Efficiency versus Equity in a Threshold Public Goods Game

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Motivation & Research Question

Threshold public good is only provided if minimum amount (threshold) of aggregate contribution is reached

Empirical relevance: e.g. climate change mitigation

- Usually in contexts with heterogeneous agents
- Multiple Equilibria $\rightarrow$ Coordination problem

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Previous literature: player heterogeneity important but ambiguous effects depending on experimental setup

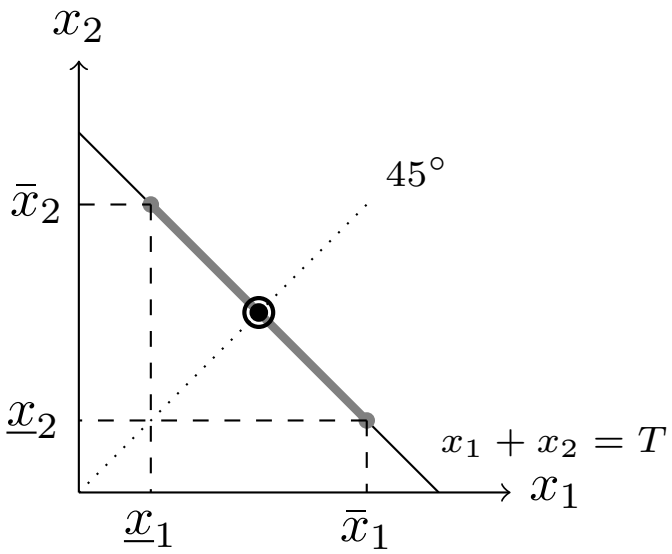
Our Goal

Design theoretically-grounded experiment to cleanly isolate effect of heterogeneity and mechanisms that can explain contribution patterns.

Efficiency vs. Equity

2 players, contributions x_i, x_j to reach threshold $T = 1$

Efficiency: lowest total costs Equity: equal payoff



Symmetric players

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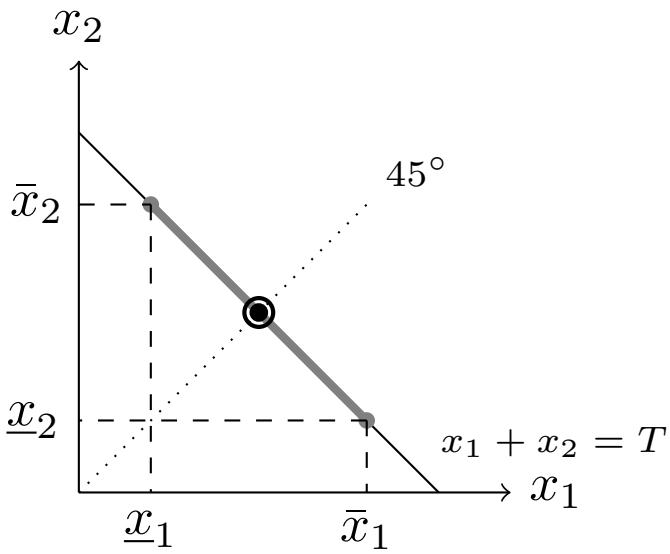

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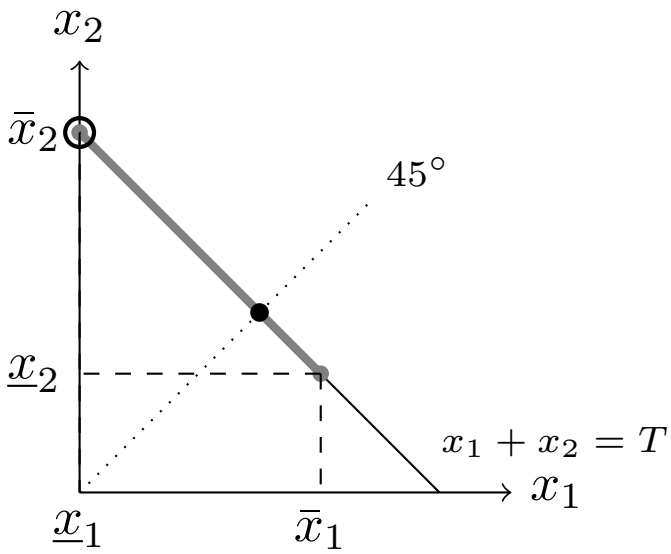


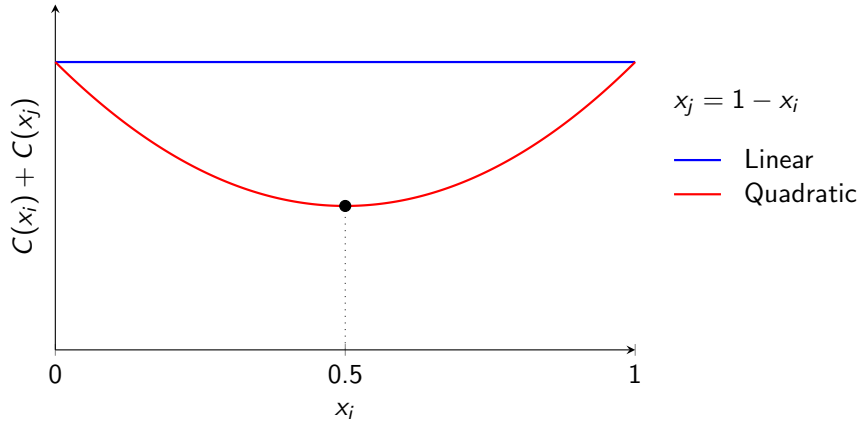
Asymmetric players

The two focal points, in the standard (quadratic) setup:

- with symmetric players, they coincide,
- with asymmetric players, they do not: coordination ambiguity.

Experimental Design

Treatment



Quadratic Costs: $C(x_i) = C^q(x_i) = \frac{1}{2}cx_i^2$

- Equal split allocation $(x_i, x_j) = (0.5, 0.5)$ is cost-efficient
- Efficiency cost for more equitable allocations with heterogenous agents

Linear Costs: $C(x_i) = C^l(x_i) = \frac{1}{2}cx_i$

- Any allocation (x_i, x_j) is equally cost-efficient
- Contribution choice about equity

Main Results

15 games structured along 2 dimensions:

- Social value: what is the public good worth?
- Player heterogeneity: how is the benefit split between agents?

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We analyse:

- How do players choose their contribution?
- Treatment effect: do players exhibit efficiency preferences?
- Individual factors: how do outcomes depend on social preferences?