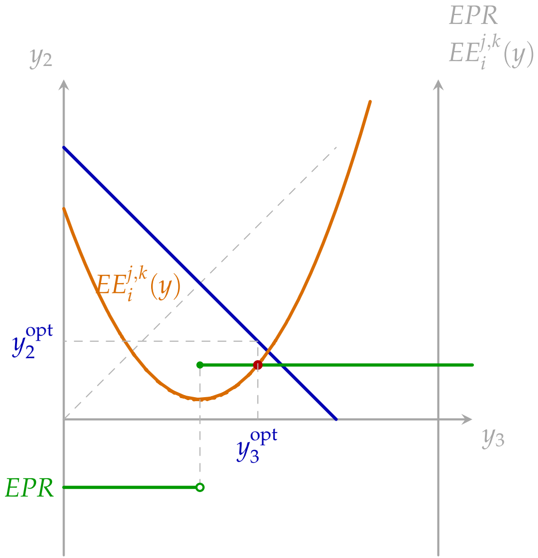
Estimation method - Spectator



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