
The approval mechanism with delegation: An experiment on CPR

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Abstract

In the absence of regulation, common pool resources (CPR) are frequently over-exploited (Hardin, 1968; Ostrom, 1990). However, Yao et al. (2022) showed that the Approval Mechanism (AM) allows preventing the undesirable social outcome of the "tragedy of the commons" in two-player CPR games. The AM was first proposed by Masuda et al. (2014) and Saijo et al. (2015) as an efficient mechanism to avoid the social dilemma of under-provision in two-player public goods games. The AM involves a two-stage game. In the case of a CPR game, in stage 1, each player proposes an individual extraction level; in stage 2 players approve/disapprove the proposed extraction vector. In case of disapproval, an endogenously fixed amount of extraction called "disapproval benchmark" (DB) is implemented.

Extending the AM to more than two players is not straightforward. Yao et al. (2022) investigated the case of a three-player CPR game and found that the mechanism sometimes fails. Failures seem to be related to the second stage approval/disapproval decisions, in particular under the majority approval rule. It is therefore useful to explore other variants of the AM, either by investigating alternative voting rules or alternative disapproval benchmark rules. In this paper we propose a variant in which, in case of disapproval, one of the players, the delegate, is randomly selected to choose authoritatively a uniform extraction level for all players, putting the disapproval arbitration at an endogenous level. Designation of delegates among group's members being common in real life CPR management institutions, such as water user associations (WUA).

We design an experiment based on a three-player CPR game. We assess the effectiveness of the AM with a delegate in case of disapproval, both under the unanimity and the majority approval rules. The delegate has the power to choose the uniform extraction level, between the minimum and the maximum first stage proposals. Backwards elimination of weakly dominated strategies (BEWDS) predicts the socially optimal level of extraction under unanimity,

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but not under majority. Our experimental findings show that the mechanism with a delegation DB, particularly under the Unanimity voting rule, reduces over-exploitation of the CPR by reducing proposals and realized extractions near the optimal level. The delegates' choices bring back the average level of extractions slightly under the approved level which is significantly under the FA level. Finally, we find that most of the delegates (81

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