Referee report on MS-2022074

This paper considers a two-player election Tullock contest to investigate gerrymandering in the lab. To win the contest, players need to simultaneously exert effort to three districts, and the player who wins two out of three districts will win the contest. District structures are varied by different maps. In this study, the authors consider two types of maps: i) the symmetric types, in which the objective function of the two players are symmetric and the result equilibrium strategy is symmetric, and ii) the asymmetric types, or "gerrymandering" types, in which one side's partisans are packed within one district while the other side's partisans are cracked and split between two other districts. Thus, the gerrymandering types give one side an advantage to win the contest.

The experiment consists of three stages. On stage 1, players need to provide their effort decisions on all types of maps, then one map is randomly selected for the actual play. On stage 2, players need to firstly state which map they would prefer to use to determine the outcome, then a computer would randomly pick one of the maps selected by two players, based on the selected map, players decide how much effort they would like to exert on each district. The only difference between stage 2 and 3 is that players are asked to select a map before knowing their roles.

The main findings of this study are: i) on average, players overbid on stage 1. ii) more than 60% of players favored a map that was gerrymandered to provide an advantage in their own favor on stage 2. iii) on stage 3, when forced to select a favored map behind a veil of ignorance, players indicate a clear preference for symmetric maps rather than gerrymandering maps.

Overall, I feel this paper investigates an interesting question, the theoretical and empirical analysis are solid. However, based on the ignorance of some related literature, the contributions and possible implications of this study need to be rephrased. Also, the experimental design seems deviate from the initial research question. Finally, a total number of 64 participants seems insufficient for experimental research, it would be better if the authors can increase the number of participants or provide appropriate power analysis to demonstrate the sample size is sufficient.

Major Comments

1. On Page 3, the authors state that "Therefore, we combine the notion of districting with a second stage Tullock style electoral competition…". However, I did not find such "districting" strategies in the experiment. In the experiment, all maps are given by the experimenter, players cannot decide how to divide the districts. Because of that, I am question whether this study analyzes the gerrymandering behavior in the lab. If not, then I would suggest the authors to rephrase the introduction section.

2. On Page 3, the authors state that one of their contributions is "the prior papers in this area have treated districting as a one stage game against nature, …. Therefore, we combine the notion of districting with a second stage Tullock style …". However, Shotts (2002) has already modelled such scenario as a multi-stage game. I noticed the authors have cited this paper, but it would be better if they can say more about how their study is different from Shotts (2002).

3. The literature coverage and the fit of the study can be significantly improved. Besides Shotts (2002), below are other studies that may related to this paper. This list can be longer, I leave it to the authors to

revisit the literature and presents the relevant fit, and contribution more appropriately than what it is now.

[1] Konishi, H., & Pan, C. Y. (2020). Partisan and bipartisan gerrymandering. Journal of Public Economic Theory, 22(5), 1183-1212.

[2] Bierbrauer, F., & Polborn, M. (2020). Competitive gerrymandering and the popular vote.

4. In section 2: as the maps are given, zones within a district are equivalent, and players are asked to allocate a certain amount of endowment (80) to different districts. I feel this model is similar as the Blotto game. More specifically, within symmetric maps, the contests stated in this study are similar as the Blotto game with one (or three) battlefields; within asymmetric maps, the contests stated in this study are similar as the Blotto game with a head start. Therefore, I would like to see the authors provide an explanation to distinguish the difference between their model and the Blotto game.

5. In section 2, the authors mentioned "the probability that Player i wins a non-preassigned zone in district d of map M is $\frac{ei}{ei+ej}$." What if $ei + ej = 0$? The probability of winnings equals ½ or 0?

6. On page 6, the third paragraph, the authors mentioned "Thus, of the three symmetric maps Sym1,1 is socially optimal and yields the greatest expected profit to the players." What are the intuition behinds that? Can we get some policy implications based on this finding?

7. The total number of participants was only 64. Although this experiment employs a within-subject design, I am still worried the sample size is insufficient. It would be better if the authors can provide a power analysis, demonstrating that their sample size is sufficient.

8. I highly suggest the authors to rephrase their experimental design section. After reading their experimental design, I still have no ideas of what research questions they are going to answer and what hypotheses they are going to verify. It would be better if they can explicitly list their research questions, or hypotheses before stating their results.

9. It would be better if the authors can provide the standard deviations of the average expenditure in Table 2.

10. The authors stated some deviations on Page 13 and 14, it would be better if they can provide some possible explanations on those deviations. For instance, why the total effort exerted in *Sym1,3* is lower than that in *Sym3,1*?

11. In Table 5 of section 7.1, why the effort exerted to W for player B in *GerryA* is significantly lower than the effort exerted to W for player A in *GerryB*? Would it have caused by the "order effect"?

12. In section 7.2, it should be mentioned that whether the standard errors in parentheses are clustered or not.

13. There are some typographical errors need to be corrected, I may not list them all, but I would recommend the authors to re-check the whole passage:

i) All footnotes are not numbered yet.

ii) On page 7, the second line, "… and an expected profit of 0…".

iii) On page 8, the fifth line, “… all 3 districts…”.