

*To Tender or not to Tender?  
Deliberate and Exogenous Sunk Costs  
in a Public Good Game*

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# Introduction

- ▶ In the field, factual rents from a contest often depend on what the winning party makes of it
- ▶ Example: Imagine two corporations tendering for a construction project
  - ▶ After decision to award the project, the subdivisions of the corporation can deliver input to construct the project
- ▶ Duopoly of unitary players



Each competitor consists of different segments (fuselage, wings, turbines...)

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# Introduction (cont.)

Two stages:

- 1** On the corporation level, each group spends resources to secure the project
- 2** Subdivisions invest capital/effort for a group enterprise
  - ▶ Theoretically, contribution in stage 2 should be independent of the amount of money spent in stage 1
  - ▶ However, sunk cost character → Potential sunk cost fallacy (Arkes and Blumer, 1985)
  - ▶ Alternatively: Reciprocal / gift exchanging process, feeling entitled



## Introduction (cont.)

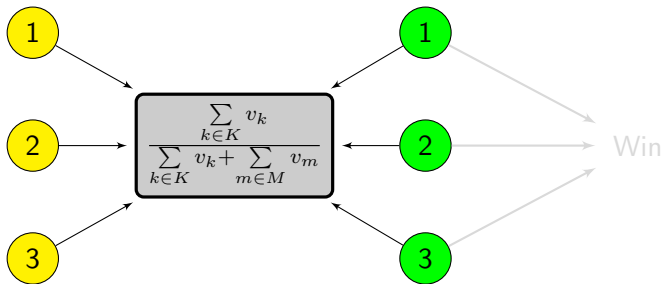
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## Setup – First Stage

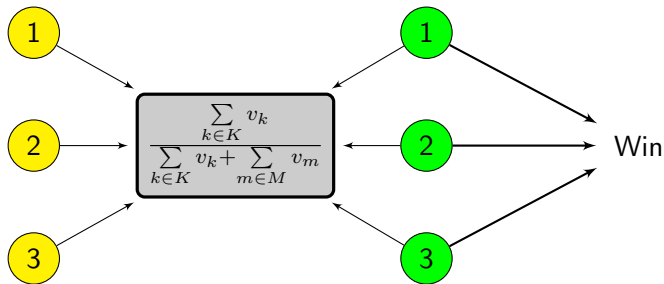
Individual endowment  $T = 200$  tokens  
100 for first stage, 100 for second stage



### Competition Treatment

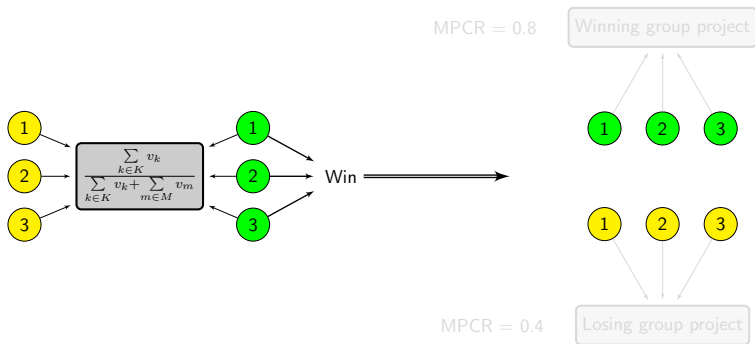
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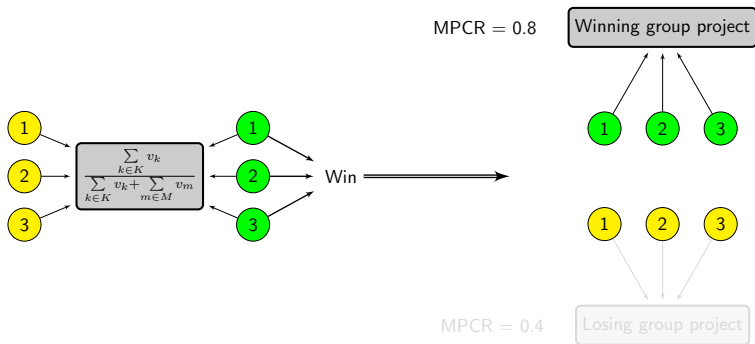


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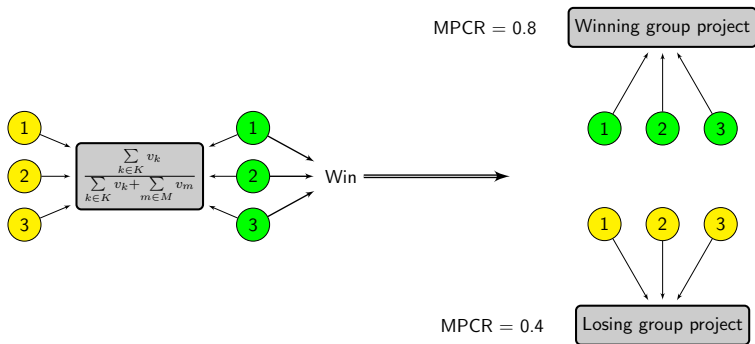
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# Equilibrium Strategies

## Second Stage:

$$\pi_i(k \in K) = T2 - w_i + MPCR \cdot \sum_{k \in K} w_k$$

As  $\pi_i' < 0$  and  $\pi_i'' = 0$ , there exists a corner solution  $w_i = 0$ .

## First Stage:

$$\pi_i(v_i) = T1 - \frac{v_i + \sum_{\substack{k \neq i \\ k \in K}} v_K}{v_i + \sum_{\substack{k \neq i \\ k \in K}} v_K + \sum_{m \in M} v_M} \cdot z - v_i$$

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# Behavioural Hypotheses

$$\bar{w}_i | \text{win, comp} > \bar{w}_i | \text{win, ex} > \bar{w}_i | \text{lose, ex} > \bar{w}_i | \text{lose, comp}$$

**Second inequality** In line with established literature on public goods games (Gunnthorsdottir et al., 2007; Isaac and Walker, 1988)

**First and last inequality** Sorting and signalling effects





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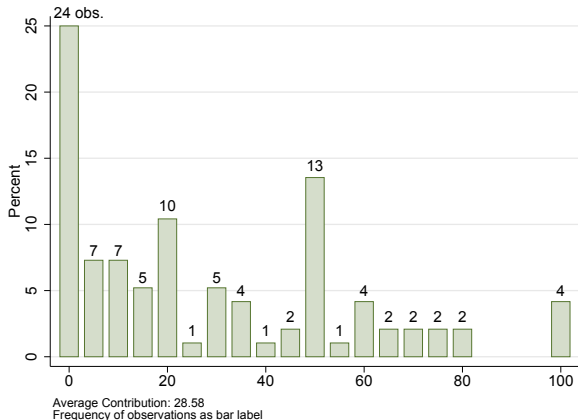
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## Procedures

- ▶ Recruited 186 participants using ORSEE (Greiner, 2004)
- ▶ Experiment programmed in z-Tree (Fischbacher, 2007) and conducted at CeDEx lab, Nottingham UK
- ▶ Each session took about 1 hour, including reading the instructions, taking an SVO measure, a trial period, the main part of the experiment, a questionnaire and payment
- ▶ Mean income £ 12.00 (about € 16.00)

## Results – First Stage



- ▶ Average Contribution at about 29 tokens
- ▶ 0 tokens as modal contribution.

## Results – First Stage (cont.)

VARIABLES	(1) First stage OLS	(2) Contribute OLS
Social value orientation (SVO)	-2.384** (1.05)	-1.849* (1.02)
Risk parameter	2.479 (2.10)	2.596 (1.94)
Female	9.866 (6.14)	16.148** (6.18)
Age	2.251 (1.39)	3.493** (1.43)
Work alone		2.422 (1.67)
Family and friends important		-9.839 (7.10)
Trust in others		17.455*** (5.97)
Income Equality		-3.429** (1.67)
Constant	86.402 (64.29)	42.992 (68.85)
N	93	93
R-squared	0.122	0.448

- ▶ SVO values negatively affect contest expenditures (robust)
- ▶ (Self assessed) risk parameter no explanatory power

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Standard errors in parentheses.

Study major dummies not listed.

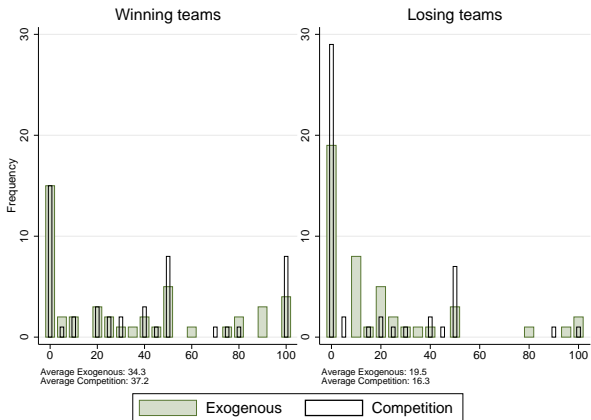
## Results – Second Stage

	Win	Lose	Overall
Exogenous	34.3	19.5	26.9
Competition	37.2	16.3	26.8
Overall	35.8	17.8	26.8

Table 2.2: Average individual contribution

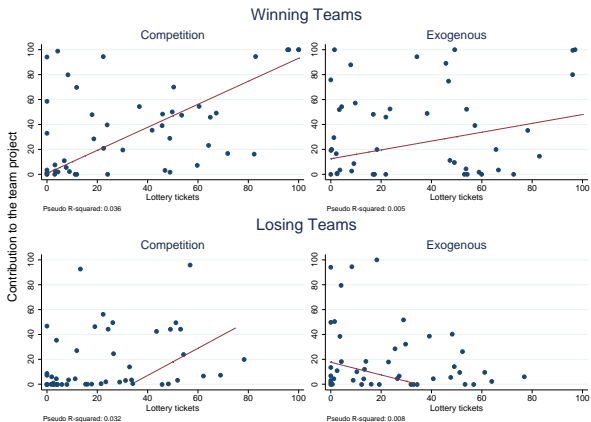
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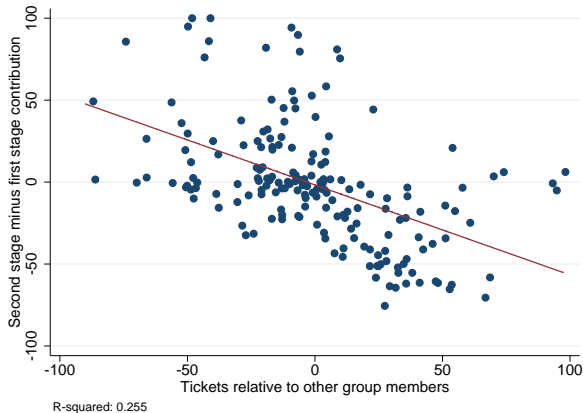
# Results – Relation between first and second stage contribution



- ▶ Positive relationship in the *competition treatment*
- ▶ Losing the contest as constant drag on a group's cooperation level



## Results – Relation between first and second stage contribution



- ▶ Subjects who contribute more relative to their other group members, tend to reduce their spending level

# Conclusion

- ▶ Contest expenditures perceived as sunk costs triggering higher contribution to the team project
- ▶ Sunk cost character only prevails for deliberately accrued spendings
- ▶ Losing the contest as constant obstacle for group's cooperativeness



## Literature

- H. R. Arkes and C. Blumer. The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, 35(1): 124 – 140, 1985. ISSN 0749-5978. doi: [http://dx.doi.org/10.1016/0749-5978\(85\)90049-4](http://dx.doi.org/10.1016/0749-5978(85)90049-4). URL <http://www.sciencedirect.com/science/article/pii/0749597885900494>.
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- A. Gunnthorsdottir, D. Houser, and K. McCabe. Disposition, history and contributions in public goods experiments. *Journal of Economic Behavior & Organization*, 62(2):304 – 315, 2007. ISSN 0167-2681. doi: <http://dx.doi.org/10.1016/j.jebo.2005.03.008>. URL <http://www.sciencedirect.com/science/article/pii/S0167268105002532>.
- R. M. Isaac and J. M. Walker. Group size effects in public goods provision: The voluntary contributions mechanism. *The Quarterly Journal of Economics*, 103(1):pp. 179–199, 1988. ISSN 00335533. URL <http://www.jstor.org/stable/1882648>.

