Nudging with heterogeneity in environmental sensitivity: A public goods experiment in networks

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Abstract

In this paper we propose an experimental test of the theoretical predictions obtained in Ouvrard and Stenger (2017), namely that the reaction to a nudge implemented in a network depends on the network structure, and on individuals' sensitivity to the environment. In particular, according to their predictions, the most sensitive individuals in a circle network should contribute more under nudge implementation coordinating their actions (ie, strategic uncertainty is reduced). In the star network, the result depends on the content of the nudge. Indeed, it is necessary for the regulator to know each individual position in the network, in order to propose a nudge for which the content is adequate to their position (the individual in the center should contribute, contrary to the individuals in the periphery).
The first step of our experiment allowed us to determine subjects' senstivity to environmental matters, using the General Ecological Behavior scale (Kaiser 1998). We then determined subjects' inequity aversion (advantageous and disadvantageous) using the same method than Blanco *et al.* (2010) and Teyssier (2012). Finally, the subjects played a twice ten period public goods game in network (circle or star), similar to the one proposed in Rosenkranz and Weitzel (2012). The first ten periods served as a baseline. During the second ten periods, a nudge was implemented. The nudge was the announcement of the socially optimal level of contribution. However, in the star network, the socially optimal level of contribution depends on individuals' position. We thus proposed two nudges in the star network. Under complete information, the content of our nudge takes into account individuals' position. Under incomplete information, our nudge cannot rely on individuals' position, and targets one individual (the individual in the center).

We show that nudge implementation does not induce an increase in the level of contributions (both for less and highly sensitive subjects, and in both networks), contrary to the theoretical predictions of Ouvrard and Stenger (2017). However, for the most sensitive subjects, this result is not surprising as their level of contribution is close to the social optimum. Moreover, our nudge induces a higher coordination on the social optimum in the circle for the most sensitive subjects, thus corroborating the theoretical predictions. In the star network, the targeted nudge induces a decrease in the level of contribution for the least sensitive subjects, which was a possibility in the model. Econometric estimations (Tobit and dynamic probit model) corroborate these different results. In addition, they highlight the positive effect of advantageous inequity aversion on the decision to contribute in the baseline in the star network. In the dynamic probit regression, we analyze the probability to observe a local coordination on the Nash equilibrium. In adequation to the past observations, environmental

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sensitivity negatively (and significantly) explains the probability to coordinate only in the circle network. On the opposite, the probability to coordinate on the Nash equilibrium in the star network is strongly influenced by the number of neighbors and the emergence of a local equilibrium since the first period.
In sum, our results suggest that a nudge has to be elaborated according to the structure of the network, the individuals' environmental sensitivity and their position in the network.

Keywords: Environmental sensitivity, Inequity aversion, Networks, Nudge, Public goods experiment