Economics Bulletin

Volume 36, Issue 2

The Impact of Random Help on the Dynamics of Indirect Reciprocity

Charlotte Klempt
Institut for Applied Economic Research

Abstract

The experiment examines cooperation via indirect reciprocity if chance determines the outcome of help. The results show that reputation has a smaller impact on cooperation with as without chance. Further, donors reciprocate a good reputation not a beneficial outcome.

I am grateful to the Max Planck Society for financial support through the IMPRS Uncertainty. A large part of this paper has been written at the Max Planck Institute of Economics in Jena.
Citation: Charlotte Klempt, (2016) "The Impact of Random Help on the Dynamics of Indirect Reciprocity", *Economics Bulletin*, Volume 36, Issue 2, pages 1058-1063
Contact: Charlotte Klempt - charlotte.klempt@iaw.edu.
Submitted: July 22, 2015. **Published:** June 11, 2016.

1 Introduction

Indirect reciprocity is a form of cooperation where a player receives a return from his partner for providing a friendly act to a third party. Reputation ensures that subjects can discriminate cooperative persons from free riders and direct rewards to those who cooperated.

Nowak and Sigmund (1998a,b)'s model shows that indirect reciprocity provides a basis for the evolution of cooperation among strangers. Experimental studies as well support the existence of indirect reciprocity and reputation building (Wedekind and Milinski, 2000; Bolton et al., 2005a; Seinen and Schram, 2006; Engelmann and Fischbacher, 2009). These experiments confirm that subjects indeed rather direct rewards to those subject with a good reputation and form a good reputation in order to gain from indirect reciprocal back-givings themselves.

In these experiments, a friendly act to a third party that leads to a good reputation involves a definite monetary transfer. However, one may consider a situation where chance defines whether a friendly act implies a beneficial outcome or not.

The experiment implements a "repeated helping game" (see e.g. Wedekind and Milinski, 2000) where a donor can provide help to his partner in each round. In the game, donors and receivers switch roles in different rounds and the donor receives information about the receiver's last decision when he was a donor. We compare a situation where a chance move determines whether the the donor's helping decision yields a reward for the receiver or not to a situation where the donor's help surely leads to a reward. Further, in different treatment, we provide information about the partner's reputation or not.

With the help of the experimental design, we want to test whether random help is as effective in inducing indirect reciprocal rewarding and therefore in enhancing cooperation as sure help. Former experiments report that cooperative decision are greatly affected by the procedural fairness of outcomes(Bolton et al., 2005b; Becker and Miller, 2009; Krawczyk and LeLec, 2010). These experiments suggest that not a purely consequentialist but also not a purely procedural model of social preferences can account for the behavior of subjects. Therefore, an act implying a fair allocation may be considered as more helpful than an act implying a fair procedure leading to the former fostering indirect reciprocal back-givings.

Further, we want to explore whether subjects only reciprocate a partner's good reputation and disregard whether a good reputation also involves a beneficial outcome for the third party. Here, we as well want to compare findings to those in studies on direct reciprocity where both the actual monetary outcome of decisions and the player's underlying intentions have been proven to affect reciprocal back-givings (Charness and Rabin, 2002).

Here, the present studies reports two main findings: First, in indirect reciprocal behavior regards fair procedures not as helpful as fair allocations. Sure help induces higher back-givings than random help. Reputational information that lead to a sure outcome has a stronger effect on cooperation than reputational information that lead to a random outcome. Secondly, we find that subjects reciprocate the recipient's good reputation; they disregard whether a good reputation also involved a beneficial outcome for the third party or not. This contrasts with direct reciprocal behavior.

Table I: Treatment overview

Treatment	Sessions	n	Cost c for donor	Benefit b for recipient	Probability p of helping	Image score available?
RiskyInfo	2	64	-12	30	0.5	yes
SureInfo	1	32	-6	15	1	yes
RiskyNoInfo	1	32	-12	30	0.5	no
SureNoInfo	1	32	-6	15	1	no
RiskyInfoControl	1	32	-12	20	0.5	yes
SureInfoControl	1	30	-12	30	1	yes

2 Experimental design

The design of the experiment is based on Wedekind and Milinski (2000)'s helping game and manipulates one important factor: the likeliness that a helping decision actually leads to a beneficial outcome.

In the game, subjects are matched in pairs consisting of one donor and one recipient for each of the 14 rounds. No pair is matched together more than once and subjects will rotate roles between rounds.

In any given round, the donor chooses between either helping the recipient or playing keep. In case the donor chooses to help, with probability p he pays a cost c and the recipient receives a benefit b; with probability 1-p, both individuals receive 0. In case the donor chooses to keep, both individuals certainly receive 0. In treatments we vary p with p equal to $p_1 = 1$ or $p_2 = 0.5$ respectively.

Before donors make their choice, they will be informed about the recipient's image score: his decision of the previous round when the recipient had been a donor. They will learn about both: the recipient's choice to 'help' or 'keep' and the actual gain of the former recipient b or 0. Hereafter, we will label these treatments *SureInfo* when help is forwarded for sure and *RiskyInfo* when help is only provided in half of the cases.

In two additional treatments *SureNoInfo* and *RiskyNoInfo*, we do not provide information about the recipient's previous action.

The experiment was conducted in the experimental laboratory of the Max Planck Institute of Economics in Jena, Germany. Subjects were students from the University of Jena, and were recruited via ORSEE (Greiner (2003)).

Subjects were randomly and anonymously paired, and their identities were never revealed to one another. Table I outlines the treatments with respect to their number of participants, payoff values, and availability of image scores. Apart from the treatments described above, we ran two control treatments *SureInfoControl* and *RiskyInfoControl*. *RiskyInfoControl*, the first session, used slightly lower payoffs. We run *SureInfoControl* to test whether differences in cooperation rates in *SureInfo* and *RiskyInfo* are due to the risky as opposed to save decisions or due to different payoff consequences in both treatments. As behavior in treatments *SureInfo* and *SureInfoControl* as well as *RiskyInfo* and *RiskyInfoControl* do not exhibit substantial differences (see regression (iv) and (v) in appendix A), we merge the data and will refer to these as treatments *SureInfo(C)* and *RiskyInfo(C)*.

Each session was conducted with 30-32 subjects, for a total of 222 subjects. Upon entering

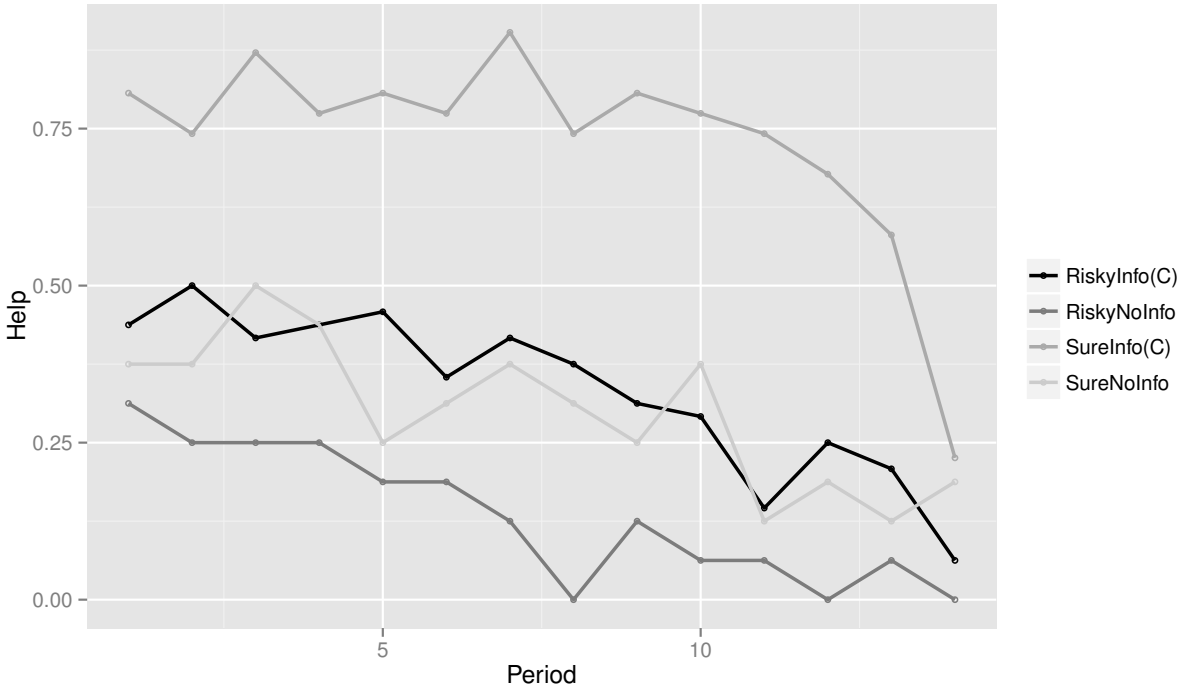

Figure 1: Average Help by Period separately for treatments *SureInfo(C)*, *RiskyInfo(C)*,*SureNoInfo*, and *RiskyNoInfo*.

the laboratory, subjects were randomly assigned to 32 visually isolated computer terminals. Instructions were distributed and read out loud. Questions were answered individually at the subjects' seats. Before the experiment, subjects filled out a short questionnaire testing comprehension of the rules.

Subjects received an endowment of 60 points. Each point earned in the experiment was exchanged for €0.1 and subjects earned on average €9.73. The experiment was programmed and conducted with z-Tree (Fischbacher (2007)).

3 Results

The results consist of three main findings:

Result 1: Reputational information enhances cooperation in the *Sure* and in the *Risky* treatment.

Firstly, the provision of the partner's image score significantly enhances cooperation in the *Sure* and in the *Risky* treatment (see 1 and regressions (i) in appendix A).

Further, subjects do discriminate their actions on the basis of their partner's image score. In the *SureInfo(C)* and in the *RiskyInfo(C)* treatment, donors help more often in case the recipient chose to give than keep the last time (see regression (ii) in appendix A).

Result 2: The cooperation enhancing effect of reputational information is stronger in the sure than in the risky treatment

Firstly, the provision of information on image scores has a stronger impact on cooperation in the *Sure* than in the *Risky* treatment (see regression (i) in appendix A). Further, subjects do discriminate their actions on the basis of their partner's image score to a larger extent in the *Sure* than in the *Risky* treatment (see regression (ii) in appendix A). This supports the idea that a fair allocation is considered to be more helpful as a fair procedure that leads to the same expected allocation.

As subjects in *SureInfoControl* and *SureInfo* exhibit the same helping behavior (see regression (v) in appendix A), we can exclude that different monetary consequences explain the drop in cooperation and further substantiate that most likely the fair procedure in *RiskyInfo* is considered to be a less kind act.

Result 3: Donors only base their reciprocal responses on recipient's reputation not on the actual outcome of the recipient's decision.

The helping rates in the *RiskyInfo(C)* treatment reveal that helping after failed and successful giving are not significantly different (see regression (iii) in appendix A). Hence, subjects do not consider the actual outcome of the recipient's decision. The subject's good reputation appears to be the only factor that induces reciprocal help.

In contrast, studies of direct reciprocal behavior regularly show that both outcomes and intentions matter for reciprocal rewarding (Charness and Rabin, 2002). The desire to achieve equality in payoffs between the reciprocator and his opponent might drive direct reciprocation (Fehr and Schmidt, 1999). As inequity concerns do not apply here, donors might only respond to reputations but not outcomes.

4 Final remarks

The results show that if a chance move determines the outcome of help the cooperation enhancing effects of reputational information still exist but are lower. Further, indirect reciprocity only responds to good reputations and does not take into account whether a good reputation also yielded positive gains for the third party.

A Appendix: Regressions

The rows (i) to (v) in table II show logistic regressions with random effects for each subject. The regressions (ii) to (v) only use part of the data as indicated in line "Data". All regressions analyze the impact of distinct dummy variables on the probability to play give. Dummy variable "Sure" denotes that no chance move determines the outcome of help. Dummy variable "Info" implies that subjects received information about the recipient's last action. The dummy variables "Help Last Round" and "Keep Last Round" impliy that the recipient played give/keep the last round when he was a donor. The dummy variable "Help Failed Last Round" indicates that the recipient played give the last round when he was a donor

but no transfer was achieved. The dummy variables "Info × Sure" and "Help Last Round × Sure" examine the interaction effect of both variables. Dummy variables "RiskyInfoControl" and "SureInfoControl" represent both control treatments.

Table II: Random-effects logit model for help choices in all treatments.

	(i)	(ii)	(iii)	(iv)	(v)
Sure	1.66**	0.95***			
	(0.74)	(0.25)			
Info	1.95***				
	(0.62)				
Info × Sure	1.42*				
	(0.86)				
Help Last Round		0.95***			
		(0.25)			
Help Last Round × Sure		0.81*			
		(0.44)			
Help Failed Last Round			0.13		
			(0.40)		
Keep Last Round			-0.89***		
			(0.34)		
RiskyInfoControl				-0.02	
				(0.58)	
SureInfoControl					-0.38
					(0.58)
const	-3.37***	-1.81***	-0.96**	-1.41***	1.74***
	(0.56)	(0.29)	(0.39)	(0.34)	(0.41)
N	1554	1027	624	672	434
log likelihood	-707.3	-491.7	-308.6	-336.5	-205.1
Data [a]	All	Info	RiskyInfo(C)	RiskyInfo(C)	SureInfo(C)

[a] Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.1.

References

Becker, A. and Miller, L. (2009). "Promoting justice by treating people unequally: an experimental study"' *Experimental Economics*, 12.

Bolton, G., Katok, E., and Ockenfels, A. (2005a). "Cooperation among strangers with limited information about reputation" *Journal of Public Economics*, 89(8):1457–1468.

Bolton, G. E., Brandts, J., and Ockenfels, A. (2005b). "Fair procedures: Evidence from games involving lotteries" *The Economic Journal*, 115(506):1054–1076.

Charness, G. and Rabin, M. (2002). "Understanding Social Preferences with Simple Tests" *Quarterly journal of Economics*, 117(3):817–869.

Engelmann, D. and Fischbacher, U. (2009). "Indirect reciprocity and strategic reputation building in an experimental helping game" *Games and Economic Behavior*, 67(2):399–407.

Fehr, E. and Schmidt, K. (1999). "A theory of fairness, competition, and cooperation" *Quarterly journal of Economics*, 114(3):817–868.

Fischbacher, U. (2007). "z-Tree: Zurich toolbox for ready-made economic experiments" *Experimental Economics*, 10(2):171–178.

Greiner, B. (2003). "An Online Recruitment System for Economic Experiments" *Forschung und wissenschaftliches Rechnen*, pages 79–93.

Krawczyk, M. and LeLec, F. (2010). "Give me a chance! an experiment in social decision under risk" *Experimental Economics*, 13:500–511.

Nowak, M. and Sigmund, K. (1998a). "Evolution of indirect reciprocity by image scoring" *Nature*, 393:573–577.

Nowak, M. and Sigmund, K. (1998b). "The dynamics of indirect reciprocity" *Journal of Theoretical Biology*, 194(4):561–574.

Seinen, I. and Schram, A. (2006). "Social status and group norms: Indirect reciprocity in a repeated helping experiment" *European Economic Review*, 50(3):581–602.

Wedekind, C. and Milinski, M. (2000). "Cooperation through image scoring in humans" *Science*, 288(5467):850.