

*Student
Seminar*



Group Size Uncertainty in Common-pool Resource Dilemmas

by Philip Brookins and Weston Watts



We present the first analysis of the common-pool resource dilemma game under group size uncertainty. In our model, the number of active players and the size of the resource are random variables, but the distributions are common knowledge. All active players privately and simultaneously choose an amount of the resource to request. If the sum of all requests is less than or equal to the realized resource size, then all players receive utility equal to their request; otherwise, all players receive zero utility. The introduction of group size uncertainty makes the traditional analysis intractable. We exploit the mixed continuous/discrete nature of the game to obtain the set of potential equilibria, of which only a subset can be classified as equilibria in the Nash sense. We compare our predictions to the data of several experimental studies ex post. Theoretically, an increase in group size uncertainty increases equilibrium resource requests. Overall, the data supports a reversal of the prediction: an increase in group size uncertainty decreases resource requests, provided resource uncertainty is not too extreme. A large portion of the data can be rationalized with simple pessimistic decision-making, whereby individuals optimize in a subjective probability framework that places nearly all mass on the worst-case scenario threshold and group size realizations.

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LeConte 422

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Bio: Philip Brookins is an Associate Professor in the Department of Economics at the Darla Moore School of Business. His research involves the use of game-theoretic techniques to model and characterize behavior in competitive settings, such as contests and tournaments, and the use of experimental methods to test the validity of such models. In particular, he examines how individuals and groups behave in contests when they are information-constrained, e.g., not fully informed as to the number of competitors and/or their characteristics. Philip joined the University of South Carolina in 2019 after completing a postdoctoral research position at the Max Planck Institute for Research on Collective Goods (Bonn, Germany). He has a doctoral, master's, and bachelor's degree in economics and a bachelor's degree in mathematics from Florida State University.