Economics Letters 120 (2013) 419–423

Contents lists available at SciVerse ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Competition lessens competition
An experimental investigation of simultaneous participation in a public good game and a lottery contest game with shared endowment[☆]

Sara Godoy[a], Antonio J. Morales[b,*], Javier Rodero[b]

[a] University of Essex, United Kingdom
[b] University of Malaga, Spain

HIGHLIGHTS

- Players simultaneously participate in two games with shared endowment.
- Biddings in the contest game are almost at the equilibrium level.
- Contributions to the public good are unaffected by the simultaneous participation.
- There are almost no behavioural spillovers across games.
- A bit of competition the between games largely disciplines irrational behaviour.

ARTICLE INFO

Article history:
Received 5 February 2013
Received in revised form
10 May 2013
Accepted 23 May 2013
Available online 5 June 2013

JEL classification:
C72
C91

Keywords:
Experiment
Competition
Public good game
Contest game
Behavioural spillovers

ABSTRACT

We experimentally analyse simultaneous behaviour in a contest game and a public good game, whose endowment is shared. Competition for resources (i) almost eliminates overbidding, without affecting public good contributions and (ii) almost eliminates the behavioural spillovers between the games.

1. Introduction

Real life situations rarely involve instances of isolated games; rather players simultaneously get involved in several games at a time. Recent experiments have been designed to measure how the experience/learning from one game carries over to the other (a behavioural spillover is said to occur whenever observed behaviour differs when a game is played together with other games, compared to the same game played in isolation, as defined by Cason et al., 2012). In some papers, the games are of the same strategic nature, as in Huck et al. (2011) or Falk et al. (2013), while in others they are of a different nature, as in Savikhin and Sheremeta (2013). In all of them however, the unique feature linking both games is that subjects make decisions simultaneously in both games.

Like Savikhin and Sheremeta (2013), we consider a competitive game and a cooperative game, but we include the restriction that the endowment is shared between the two games. We find that competition for the resources does not affect contributions to

☆ We are thankful for the comments by Enrique Fatas and an anonymous referee on earlier drafts of this paper. We gratefully acknowledge financial support from the Spanish Ministry of Science, grant number MEC-ECO2011-26996 and Junta de Andalucía Excellence Projects SEJ-8065 and SEJ-4794.

* Correspondence to: Departamento de Teoría e Historia Económica, Facultad de Ciencias Económicas, Plaza El Ejido s/n, Universidad de Málaga, Málaga E29013, Spain. Tel.: +34 952 13 12 46; fax: +34 952 13 12 99.

E-mail addresses: amorales@uma.es, antoniojmorales@gmail.com (A.J. Morales).

0165-1765/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.econlet.2013.05.021

Table 1
Experimental design. Main variables.

	Treatment		
	Contest	VCM	Contest + VCM
Participants	24	52	60
Sessions	1	1	2
Group size	4	4	4
Matching protocol	Fixed	Fixed	Fixed
Independent obs.	6	13	15
Endowment	100	100	100
Number of rounds	20	20	20
Information between rounds	Own and total bids and own payoff	Own and total contribution and own payoff	Own and total bids and contributions and own payoff from each game

the public good but it eliminates 66% of the overbidding in contest (doubling the overbid reductions reported by Savikhin and Sheremeta, 2013) and almost eliminates the behavioural spillovers across games. Hence, the principle that a little bit of competition goes a long way (Nalbantian and Schotter, 1997, p. 332) is also applicable to our context.

The rest of the paper is as follows. Section 2 introduces the experimental design and procedures and the results are presented in Section 3. Finally, Section 4 concludes.

2. Experimental design and procedures

We have two games and three treatments. Table 1 contains a summary of the design.

2.1. The games

The first game is a standard *voluntary contribution game*. Each player i of a group of n players must decide her contribution c_i to a public good out of her endowment e. For a profile c of contributions, the payoff to player i is

$$\pi_i(c) = e - c_i + \frac{a \sum_j c_j}{n}.$$

The assumption $a < n$ implies that each player has an incentive to free ride on other contributions and that the unique Nash equilibrium c^* is to contribute zero.

The second game is a *lottery contest game*. Each player i of a group of n players must decide her bid b_i to win a prize V out her endowment e. For any profile $b \neq (0, \dots, 0)$ of bids, player i gets the prize with probability $b_i / \sum_j b_j$. Otherwise, the prize is randomly allocated among contestants. The expected payoff to player i is

$$\pi_i(b) = \begin{cases} e - b_i + \dfrac{b_i}{\sum_j b_j} V & \text{if } b \neq (0, \dots, 0) \\ e - b_i + V/n & \text{if } b = (0, \dots, 0). \end{cases}$$

This game has a unique symmetric Nash equilibrium in which each player bids $b^* = \frac{n-1}{n^2} V$.

2.2. Experimental design

We use the following values for the relevant parameters $n = 4$, $e = 100$, $V = 100$ and $a = 2$. We consider three treatments; comparisons across treatments are between subjects analysis. Two treatments will serve as baselines where subjects faced only one of the two games. The associated equilibrium predictions are $c^* = 0$ and $b^* = 18.75$ with equilibrium expected payoffs of 100 and 106.25 respectively.

In the third and last treatment (SIM), subjects play *both* games *simultaneously* with the endowment *shared* between the games, with expected payoffs

$$\pi_i(c, b) = e - b_i - c_i + \frac{a \sum_j c_j}{n} + \frac{b_i}{\sum_j b_j} V.$$

From a theoretical point of view, this shared endowment restriction makes no difference as long as it is not binding at the equilibrium values, which is the case in our experiment, i.e. $c^* + b^* < e$. Finally, the efficient behaviour in the simultaneous treatment coincides with the efficient behaviour in the games in isolation: Full contribution and no bids, with expected payoffs $25 + 160 = 185$.[1]

2.3. Experimental procedures

The experiment was conducted at the University of Valencia (LINEEX). A total of 136 inexperienced subjects participated in the computerised experiments that were run using z-Tree (Fischbacher, 2007). At the end of the experiment, subjects were paid in private and in cash. Participants earned 12 € on average for sessions lasting less than one hour.

3. Results

We first report the results of an analysis at the aggregate level and then we move into an individual analysis to understand the main behavioural determinants.

3.1. Aggregate analysis

Table 2 reports the average decisions in the public good and in the lottery contest across treatments for all periods, the first half and the second half of the experiment, together with their corresponding theoretical predictions. It also displays the percentage of zeros by treatment.

Behaviour in the baseline treatments is consistent with previous experimental literature: overbidding in the contest game—the average bid 32.27 represents 172.10% of the equilibrium (Wilcoxon signed-rank test, p-value $= 0.046$), and overcontribution in the public good game: the average contribution 29.39 (Wilcoxon signed-rank test, p-value $= 0.0015$).

The treatment effect can be analysed at the aggregate level by comparing the average behaviour in the baseline games with the corresponding one in the simultaneous treatment. While there are no significant differences in the VCM game, (MW, p-value

[1] This holds because in the contest game, the prize is randomly allocated if no one bids.