

Evaluation report (posudok oponenta) on the thesis

Introduction to cooperative games: theory and experiment

submitted by Dominika Zogatova (2020)

Author of this report:

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Grade: A

Remark: I will not be able to attend the defense of the thesis. I attach my questions for the defense below, and agree that a subset of these questions will be asked during the defense on my behalf. Jana Vyrastekova

Summary of the evaluation

This thesis presents the foundations of cooperative game theory and discusses cooperative game solutions to distributional problems. The stipulated goal of the thesis – to introduce these theoretical foundations – has been achieved. The axiomatic foundations of the cooperative game theory solutions do not take into account human behavior. In the second part of the thesis, the behavior of experimental subjects has been analyzed and linked to the theoretical

benchmarks from cooperative game theory. The candidate herewith also demonstrated the ability to apply the theoretical knowledge in a specific game, and work with experimentally generated data, process and analyze the data, and draw conclusions related to human behavior and the relevance of the theoretical benchmarks. The data studied comes from a preexisting experiment implementing a fairness decision problem that allows to address what division of jointly produced surplus human decision-makers consider to be fair, in a specific case when they receive only imperfect signal about the individual productivities. Overall, the first part of the thesis straightforwardly summarizes the existing literature, the theory, and links cooperative games to axiomatic and bargaining (noncooperative) foundations of theoretical solutions to the games, and the second part applies this knowledge to the experimental dataset.

In the experiment analyzed after the theory introduction, one subject was assigned as a dictator and divided the surplus produced by two other players. The dictator and players faced incomplete information about the contributions of the individual players to the generated surplus. This represents a deviation from the theoretical assumptions as outlined in the first part of the thesis, and raises a question whether the signal about the individual productivity can be interpreted as a value of the singleton coalition. What would cooperative solutions look like in situations when information on individual contributions is not known, and there is only an imperfect signal? This challenging question remains open and suggests a gap in the literature.

Overall, the thesis makes a good contribution to the topic outlined as research question, and contains outline of a research program for the future.

Questions for the candidate defense:

1. What do cooperative solutions predict in situations when information on individual contributions (one-person coalitions) is incomplete, and there is only an imperfect signal

about these? This question remains open in the thesis. Discuss/speculate about possible answers based on your reading of the cooperative game theory literature.

2. What experiment would you design to address the behavioral relevance of various game-theoretic benchmarks? Explain.
3. Discuss how the productivity of the players in the experiment you studied could affect the perceived fairness/ideal solutions, and link this both to the theoretical cooperative game theory literature, and to experimental and behavioral economics. Do these two research fields make similar use of the information on players' productivity? Is such information used efficiently, not at all, only partially, and does this allow us to make predictions about human behavior that are descriptively correct?
4. On page 33 of your thesis, you present the theoretical benchmarks for the division of the surplus, that are later compared to the actual behavior of the subjects. In order to calculate these benchmarks, you make the assumption that the 3-minute signal of an individual player productivity is THE player's contribution (productivity). This is a strong assumption. Why do you make it? Explain. Discuss also how the current experimental analysis results depend on this assumption. Further, in the questionnaire that you have added at the end of your thesis, it is obvious that the authors that have designed the study have also collected data from subjects indicating to what extent they considered the information provided by the imperfect signal to be relevant for a fair division. Looking at the questionnaire, what questions could you use to substantiate the assumption you made on p33, and outline how would you proceed with your analysis using this additional questionnaire information.
5. Reading the results on p.40, it seems that the knowledge of own productivity decreases the spread in decisions/fairness perceptions of the dictators/players. Would you support

this observation? If correct, what implications would it have for applying theoretical fairness benchmarks for predicting behavior of humans in distributional tasks?

6. On p.49 of your thesis, you define a threshold for the consistent behavior of a subject (dictator or player) in dividing the produced surplus, and accounting for the imperfect signal that the subjects received about individual player productivity. You select a threshold of 1/5: please explain why. Could you find alternative ways how to establish what “type” of a preference/fairness ideal a subject holds that is consistent with the data presented? If you would need more data, another type of data than available in this experiment, discuss what data you would like to have to be able to establish the fairness types of dictators/players.
7. In the conclusion, you propose that the data from the experiment you analyzed support that there might be multiple norms of fairness in the population. Please discuss what fairness norms (going beyond the averages that you present) you observe most frequently.

Jana Vyrastekova

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