Review of: "The Uncertainty of Fairness: a Game Theory Analysis for a Debt Mutualization Scheme in the Euro Area"

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Summary. The paper adopts a fairness approach to set-up a simple game between two players, in which a debt mutualization scheme is proposed. The game is specifically designed to fit the case of a "peripheral" country within the European Union (i.e., a country prone to run fiscal deficits) and a bulk of "core" countries within the EU, which might be willing to take on part of the debt issued by the former. The main argument developed in the paper is players' (self-centered) inequity aversion, meaning that players value a more equitable outcome of the game up to the point they might be disposed to give up part of their own material payoff. A first game is proposed, in form of a sort of ultimatum game, in which fairness-based considerations induce the rest of the EU to accept a debt quote equal to 50%. To investigate the dynamic aspects of strategic interaction between the debt issuing country and the rest of the EU, a repeated prisoner's dilemma with sympathy is analyzed, which shows that the optimal solution of a debt mutualization scheme consists of the former committing to debt reduction, and the latter enforcing strict control over the effective implementation of the necessary austerity measures. Finally, a gift exchange game is used to show that the 50%-50% debt mutualization scheme identified as solution of the first game qualifies as a subgame perfect Nash equilibrium.

General comment. The paper tackles a policy issue that periodically comes back to the center of the political debate in Europe, i.e., a possible enactment of a sort of sovereign debt mutualization. This topic is of paramount importance, and more research on that is certainly desirable. The authors deserve praise for having gone in quest of an original approach to this issue, yet fairness appears to me hard to justify as the funding element of a possible agreement among national governments, intended to give rise to some form of debt mutualization. Overall, the three games outlined in this papers appear to be specifically designed to apply to the hypothesis (and explore the feasibility) of shared sovereign debt within the EU. In my view, a game specifically aimed to investigate the issue should take on board a series of elements that are neglected in the current version of the paper, namely (i) the negative externalities that a debt crisis in peripheral UE countries would exert on the other countries; and (ii) the fact that the rest of the UE is not a unified front, as national government oftentimes give proof of largely different sensibilities on the matter.

Concerns / proposals / other remarks.

#1. I wonder whether it could turn more convincing and effective to present the paper in a different way, i.e., proposing the three games as models of strategic interaction intended to analyze possible debt mutualization between two players, which are not necessarily to interpret as members States of the UE. In this case, debt mutualization within the UE could be simply mentioned as one possible application of these games, given the due approximations and caveats. I am not familiar with the literature of game theory embedding fairness… if taking this route, it might then be necessary to find a way to differentiate the paper from existing articles (if any) that develop a similar narrative.

#2. If the authors prefer to stick to the current narrative, I would suggest them to adapt the three games in such way to make them more fit to the specific application about debt mutualization within the UE. Related to my general comment above, I would see a mayor contribution of the paper if it were able to consider a more sophisticated setting with multiple players, and heterogeneous distribution of the their advantageous/disadvantageous inequality parameters, sympathy parameters, etc. Alternatively, sticking to the current version of the games with two players, a more convincing narrative could be developed, e.g. interpreting the two players as the bulk of “core” and "peripheral" countries in the EU, respectively (rather than one single member country vs the rest of the Union). It might be interesting to consider, in this regard, the relative size of the two groups, e.g. adding additional model parameters capturing their relative bargaining share. In my view, understanding how the optimal debt quota to share varies with the numerosity (and size) of the countries in the two groups would certainly make a relevant contribution, able to increase the overall appeal of the analysis.

#3. Related to the other main point raised in the general comment section, the current version of the games assumes that a pure solidarity value of a possible debt mutualization scheme, without taking into consideration neither the risk of contagion in case of a financial crisis in the debtor country, nor the need of the other player acting as a last resort lender. Whereas I see that the fairness approach may offer an interesting framework for the study of debt mutualization and optimal debt quotas, inequity aversion --*per se*-- is not a solid argument. I wonder whether the games, in their current formulation, may undergo a simple re-labeling of the variables and model parameters (or however, a very simple and conservative re-formulation, with just a few adaptations/extensions), in such way that he other countries' willingness to take on part of the debt of one member State can be justified based on the alternative motives mentioned above.

#4. The literature review portrayed in Section 2 is done fairly well and helps the reader --even the one not familiar with the “fairness approach” to game theory-- to immediately grasp the key insights of this line of research as well as the functioning of the models.

#5. I invite the authors to revise the main text extensively, and reconsider various lexical choices (e.g. “this opens the track for…”, 4th sentence in the Introduction; or “We refer to this modus operandi as--”, again in the Intro). Overall, I would suggest a formal process of external proof reading, once a new version of the article will be released; And I would like to invite the authors to be more precise in their wording, particularly in the more technical parts of the text (e.g. at the first bullet point right after Table 2, "p is the probability assigned to each action" is presumably incorrect, unless assuming $p = ½$)