Which determines "Dictating the Risk", risk preference or social image? –Experimental evidence-*

Tetsuya Kawamura[a], Kazuhito Ogawa[a,b] and Yusuke Osaki[a,c]

[a] Center for Experimental Economics, Kansai University

[b] Faculty of Sociology, Kansai University

[c] Faculty of Economics, Osaka Sangyo University

Abstract

We conducted the experiment of risky dictator games in which recipients face risk in their allocations, and investigate how risk preference or social image affect the donating behavior. We conducted three dictator games (one standard dictator game and two risky dictator games) in two treatments: Social Image treatment wherein the recipients directly observe the allocation and No Social Image treatment wherein the participant cannot directly observe it. We found that social image significantly change the donating behavior between standard and risk dictator games, but risk preference does not.

Keywords: Dictator Game, Risk Preference, Social Image, Fairness

JEL classification numbers: C72, C91, D63, D81

1. Introduction

Brock, Lange and Ozbay (2013) (Hereafter, BLO) conducted modified dictator game experiment in which the payoff of a recipient is stochastically determined depend on the allocation by the dictator. B BLO shows that the social preference on both ex-ante and ex-post fairness well describe the behavior of dictators faced with the risk of their recipients. Especially, BLO experimentally showed that the social preference consisting of linear combination of own payoff, ex-ante fairness and ex-post fairness accurately explain behavior of dictators faced with the risk of the recipients.

* This study is partly supported by MEXT-Supported Program for the Strategic Research Foundation at Private Universities, 2014-2018, and JSPS Kakenhi Grant Number 26705004.

However, Krawczyk and Lec (2016) threw two doubts on the interpretation of their results. First, they ignore the effect of social image on the donating behavior even though the effect is different between the standard and the risky dictator games.[1] Second, they assume the risk neutrality to the comparisons of the payoffs. In this paper, we provide an answer to their questions. In order to distinguish the effect of social image and effect of fairness, we conducted two treatments: Social Image Treatment in which a recipient directly observes the allocation by the dictator and No Social treatment in which a recipient cannot directly observe it. Based on the experimental design of BLO, we conducted three types of dictator games, a standard dictator game and two risky dictator games in both treatments. The level of ex-ante fairness is set to be the same in all the dictator games. By doing so, we focus on the effect of ex-post fairness and social image on donating behavior in risky dictator game experiment.

We obtain the following result from the experimental observation. First, the assumption of risk neutrality to the payoff comparison holds when the same social image exists in all games. Second, the social image significantly changes the donating behavior of dictators.

2. Experimental Design

Before stating our experimental design, we introduce a model of social preference. We derive the testable predictions based on it. A model of inequality aversion of Fehr and Schmidt (1999) is adopted as a model of social preference. An individual evaluate certain payoffs by the following utility:

$$u(c^1, c^2) = c^1 - \alpha \max[0, c^2 - c^1] - \beta \max[0, c^1 - c^2]. \quad (1)$$

is an own payoff and c^2 is a payoff of others. The second and third terms in (1) represent the disutility from inequality which is the difference of payoffs between own and others. In a risky environment, risky payoffs are evaluated by the expected utility for (1):

$$V(F) = \int u(c^1, c^2) dF(c^1, c^2).$$

BOO consider the utility from both ex-post and ex-ante comparisons and refer this expected utility as the ex post comparison. In our experimental design, the expected

[1] Andreoni and Bernheim (2009) conducted modified dictator game experiment and investigated the effect of social image on donating behavior.

payoffs are set to be same for all tasks given a dictator decisions, so the ex-ante comparison is not necessary.

Our experiment consisted of three choice tasks which are a series of dictator games. The subjects are randomly divided by two groups, where all others are same except of social image. One task is the standard dictator game. In all tasks, the dictators endows 100 points (2000 yen) and allocate it between owns and their recipients. The payment is based on one task randomly selected. This payment method is widely adopted in economic experiments like Holt and Laury (2002). The other two tasks are variations of the dictator game where risk is included in the dictators' choices.

We conducted 10 sessions in Kansai University from October 2016 to May 2017. Participants were recruited from all the faculty. The experiments continue about 3 hours and the average payment is 1975 JPY. The following table shows the summary of experimental condition

The number of dictators	111
The number of male participants (The percentile of male participants)	66 (55.86%)
The number of dictators in economics or management (The percentile of economics or management)	20 (18.02%)
The average payment (The standard deviation)	1975 JPY (580.02)

In each task, the dictators determine how to allocate their endowment between their own and their recipients' payoffs. More specially, the dictators endow 100 points and their own payoffs are $100 - x$ and the recipients' payoffs are determined by the rule in each task which is dependent on the amount x chosen by the dictators. The payoffs for the dictators are certain for all tasks, but the recipients are risky in two of three tasks. We summarize the tasks in the following Table:

Task	Payoff for the Dictator	Payoff for the Recipient
T1	$100 - x$	x
T2	$100 - x$	The recipient receives 100 points with probability $x/100$, and nothing with

		probability $1-(x/100)$.
T3	$100-x$	The recipient receives either $2x$ points or nothing with equal probabilities.

The expected payoffs for the recipient is equal to x in all tasks, so that we can ignore the ex-ante comparisons.[2]

There is the obvious difference between T1 and other tasks, that is, the payoff for the recipient is certain in T1, but it is risky in T2 and T3. In addition to this difference, there is another difference in tasks, that is, social image differs in tasks. Social image is our desire to perceive positive images by others. There are many empirical evidences that we care social images, for example, Andreroni and Bernheim (2009). Thus, social image also influences the amount of a dictator's allocations in addition to a risky payoff for the recipient. As the result, we cannot identify that the difference of allocations in different tasks is caused by social image or risk preference or both? In our experiment, we overcome this issue by the very simple method that the recipient can confirm how many x in the box he draws. By this method, we can arrange social images equally in all tasks. Two groups are identified by the existence of social image or not. We summarize social image in each task and each group as the following:

Task	No Social Image	Social Image
T1	The recipient directly observes x. Social image	The recipient directly observes the number of xs. Social image
T2	The recipient cannot know how many x in the box. No social image	The recipient directly observes x before putting x in the box. Social image
T3	The dictator has an incentive for $x=0$ because she can hide her	The recipient directly observes x before putting x in the box.

[2] As in BLO, the ex-ante comparison is based on $u(Ec^1, Ec^2)$ in the general form.

	choices. The recipient can infer x when he gets $2x$. Mixed social image	Social image

In this preparation, we can construct three following hypotheses. We denote x_i^j which is task $i = 1,2,3$ and group $j = NoSI, SI$.

Hypothesis 1: If the dictator is risk neutral for comparisons, $x_1^{SI} = x_3^{SI} \geq x_2^{SI}$.

Hypothesis 2: If social image exists, $x_2^{SI} > x_2^{NoSI}$ and more dictators in no social images chooses zero in T3 compared with social groups.[3]

Hypothesis 3: $x_1^{SI} = x_1^{NoSI}$.

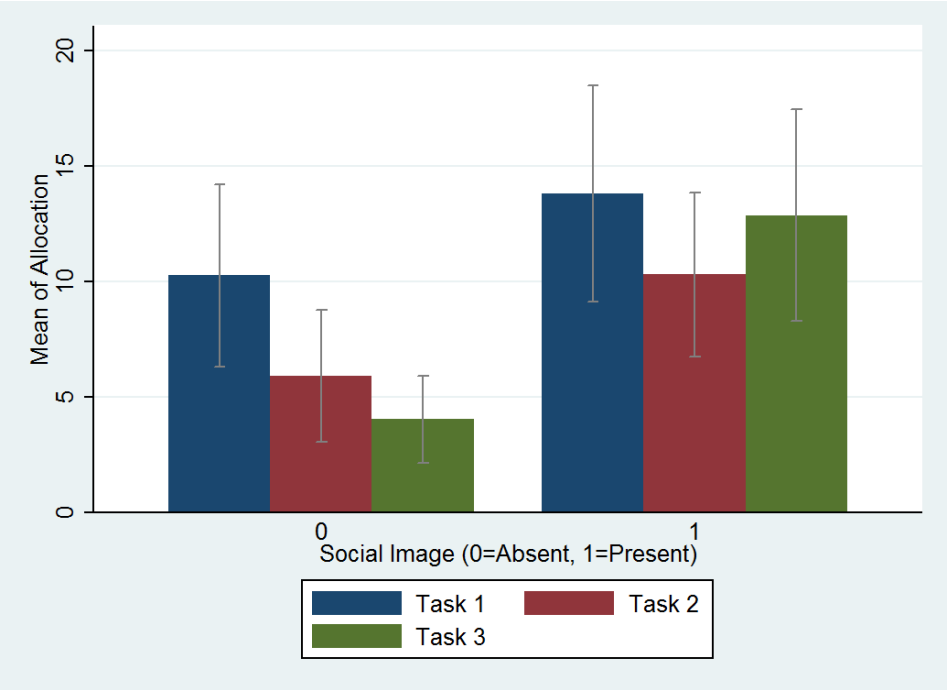
3. Results

The average token given in task 1, task 2, task 3 in No Social Image treatment is x_1^{NoSI} =10.26, x_2^{NoSI} =5.91 and x_3^{NoSI} =4.04, respectively. The average token given in task 1, task 2 and task 3 in Social Image treatment are x_1^{SI} =13.79, x_2^{SI} =10.30 and x_3^{SI} =12.86, respectively. The following graph shows the average token given in every task in two treatments with 95% confidence interval.

We investigate our experimental hypotheses by t-test. Firstly, x_1^{SI} is not significantly different from x_3^{SI} (t-test, p-value= 0.7802). Therefore the first half inequality in Hypothesis 1 is supported. However, the difference between x_1^{SI} and x_2^{SI} is not significant (t-test, p value=0.2436), and the difference between x_2^{SI} and x_3^{SI} is also not significant (t-test, p-value=0.3853). These indicate that the latter half equation in Hypothesis 1 is not supported. As the reuslt, Hypothesis 1 is weakly supported. Holding $x_1^{SI} = x_3^{SI}$ indicates that the assumption of risk neutrality of a dictator on the risk of a recipient and social preference consisting of linear combination of own payoff and ex-post fairness are justifiable. On the other hand, not holding $x_1^{SI}(x_3^{SI}) > x_2^{SI}$ indicates that formulation by Fehr and Shmidt Utility function on ex-post fairness

[3] At the task 3 in No Social Image treatment, the dictator can fully hide their true fairness preference by choosing $x = 0$.

cannot fully describe the behavior of dictators in the tasks.



Secondly, x_2^{SI} is significantly higher than x_2^{NoSI}(t-test, p-value=0.0615). It indicates the social image promotes allocation in Task 2. And the frequency of no allocation in Task 3 are 0.667 and 0.456 in No Social Image treatment and in Social Image treatment, respectively. The former is significantly higher than the latter ($\chi^2 = 4.984$, p-value=0.026). Therefore Hypothesis 2 is supported.

Finally, x_1^{SI} is not significantly different from x_1^{NoSI} (t-test, p-value=0.2609). Therefore Hypothesis 3 is supported.

References

- Andreoni, J., and Bernheim, B. D. (2009). Social image and the 50–50 norm. EMCA, 77(5), 1607-1636.
- Brock, J. M., Lange, A., and Ozbay, E. Y. (2013). Dictating the risk. AER 103(1), 415-437.
- Fehr, E. and Schmidt, K. M. (1999). A theory of fairness, QJE 114(3), 817-868.
- Holt, C. A. and Laury, S. K. (2002). Risk aversion and incentive effect. AER 92(5), 1644-1655.
- Krawczyk, M., and Lec, F. L. (2016). Dictating the risk: comment. AER, 106(3), 836-839.