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Multiple collective goods provision: Does endogenous exclusion matter?

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Introduction:

This paper focuses onmultiple collective goods provision. We analyze voluntary contributions througha comparison between a situation where players face two identical public goods and a situation where players face both a public good and a club good.

Individual contributions can be affected by the presence ofmore than one collective good. For instance, Cherry and Dickinson (2008) and Bernasconi et al. (2009) found an increase of total contributions when individuals face several identical public goods, compared to a single public good situation.

Multiple collective goods designs can also be useful for analyzing the preferences between two different collective goods. Blackwell and McKee (2003) and Fellner and Lünser (2014) found individual preferences for a local rather than a global public good when the average per capital return (A.P.C.R.) of the two goods is the same.

The mean contribution can bemodified by the variation of the number of public goods. But according to the characteristics of the goods, individuals will either be indifferent to them, or will have preferences for one over the other.We study the distribution of contributions and the individual preferences between a standard public good and an exclusive collective good. However, we do not analyze theexogenous exclusion , such as between local and global, or in terms of discriminations as the experience of Fonseca and Chakravarty (2013); but rather by analyzing theendogenousexclusion, by testing a voluntary adhesion in good club.

The literature on club goods remains scarce and few papers have tried to make such a comparison.By definition, a public good is non-rival and non-exclusive while a club good is non-rival but exclusive. Swope (2002) compares a standard public good game with a club good game. In his experiment, exclusion is read into a voluntary adhesion where *"subjects who contribute less than a minimal amount in a given period do not get any return from the*

public good in that period". His results show that exclusion increases contributions in most cases, compared to a standard and single public good game.

In our experiment, exclusivity is treated alike to Swope (2002). We suppose that the club good will bepreferred compared to thepublic good.And we suppose a significant increase of the total collective contribution between the baseline and the treatment.

To our knowledge, we are the first who experimentally test endogenous exclusion through a multiple collective good design. However,this analysis can beusefulto describe severalreal-life situations.

We witness aproliferationof club organizations, which groups benefit togetherfroma commonbenefit(business consortium, community supported agriculture, grouping consumers, ...). Theseclubsmay havedifferent objectives and rules to join theclub. The common ruleis the voluntaryadhesion thatranges from a simplefree registration, tothe payment of afee thatmay bestronger or weakerdepending on the natureof theclub.

Reference:

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Fellner G., Lünser G., 2014, "Cooperation in local and global groups", *Journal of Economic Behavior and Organization*. http://dx.doi.org/10.1016/j.jebo.2014.02.007

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Experimental design and procedures

In this paper, we analyze and compare contributions of three multiple collective goods treatments, i.e. one treatment where players face simultaneously two identical public goods (2PG), our baseline ; and two treatments where players face simultaneously a public good and a club good. The two last treatments diverge only by the level of the minimum contribution requirement, fixed for one treatment at 30 tokens (30CG) and fixed for the other at 1 token (1CG). By using a mixed design, every participant takes part in two of the three treatments.

Each treatment is composed of eight groups of four students and carried over 20 periods (10 periods from the 2PG treatment and 10 from either the 30CG or the 1CG treatment). To compare each treatment with each other, we counter-balance,depending on the session, the baseline and the two treatments. Every participant is endowed with 60 tokens per period. Communication is never allowed. Instructions are distributed just before the beginning and are read out loud. Directly afterwards, a set of control questions are asked in order to ensure the participants' understanding of the game.

<u>The variables for all treatments:</u>

x_i is the individual contribution invest in the private good. $0 \leq x_i \leq 60$
y_i is the individual contribution invest inthe public good. $0 \leq y_i \leq 60$
z_i is the individual contribution invest inthe club good. $0 \leq z_i \leq 60$
$x_i + y_i + z_i = 60$
α is the yield of individual contribution in the private account. $\alpha = 10$
β is the yield of individual contribution in the public good. $\beta = 4$
λ is the yield of individual contribution in the club good. $\lambda = 4$
n is the number of total individuals. $n = 4$
k is the number of individuals in the club good. $k \leq n$
MPCR = 0.4

Baseline:

Individual profits function:

$$\pi_i = \alpha . x_i + \beta . \left(\sum_{j=1}^{n} y_j \right) + \lambda . \left(\sum_{j=1}^{n} z_j \right) \qquad where\ x_i + y_i + z_i = 60$$

Treatment:

Individual profits function:

$$\begin{cases} \pi_i = \alpha . x_i + \beta . \left(\sum_{j=1}^{n} y_j \right) + \lambda . \left(\sum_{j=1}^{k} z_j \right) if\ z_i \geq fee \\ \pi_i = \alpha . x_i + \beta . \left(\sum_{j=1}^{n} y_j \right) otherwise \end{cases}$$

$$where\ x_i + y_i + z_i = 60$$

$$and\ where\ fee = 30\ for\ the\ 30CG\ treatment\ and\ fee = 1\ for\ the\ 1CG\ treatment$$

This design generates multiple Nash equilibria which are Pareto ranked and keeps the social dilemma. The dominant strategy is to contribute nothing to the public good, the minimum amount of tokens to the club good and the rests in the private account. Nevertheless, a no-contribution Nash equilibrium exist also, but it is Pareto dominate by the coordination Nash equilibrium.