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Dissertation abstract: Exclusion and cooperation in networks

Aljaž Ule

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The traditional game theoretic models of social dilemmas assume that agents have no other option but to participate. These models fail to capture an important element of human interaction: that in general people are not embedded in exogenously imposed networks but are free to select their partners for interaction. Notably, these models fail to explain why high cooperation is characteristic for social networks.

In this thesis a Prisoner's dilemma game with partner selection is introduced, which allows exploration of simultaneous evolutions of the network structure and of cooperative behavior on this structure. We investigate this game using three different approaches. We begin with a standard equilibrium analysis of the game. We then set up laboratory experiments to study actual behavior in this game. Finally, we use computer simulations to investigate the dynamics of adaptive behavior under the assumption that the game is played by boundedly rational agents.

Equilibrium analysis reveals that cooperation in our social dilemma game can be achieved in a subgame-perfect equilibrium even when the game is *finitely* repeated. A necessary condition for the existence of such equilibrium is that the set of 'stable' networks is sufficiently rich, including efficient as well as inefficient networks. In our experiments we focus on situations that violate this condition. Contrary to the theory, high and increasing cooperation during all but the last few periods is observed whenever partner selection is possible, with treatment averages between 66% and 93%. In contrast, cooperation declines in the treatment with a fixed interaction structure, averaging only 35%. Our main conclusions are that people are willing to enter into risky social dilemma situations, that they use costly exclusion as a means of retaliation for free-riding, and that partner selection is a powerful means for promoting cooperation. These findings mirror similar results about effectiveness of costly punishment in sustaining cooperation and are significant, as exclusion is possible in many environments that sanction or lack means of direct punishment.

Aljaž Ule (✉)
Center for Research in Experimental Economics and political Decision-making - CREED, Faculty of Economics and Econometrics, University of Amsterdam, The Netherlands
e-mail: a.ule@uva.nl
(http://www.fee.uva.nl/creed/people/ule/index.htm)

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Further analysis shows that behavior of our subjects cannot be explained by their altruism or inequity aversion. However, developing a model of agents with limited foresight and using computer simulations, we show that the behavior in our experiments is captured relatively well by considering altruistic agents that care about their future earnings.

Keywords Networks · Cooperation · Non-cooperative games · Experiments · Simulations

JEL Classification C72, C73, C92, D85, H41

Advisors: Arno M. Riedl and Arthur J.H.C. Schram

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