

Monitoring networks in a common pool resources dilemma: Experimental evidence on extraction, punishment and beliefs

Abstract:

Previous experimental evidence indicates that punishment has only a lagged and modest effect on extraction in common pool resource (CPR) appropriation dilemmas. These experiments model only perfect monitoring institutions, with perfect information on extractions and equal punishment opportunity to all players. But in reality monitoring institutions can be imperfect i.e. not everyone can observe and punish everyone else in the group. Although standard economic models predict that cooperation maybe higher in more connected networks, the empirical evidence is still ambiguous. We use a workhorse model of a common pool appropriation dilemma (that is modelled after a fisheries bio-economic model) to test whether and how extraction and punishment vary with imperfect monitoring. We also elicit incentivised beliefs on the expected extraction of other members in the group. We compare three imperfect and fixed monitoring networks, namely the undirected circle, directed circle and directed line networks, to the perfect monitoring network we use as the baseline. We find that the complete network elicits higher extraction, punishment and beliefs, making this the least efficient network. Subjects use both anti-social and altruistic punishment, but it does not seem to significantly deter free-riding. Interestingly, beliefs are influenced by the monitoring network, as well as by lagged beliefs and lagged feedback about the extraction of others in the group. When we control for the endogeneity between beliefs and extraction, we find that beliefs are positively and significantly associated with extraction. Finally we find that in this CPR dilemma the network graph theoretic property of completeness is associated with higher extraction, punishment and beliefs. Directedness is associated with lower punishment and beliefs and connectedness is associated with lower beliefs over others' extraction.

Keywords: Common pool resources, social dilemma, monitoring, punishment, networks, beliefs

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