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Abigail Barr, Trudy Owens and Ashira Perera

May 2017

Risk taking and sharing when risk exposure is interdependent

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Suzanne Robey
Centre for Decision Research and Experimental Economics
School of Economics
University of Nottingham
University Park
Nottingham
NG7 2RD
Tel: +44 (0)115 95 14763
Fax: +44 (0) 115 95 14159
suzanne.robey@nottingham.ac.uk

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Risk taking and sharing when risk exposure is interdependent

Abigail Barr*, Trudy Owens* and Ashira Perera*

30 May 2017

Abstract

Using a specially designed experiment, we investigate whether and how interdependence in risk exposure i.e., risk taking by some members of a potential risk sharing group affecting not only their own but also their co-members risk exposure, affects both risk taking and *ex post* sharing. The experimental subjects were Sri Lankan small-holders who face interdependent risk and share when neighbors fall on hard times in everyday life. We find that the Sri Lankan farmers reward socially responsible risk taking and, under some circumstances, punish socially irresponsible risk taking. Their behaviour is consistent with socially responsible risk taking being cost dependent, although, here, the statistical evidence is inconclusive. Finally, social responsibility in risk taking and *ex post* sharing do not appear to be substitutes, rather, they appear to be co-determined.

Keywords: behavioural experiment; risk-sharing; solidarity.

JEL Classifications: C93, D81, O12.

* University of Nottingham.

Please address all correspondence to: ashira.perera@gmail.com

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1. Introduction

Levels of environmental risk are increasing across many locations worldwide (IPCC, 2014). Poor farmers in developing countries are particularly vulnerable to these increases (Baettig et al, 2007; Füssel, 2010; World Bank, 2010; Sherbinin, 2014; Rosenzweig, 2014). While efforts are being made to make micro insurance available to these farmers, it will take time to bring access to such products to scale and, in trials, take-up has been very low (Cole et al, 2012; Greatrex et al, 2015; Platteau et al, 2017). The traditional form of risk pooling, involving *ex post* transfers from "lucky" to "unlucky" people within small communities and kinship networks, is still heavily relied upon as a coping mechanism and is likely to remain so for some time (Udry, 1994; Fafchamps and Lund, 2003; Takasaki *et al.*, 2004; Bulte and Rondeau, 2007; Bramoullé and Kranton, 2007; Porter, 2012; Platteau et al, 2017). This being the case, we need to ensure that interventions designed to help poor farmers mitigate risk do not undermine this form of risk pooling and, to do this, we need a thorough understanding of how it works.

We know that this traditional form of risk pooling is an effective mechanism for smoothing consumption when risk is idiosyncratic, but fails when risk is co-variate within the risk pooling group (Townsend, 1994; Dercon, 2002; Fafchamps, 2011; Barrett, 2011; de Janvry *et al.*, 2014; Sawada et al, 2017). However, little is known about how risk taking by pooling group members impacts on *ex post* transfers. And even less is known about how interdependence in risk exposure, i.e., risk taking by some members affecting not only their own but also their co-members risk exposure, impacts on either the risk taking itself or *ex post* transfers. In this paper, we take a first step towards filling this gap in our knowledge by engaging Sri Lankan small-scale farmers in a novel lab-type behavioural experiment.

In behavioural experiments involving students, risk taking by or for groups compared to by individuals for only themselves, tends to be more conservative, i.e., consistent with higher levels of risk aversion, especially in high risk situations (Baker et al, 2008; Shupp and Williams, 2008; Reynolds et al, 2009; Masclet et al, 2009, Bolton et al, 2015). Bolton et al (2015) found that this was owing to risk takers assuming a degree of "social responsibility" rather than because they were endeavouring to take the preferences of other group members into account. However, in these experiments the possibility of *ex post* redistribution was excluded by design.

The literature on experiments involving opportunities for *ex post* redistribution of gamble outcomes started with Selten and Okenfels (1998). In their solidarity game each of three players faced a 2/3 probability of receiving a positive sum of money and had to decide, prior to outcomes being realised, how much they would give to one or each of two losers in the event they (the decision-maker) wins. The majority of their student subjects were willing to give substantial amounts. More recently, Cappelen *et al.* (2013) conducted an experiment to investigate whether subjects' (again students) redistributive decisions depend on whether inequality emerges as a consequence of choice or luck. Their student subjects redistributed more in the direction of equality when subjects made the same risk taking choice, i.e., when inequalities were owing to luck alone. This finding is directly relevant to the issue of how risk taking by pooling group members impacts on *ex post* transfers, although Cappelen *et al's* (2013) subjects are not poor farmers in a developing country.

In a related line of research, Zizzo and Oswald (2001), Zizzo (2003, 2004) and Kebede and Zizzo (2015) allowed subjects to choose how much to invest in high return but risky prospect and, following the realisation of investment outcomes, at a cost to themselves, burn other subjects' money. The study by Kebede and Zizzo (2015) is particularly relevant because their

subjects were small-scale farmers in Ethiopia. The farmers' burned a lot of money and their burning decisions were consistent with inequality aversion, more specifically, envy. Further, in villages where there was more money burning there was less agricultural innovation in everyday life. These experiments relate, albeit indirectly, to the issue of how risk taking by pooling group members impacts on *ex post* transfers. However, by design, they exclude both helping via positive transfers and the possibility of interdependence in risk exposure.

To our knowledge, only one experiment has been conducted with the stated objective of investigating how individual risk taking impacts on risk pooling. Cettolin and Tausch's (2015) experiment involved a game in which two players either chose or were assigned gambles and then one, having been informed of their co-player's gamble choice but prior to the realisation of the gamble outcomes, had to decide what proportion of their earnings should be pooled and shared equally. They found that risk averse subjects prefer not to *ex ante* pool with high risk takers. However, the focus of this experiment was on *ex ante* rather than *ex post* risk pooling.

Our experimental design is most closely related to those of Cappelen *et al.* (2013) and Bolton *et al.* (2015). The principal distinguishing feature of our experiment compared to Cappelen *et al's* (2013) is that, in common with Bolton *et al.* (2015), we include treatments in which some players' levels of risk exposure are owing to the risk taking choices made by other players, i.e., risk exposure is interdependent. And in our analysis we focus on whether and how this interdependence affects both risk taking and *ex post* redistribution, i.e., sharing. Especially when thinking about efforts by small-scale farmers to mitigate environmental risks and interventions by development agencies to support those efforts, interdependence in risk exposure looms large. Consider, for example, one farmer improving his flood defences and, thereby, increasing the flood risk to another farmer nearby. Or one farmer strengthening his

defences against landslips and, thereby, reducing the risk to his neighbour just down the hill. We need to know how such interdependencies impact on both risk taking and ex post sharing behaviour so that we can ensure that the support offered to farmers is optimally designed.

We endeavour to answer four questions: Is socially responsible risk taking rewarded? Is socially irresponsible risk taking punished? Is social responsibility in risk taking cost-dependent? and Are social responsibility in risk taking and *ex post* sharing substitutes? It is reasonable to expect that socially responsible behaviour will be rewarded or, at least, not punished. Within the context we are interested in, this would translate into a farmer who is exposed to less (more) risk owing to the risk taking decisions of another farmer being more (less) inclined to help that other farmer in the event that he (the other farmer) is unlucky. If this is what we observe, there is a case for promoting socially responsible risk taking. Our interdependent risk exposure treatments combined with a treatment in which risk exposure is randomly allocated allow us to investigate this. In the presence of interdependence in risk exposure, socially responsible risk takers might have to choose levels of risk exposure for themselves that are not directly consistent with their own risk preferences. Thus, socially responsible risk taking is costly and that cost will depend on the nature of the interdependence and decision makers' level of risk aversion. Gaining an understanding of whether and how such costs impact on decision-making will inform the design of interventions aimed at promoting socially responsible risk taking. Our interdependent risk exposure treatments combined with a treatment in which subjects choose their own risk exposure but there is no interdependence allow us to investigate this. Finally, socially responsible risk taking and sharing are both positively other regarding behaviours and, this being the case, they may be substitutes. Alternatively, but for the same reasons, they may be co-determined. Which of these is the case, has important implications for the possible effects

of interventions aimed at promoting socially responsible risk taking on the efficacy of traditional risk pooling as a mechanism for coping with environmental risk.

We find that the Sri Lankan farmers in our sample reward socially responsible risk taking and, under some circumstances, punish socially irresponsible risk taking. Their behaviour in the experiment is consistent with socially responsible risk taking being cost dependent. However, here, the statistical evidence is inconclusive. Finally, social responsibility in risk taking and *ex post* sharing do not appear to be substitutes, rather, they appear to be co-determined.

The remainder of the paper is organised as follows: Section 2 presents our experimental design; Section 3 describes our conceptual framework and sets out predictions relating to each of our research questions; Section 4 presents our results; and, finally, Section 5 concludes.

2. Experimental design

2.1 The Risk-and-sharing game

The RSG is played in pairs. At the start of the game each player chooses or is assigned either the safer or the riskier of two gambles. Each gamble yields a high payoff with probability 0.5 and a low payoff with probability 0.5. The payoff from the gamble assigned to or chosen by a subject is determined by playing a which-hand-is-it-in game that involves the subject guessing which of the researcher's hands contains a blue rather than a yellow counter. If the player finds the blue counter, she receives the high payoff. If she finds the yellow counter, she receives the low payoff. Table 1 presents the two gambles, their expected values, and standard deviations.[1]

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[1] The visual aid used to explain the gambles to the participants is presented in Figure A1 in the Appendix.

Table 1: Risk and sharing game gambles

Gamble	Low payoff (Rs.)	High payoff (Rs.)	Expected value (Rs.)	Standard deviation (Rs.)
Safer	360	760	560	200
Riskier	80	1520	800	720

Under the baseline treatment half of the players are randomly assigned the safer gamble and half the riskier gamble. Below, this treatment is referred to as *RAND*. Prior to realising the outcomes of their gambles, each player is presented with the set of scenarios within which she is richer than her co-player once both of their gamble outcomes have been realised. For each scenario, each player must decide whether to "share", i.e., redistribute so as to equalise earnings from the game, or "leave" the payoffs as they are. All the possible scenarios that players may face are set out in Table 2. If a player is assigned the safer gamble, she must decide whether to share or leave in Scenarios 1, 2, and 3. If a player is assigned the riskier gamble she must decide whether to share or leave in Scenarios 4, 5 and 6.

Table 2: RSG sharing scenarios

Scenario	Own gamble payoff from gamble	Co-player's gamble payoff
1	High from safer gamble (Rs.760)	Low from safer gamble (Rs.360)
2	High from safer gamble (Rs.760)	Low from riskier gamble (Rs.80)
3	Low from safer gamble (Rs.360)	Low from riskier gamble (Rs.80)
4	High from riskier gamble (Rs.1520)	High from safer gamble (Rs.760)
5	High from riskier gamble (Rs.1520)	Low from safer gamble (Rs.360)
6	High from riskier gamble (Rs.1520)	Low from riskier gamble (Rs.80)

Once all decisions have been made, the gambles are played out. Then, if the players' gamble payoffs are unequal, the prior share-or-leave decision of the player with the higher payoff in the relevant scenario is used to determine both players' final earnings from the game. If the players' gamble payoffs are the same, their final earnings from the game equal those gamble payoffs. Subjects are talked through the entire game before making any decisions.

Under the *CHOS* treatment (also used as a baseline in some analyses) the game is the same except that each player chooses either the safer or the riskier gamble. If a player chooses the safer gamble, she must decide whether to share or leave in Scenarios 1, 2, and 3. If a player chooses the riskier gamble, she must decide whether to share or leave in Scenarios 4, 5 and 6.

Interdependence in risk exposure is introduced in two further treatments, the *IDSG* and *IDDG* treatments. The *IDSG* treatment consists of two sub-treatments: *IDSG chooser* and *IDSG chosen-for*. In *IDSG* sessions, players are randomly assigned to either the *IDSG chooser* or the *IDSG chosen-for* sub-treatment and each playing pair is made up of one *chooser* and one *chosen-for* player. An *IDSG chooser* must choose either the safer or the riskier gamble for herself *and* her co-player. If an *IDSG chooser* chooses the safer gamble for both players, she must also decide whether to share or leave in the event that Scenario 1, where her gamble payoff is greater than her co-player's, arises. If an *IDSG chooser* chooses the riskier gamble for both players, she must also decide whether to share or leave in the event that Scenario 6 arises. An *IDSG chosen-for* player must decide whether to share or leave under Scenario 1, in which she ends up the richer after her co-player chooses the safer gamble for both, and Scenario 6, in which she ends up the richer after her co-player chooses the riskier gamble for both.

The *IDDG* treatment also consists of two sub-treatments: *IDDG chooser* and *IDDG chosen-for*. In *IDDG* sessions, players are randomly assigned to either the *IDDG chooser* or the *IDDG chosen-for* sub-treatment and each playing pair is made up of one *chooser* and one *chosen-for* player. An *IDDG chooser* must choose either the safer or the riskier gamble for herself in the knowledge that her co-player will face the residual gamble, i.e., if an *IDDG chooser* chooses the safer (riskier) gamble for herself, her co-player will face the riskier (safer) gamble. If an *IDDG chooser* chooses the safer gamble for herself, she must decide whether to share or leave

in Scenarios 2 and 3. If an *IDDG chooser* chooses the riskier gamble for herself, she must decide whether to share or leave in Scenarios 4 and 5. An *IDDG chosen-for* player must decide whether to share or leave under Scenarios 2 and 3, in which she ends up the richer after her co-player chooses the riskier gamble for herself and thereby the safer gamble for the *chosen-for* player, and Scenarios 4 and 5, in which she ends up the richer after her co-player chooses the safer gamble for herself and thereby the riskier gamble for the *chosen-for* player.

Each participant played the RSG once under one of the treatments. Treatments were assigned at the session level (more on this below). Participants were randomly paired within sessions. Each knew that they were paired with a fellow villager attending the same session, but would never know the identity of their co-player.

2.2 The Gamble Choice Task

To generate a measure of each subject's level of risk aversion, immediately prior to the RSG, the subjects undertook a Binswanger-type (1980) gamble choice (GC) task. Each had to choose one out of six gambles. Every gamble yielded either a high or low payoff, each with probability 0.5. The payoff from the chosen gamble was determined by playing the which-hand-is-it-in game described above. Table 3 presents the six gambles, their expected values, standard deviations and the Cole *et al*. (2013) measure of risk aversion associated with each choice.[2] The Cole *et al*. (2013) measure of risk aversion captures the maximum rate at which the gamble chooser is willing to accept additional risk (standard deviation) in return for a higher expected value. It is constructed as follows: the measure is set equal to one if the least risky option (Gamble A) is chosen; then, for each of the other gamble choices it equals the expected value

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[2] The visual aid used to explain the gambles to the participants is presented in Figure A2 in the Appendix.

of that gamble minus the expected value of the consecutive and safer gamble in the series divided by the difference in standard deviation between the same two gambles.

Table 3: Gamble Choice Task Choices

Gamble	Low payoff (Rs.)	High payoff (Rs.)	Expected value (Rs.)	Standard deviation (Rs.)	Cole *et al.* (2013) measure of risk aversion
A	200	200	200	0	1.00
B	180	380	280	100	0.80
C	160	480	320	160	0.67
D	120	600	360	240	0.50
E	40	760	400	360	0.33
F	0	800	400	400	0.00

2.3 Participants and treatment assignments

The experiment was conducted in 16 villages in Wellawaya district, Sri Lanka.[3] The small-holder farmers rely heavily on the traditional form of risk pooling described above and, to varying degrees, they are exposed to the Human-Elephant Conflict, an environmental risk which is interdependent in nature. The decision of one farmer to mitigate against elephant-related crop damage, e.g. by keeping watch, sounding horns and igniting firecrackers or by installing an electric fence, has direct consequences on the risk exposure of and outcomes for neighbouring farmers.

In each village, 32 household heads were randomly sampled from the 2012/13 Electoral Register. Each of these household heads was invited to participate in a one-day workshop to be

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[3] Falk et al. (2015) found that, in general, Sri Lankans exhibit high levels of positive reciprocity and altruism, but fairly low levels of negative reciprocity, compared to the global average.

conducted in their village. Where the household head was unable to attend, the next most important decision-maker in the family was invited to participate.

Table 4: Subject characteristics, including risk aversions, by RSG Treatments and Sub-Treatments

Treatment	*ALL*	*RAND*	*CHOS*	*IDSG*		*IDDG*	
				chooser	*chosen-for*	*chooser*	*chosen-for*
Age	44.27[a]	40.48[b]	46.10	44.97	43.34	45.51	45.38[c]
	(13.76)	(12.67)	(12.42)	(14.64)	(14.50)	(13.31)	(13.62)
Female	0.67	0.71	0.62	0.60	0.71	0.74	0.64
	(0.47)	(0.45)	(0.49)	(0.49)	(0.46)	(0.44)	(0.48)
Education	8.84[c]	8.45	8.85	8.47[c]	9.25	8.82	9.22
(years)	(3.70)	(3.85)	(3.58)	(3.97)	(3.81)	(3.57)	(3.83)
H'hold income	209	204	220	198	194	232	209
(p.a. Rs.'000s)	(260)	(303)	(239)	(235)	(272)	(275)	(236)
Risk aversion	0.53	0.56	0.55	0.51	0.51	0.51	0.55
(Cole et al,)	(0.25)	(0.27)	(0.23)	(0.24)	(0.27)	(0.27)	(0.23)
Gamble Choice distributions:							
Gamble A	0.08	0.11	0.05	0.06	0.11	0.07	0.08
Gamble B	0.10	0.15	0.11	0.06	0.05	0.12	0.13
Gamble C	0.17	0.15	0.25	0.18	0.10	0.18	0.15
Gamble D	0.46	0.39	0.46	0.44	0.52	0.45	0.50
Gamble E	0.08	0.08	0.04	0.14	0.10	0.05	0.08
Gamble F	0.10	0.11	0.09	0.10	0.12	0.15	0.08
Subjects	467	84	79	77	73	74	80

Notes: Means and standard deviations (in parentheses) presented; [a] three missing values; [b] two missing values; [c] one missing value;; differences between the numbers of *choosers* and the numbers of *chosen-fors* in the *IDSG* and *IDDG* treatments are owing to the sub-treatment assignment by badge picking combined with no-shows.

Each village workshop was made up of two experimental sessions and two survey-completing sessions. Each invited subject participated in one experimental session and one survey-completing session. We conducted 6 sessions under *RAND*, 6 sessions under *CHOS*, 10 under *IDSG* and 10 under *IDDG*. RSG treatments were assigned at the session level with different

treatments assigned to the two sessions in any one village with the aim of ensuring balance across treatments with regard to village characteristics and time of day.

The aim was to have 16 subjects in each of the 32 experimental sessions, so 512 subjects in total. However, 45 household heads neither showed up for their workshops nor sent other household members in their stead. So, 467 subjects ultimately participated in the experiments.

On arrival at a workshop, each subject randomly picked a badge. Half of the badges were labelled "AM session" and, half "PM session", and each badge also bore an ID number. Prior to each session, ID numbers were randomly matched into RSG playing pairs and, in the *IDSG* and *IDDG* treatments, randomly assigned to roles. Thus, the badge a subject picked determined his or her experimental session, and hence RSG treatment, playing pair in the RSG and, in the *IDSG* and *IDDG* treatments, RSG role.

Table 4 presents a summary of the subjects' characteristics, including their levels of risk aversion. Sixty-seven percent of the subjects were female and the average subject was just over 44 years in age and had just under 9 years of education and an annual household income of approximately 209 thousand Rupees. The average subject's level of risk aversion according to the Cole et al (2013) measure derived from their GC gamble choices was 0.53. According to linear regressions taking each of the variables, age, female, education, household income, and risk aversion as the dependent variable and treatment assignment indicators as the explanatory variables, the treatment assignment was balanced. A chi-squared test indicates that GC choices were also balanced across treatments.

2.4 Implementation

During each village workshop, "AM session" subjects participated in the experiment in the morning and the survey in the afternoon. The "PM session" subjects did the opposite. AM and PM subjects were not allowed to interact at any point during a workshop and no communication between subjects was allowed within each experimental session.

The experiments proceeded as follows. First, a research assistant described the GC task to all of the subjects in a session in Sinhala, the local language, following a pre-written script and using visual aids.[4] Then, each player met with a research assistant in private and chose one of the six gambles. Once a player had made his or her gamble choice, he or she returned to the main seating area. Then, one of the research assistants described the RSG to all the participants in the session. Again, a pre-written script in Sinhala and a set of visual aids was used.[5] Next, each player met with a research assistant in private, the research assistant described the RSG again and the subject made his or her RSG gamble choice, if appropriate given their treatment assignment, and their share-or-leave decisions in each of the relevant, given the treatment and his or her gamble choice, scenarios. The subject then returned to the main seating area.

Outcomes were realised at the end of the day upon completion of both experimental sessions in the village.[6] Mean earnings from the GC and RSG were Rs.341 and Rs.675 respectively.[7] In addition to their earnings from the GC and RSG, subjects were paid their earnings from a public goods game and a show-up fee of Rs.250. They were also given lunch and refreshments.

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[4] Scripts available from authors. See Table A2 for the visual aid.
[5] Scripts and visual aids available from authors.
[6] If a subject's assigned RSG co-player was a no-show, his or her payoff was calculated "as if" the co-player had made the modal choices given the treatment.
[7] These amounts correspond to just under half a day's farm labour wage and just under a full day's farm labour wage for a male farm labourer, respectively.

3. Conceptual framework and predictions

In this section we draw on the behavioural and experimental literature to derive predictions relating to each of our four research questions: Is socially responsible risk taking rewarded? Is socially irresponsible risk taking punished? Is social responsibility in risk taking cost-dependent? and Are social responsibility in risk taking and *ex post* sharing substitutes?

Before we can address these questions, we need to think about what socially responsible risk taking means within the context of the RSG. If socially responsible risk taking equates to minimising the risk exposure of others: under *IDSG*, a socially responsible *chooser* will choose the safer gamble for both her *chosen-for* co-player and herself; and under *IDDG*, a socially responsible *chooser* will choose the safer gamble for her *chosen-for* co-player and, hence, the riskier gamble for herself. However, if socially responsible risk taking equates to minimising the risk exposure of the group, i.e., the pair within the RSG, while under *IDSG*, the socially responsible *chooser* will, once again, choose the safer gamble for both, under *IDDG* the socially responsible *chooser* will be indifferent between her two risk taking options. This is because the two options are equivalent in terms of risk exposure to the pair; they vary only with respect to the distribution of risk exposure between the *chooser* and *chosen-for* player. Initially, we adopt minimising the risk exposure of others as our definition of socially responsible risk taking. However, at the end of this section, we revisit our predictions in the light of the other definition.

3.1 Is socially responsible risk taking rewarded? Is socially irresponsible risk taking punished?

 "Socially responsible" implies kind and/or in accordance with social norms or moral values and, thus, worthy of positive reciprocation or reward or, at least, not punishment (Bolton, G. and Ockenfels, 2000; Fehr et al. 2002; Cox, 2004, Dufwenberg and Kirchsteiger,2004; Falk

and Fischbacher, 2006; Bicchieri, 2006; Cox *et al*. 2007). Within the RSG, positive reciprocation or reward towards *choosers* can take only one form – a greater willingness on the part of the *chosen-for* to share in the event that they (the *chosen-for*) receive higher gamble payoffs than their *chooser* co-players. And punishment, also, can only take one form – a reduced willingness on the part of the *chosen-for* to share in the event that they (the *chosen-for*) receive higher gamble payoffs than their *chooser* co-players. To investigate whether socially responsible risk taking is rewarded or punished we can compare willingness to share in the *IDSG* and *IDDG* treatments, where the *chosen-for* players' risk exposure depends on the risk taking decisions of their *chooser* co-players, with willingness to share in the *RAND* treatment, where there is no interdependence in risk exposure.

All other things being equal, if socially responsible risk taking equates to minimising the risk exposure of others and is positively reciprocated or rewarded, while socially irresponsible risk taking is punished:

- Prediction 1.1: a *chosen-for* subject under *IDSG* or *IDDG* who faces the safer gamble owing to the decision made by her *chooser* co-player will be more likely to share compared to a subject who is assigned the safer gamble under *RAND*.

- Prediction 1.2: a *chosen-for* subject under *IDSG* or *IDDG* who faces the riskier gamble owing to the decision made by her *chooser* co-player will be less likely to share compared to a subject who is assigned the riskier gamble under *RAND*.

3.2 Is social responsibility in risk taking cost-dependent?

What socially responsible risk taking implies for the risk exposure of the *chooser* depends on her treatment assignment. In the *IDSG* treatment, a socially responsible *chooser* faces the safer gamble, while in the *IDDG* treatment, a socially responsible *chooser* faces the riskier gamble.

Thus, the cost to a *chooser* of acting in a socially responsible way depends on her treatment assignment and her own level of risk aversion. Social responsibility is relatively low-cost (high-cost) for risk averse *choosers* under *IDSG* (*IDDG*) and relatively low-cost (high-cost) for risk tolerant or neutral *choosers* under *IDDG* (*IDSG*). To find out whether social responsibility in risk taking is cost-dependent we can make use of our measure of risk aversion derived from the GC task in a comparison of risk taking under *IDSG*, *IDDG* and *CHOS*.

All other things being equal, if acting in a socially responsible way is cost-dependent:

- Prediction 2.1: a *chooser* will be more likely to choose the safer gamble for herself under *IDSG* compared to a subject under *CHOS*;

- Prediction 2.2: the difference in the likelihood of a subject choosing the safer gamble for herself between *IDSG* and *CHOS* will be increasing in risk aversion;

- Prediction 2.3: a *chooser* will be less likely to choose the safer gamble for herself under *IDDG* compared to a subject under *CHOS*; and

- Prediction 2.4: the difference in the likelihood of a subject choosing the safer gamble for herself between *IDDG* and *CHOS* will be decreasing in risk aversion.

3.3 Are social responsibility in risk taking and sharing substitutes?

Socially responsible risk taking and sharing are both positively other regarding behaviours and, this being the case, they may be substitutes. If they are substitutes, we should see a negative correlation between the two actions.

All other things being equal, if social responsibility in risk taking and sharing are substitutes:

- Prediction 3.1: under *IDSG* and *IDDG*, a *chooser* will be less likely to share if she chooses the safer gamble for her *chosen-for* co-player.

Of course, because socially responsible risk taking and sharing are both positively other regarding behaviours, they may be co-determined, in which case we would expect them to be positively correlated.

3.4 What if socially responsible risk taking equates to minimising the risk exposure of the group?

If we accept this alternative definition of socially responsible risk taking and if we assume that the only reason for *chosen-for* subjects' sharing behaviour to differ from that of subjects under *RAND* is because they wish to reward(punish) socially (ir)responsible risk takers, Predictions 1.1 and 1.2 will hold for the *IDSG-RAND* comparison but not for the *IDDG-RAND* comparison. Further, if we also assume that the only reason for *choosers*' behaviour to differ from that of subjects under *CHOS* is because they wish to be socially responsible and, possibly, be rewarded and/or avoid punishment as a consequence, Predictions 2.1 to 2.4 will hold for the *IDSG-CHOS* comparison but not for the *IDDG-CHOS* comparison.

Finally, note that, under the assumptions set out in the preceding paragraph, we may be able to use our data to establish what socially responsible risk taking means to Sri Lankan farmers.

4. Results

The upper panel of Table 5 presents the proportions of subjects exposed to the safer and riskier gambles under each of the RSG treatments. According to t-tests accounting for clustering at the session level, risk exposure varied markedly across treatments. Specifically, the proportion facing the safer gamble under *CHOS*, i.e., when they chose their exposure, was significantly

higher than the proportion under *RAND*, i.e., when risk exposure was randomly assigned ($p<0.01$). The proportions facing the safer gamble under *IDSG* was indistinguishable from both the proportion under *RAND* ($p=0.21$ for *choosers*, $p=0.28$ for *chosen-for*) and the proportion under *CHOS* ($p=0.35$ for *choosers* and *chosen-for*). The proportion of *IDDG choosers* facing the safer gamble was significantly higher than the proportion under *RAND* ($p<0.01$), but statistically indistinguishable from the proportion under *CHOS* ($p=0.32$). And finally, the proportion of *IDDG chosen-for* players facing the riskier gamble was significantly higher than the proportions under *RAND* ($p<0.01$) and *CHOS* ($p<0.01$).

Table 5: Risk exposure and sharing in the RSG

Treatment	*ALL*	*RAND*	*CHOS*	*IDSG*		*IDDG*	
				chooser	*chosen-for*	*chooser*	*chosen-for*
Risk exposure:							
Safer	0.53	0.48	0.62	0.56	0.55	0.68	0.32
Riskier	0.47	0.52	0.38	0.44	0.45	0.32	0.68
Obs. (subjects)	467	84	79	77	73	74	80
Sharing	0.70	0.71	0.64	0.73	0.81	0.66	0.71
Obs. (decisions)	947	252	237	77	73	148	160

Notes: proportions presented; mismatch in risk exposure between *choosers* and *chosen-for* players under *IDSG* is owing to the sub-treatment assignment by badge picking combined with no-shows.

From the upper panel of Table 5 we can infer that 56 percent of *choosers* choose the safer gamble for their *chosen-for* co-player under *IDSG* and a significantly lower 32 percent of *choosers* choose the safer gamble for their *chosen-for* co-player under *IDDG* ($p<0.01$).

The lower panel of Table 5 presents the proportions of share as opposed to leave decisions made under each of the RSG treatments. Overall, the proportion of share as opposed to leave decisions was 70 percent and variation across treatments was limited.[8] According to t-tests

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[8] Controlling for village fixed effects leaves this result unchanged.

accounting for clustering at the session level, only the difference in the proportion between *CHOS*, where the proportion was lowest, and *IDSG chosen-for*, where the proportion was highest, is significant (*p*=0.06).[9]

4.1 Is socially responsible risk taking rewarded? Is socially irresponsible risk taking punished?

To test predictions 1.1 and 1.2 we used the share-or-leave decisions made by subjects under *RAND* and *chosen-for* subjects under either *IDSG* or *IDDG*. Figure 1, Panel A. graphs the proportions of subjects choosing to share under *RAND* (two bars on the right) and under *IDSG chosen-for* (two bars on the left). Panel B. graphs the proportions of subjects choosing to share under *RAND* (two bars on the right) and under *IDDG chosen-for* (two bars on the left). The test results in Panels A and B are derived from the linear probability model (LPM) presented in column (1) of Table 6.[10] An observation in this model is a share-or-leave decision. The dependent variable equals one if a subject chose to share and zero if they chose to leave the gamble payoffs unchanged. The explanatory variables *IDSG-chosen-for* and *IDDG-chosen-for* equal one if the decision was made by a *chosen-for* player under *IDSG* or *IDDG* respectively and zero otherwise. The explanatory variable *riskier* equals one if the decision-making subject faced the riskier gamble and zero if they faced the safer gamble.

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[9] The difference becomes insignificant once village fixed effects are controlled for.
[10] An LPM is estimated rather than a Probit or Logit because all of the explanatory variables are zero-one. Probit and Logit estimations yield very similar results.
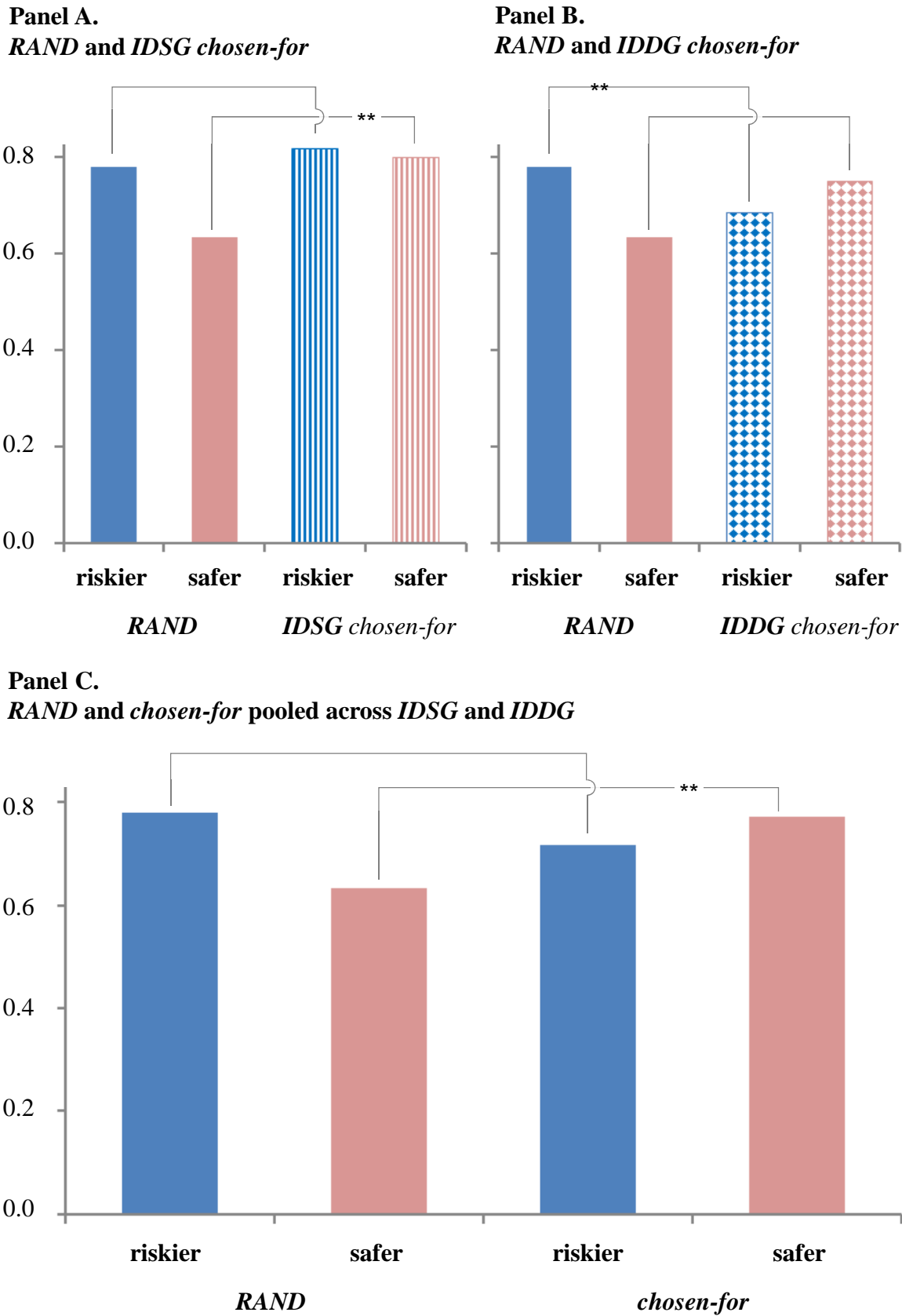
Table 6: Sharing by subjects who are assigned their risk exposure: linear probability model estimations

Dependent variable = 1 if i chose to share, = 0 if i chose to leave

	(1)	(2)	(3)	(4)
$riskier_i$	0.147	0.147*	0.108	0.124*
	(0.080)	(0.080)	(0.180)	(0.071)
$IDSG\text{-}chosen\text{-}for_i$	0.167**	-	-	-
	(0.079)			
$IDDG\text{-}chosen\text{-}for_i$	0.117	-	-	-
	(0.073)			
$chosen\text{-}for_i$	-	0.138**	0.390**	0.201**
		(0.058)	(0.168)	(0.085)
$riskier_i *IDSG\text{-}chosen\text{-}for_i$	-0.129	-	-	-
	(0.121)			
$riskier_i *IDDG\text{-}chosen\text{-}for_i$	-0.212**	-	-	-
	(0.103)			
$riskier_i *chosen\ for_i$	-	-0.202**	-0.337	-0.225**
		(0.097)	(0.223)	(0.096)
RA_i	-	-	0.111	-
			(0.261)	
$riskier_i*RA_i$	-	-	0.050	-
			(0.286)	
$chosen\text{-}for_i*RA_i$	-	-	-0.475	-
			(0.318)	
$riskier_i*chosen\ for_i*RA_i$	-	-	0.276	-
			(0.354)	
$Same\ gamble_i$	-	-	-	0.042
				(0.031)
$Diff.\ in\ gamble\ payoff_i$	-	-	-	$3.2e^{-5}$
				$(6.6e^{-5})$
$Female_i$	-	-	-	-0.112*
				(0.061)
Age_i	-	-	-	$-4.6e^{-4}$
				(0.002)
$Education_i$	-	-	-	0.008
				(0.009)
$Household\ income_i$	-	-	-	$7.9e^{-8}$
				(0.394)
Constant	0.633***	0.633***	0.576***	-
	(0.030)	(0.030)	(0.142)	
Village fes	No	no	No	Yes
Linear restriction test of				
H_0: Model 2 (p-value)	0.303	-	0.143	<0.01
R-squared	0.022	0.017	0.028	0.076
Obs.	485	485	485	477

Notes: An observation is a share-or-leave decision; sample includes decisions by 237 subjects, 1 to 3 decisions per subject; standard errors are adjust to account for clustering at the session level; *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Figure 1: *Chosen-for* players' sharing decisions

Panel A.
RAND and *IDSG chosen-for*

Panel B.
RAND and *IDDG chosen-for*

Panel C.
RAND and *chosen-for* pooled across *IDSG* and *IDDG*

Notes: Bar heights are proportions of chosen-for players sharing in each sub-sample; test results derived from LPM in columns (1) and (2) of Table 6; ** *p*<0.05.

Panel A shows that the *chosen-for* players who were assigned the safer gamble by their *chooser* co-players under *IDSG* were significantly more likely to share gamble payoffs compared to subjects who were randomly assigned the safer gamble under *RAND*. However, there was no difference in sharing rates between the *chosen-for* who were assigned the riskier gamble by their *chooser* co-players under *IDSG* and subjects who were randomly assigned the riskier gamble under *RAND*. Panel B shows that the *chosen-for* players who were assigned the riskier gamble by their *chooser* co-players under *IDDG* were significantly less likely to share gamble payoffs compared to subjects who were randomly assigned the riskier gamble under *RAND*. However, the apparent difference in sharing rates between the *chosen-for* who were assigned the safer gamble by their *chooser* co-players under *IDDG* and subjects who were randomly assigned the safer gamble under *RAND*, while consistent with the prediction, is not significant.

Figure 1, Panel C graphs the proportions of subjects choosing to share under *RAND* (two bars on the right) and under either *IDSG chosen-for* or *IDDG chosen-for* (two bars on the left), i.e., in Panel C the decisions of the *IDSG chosen-for* and *IDDG chosen-for* players have been pooled. The test result in Panel C is derived from the LPM in column (2) of Table 6. The LPM in column 2 is a restricted version of the LPM in column 1. A linear restriction test based on these two LPMs indicates that we cannot reject the null that the coefficients on *IDSG chosen-for* and *IDDG chosen-for* are equal to one another and the coefficients on riskier interacted with each of *IDSG chosen-for* and *IDDG chosen-for* are equal to one another. So, the LPM in column 2 of Table 6 and the corresponding graphs in Panel C of Figure 1 are preferred.

Panel C shows that the *chosen-for* players who were assigned the safer gamble by their *chooser* co-players were significantly more likely to share gamble payoffs compared to subjects who were randomly assigned the safer gamble under *RAND*. However, there was no difference in

sharing rates between the *chosen-for* players who were assigned the riskier gamble by their *chooser* co-players and subjects who were randomly assigned the riskier gamble under *RAND*.

In column (3) of Table 6, we investigate whether *chosen-for* players' levels of risk aversion affect their inclinations to reward (punish) socially (ir)responsible risk taking on the part of their *chooser* co-players. Introducing risk aversion (*RA*) and its interactions with *chosen-for*, *riskier* and both perturbs the coefficients on *chosen-for* not interacted and the interaction between *chosen-for* and *riskier* and renders the latter statistically insignificant. However, according to a linear restriction test, *RA* and its interactions are jointly insignificant (p=0.143). So, the perturbation is owing to multicollinearity and the LPM in column (2) remains preferred.

In column (4) of Table 6, we return to the preferred LPM and add two controls from the experimental data, four demographic controls, and village fixed effects. The experimental control *Same gamble* equals one if the decisions-maker faced the same gamble as her co-player and zero otherwise. It is included because Cappelen *et al.* (2013) found that individuals redistributed more towards equality when co-players chose the same level of risk exposure.[11] The experimental control *Difference in gamble payoff* is included because the cost of sharing is increasing in this difference. Age, sex, education, and household income are included to control for the effects of individual characteristics on willingness to share. The village fixed effects are included to control for many factors including differences in village-level culture.

The set of controls is jointly highly significant (p<0.01), principally owing to the high joint significance of the village fixed effects (p<0.01). There is also weak evidence that women are less willing to share compared to men. However, the inclusion of the controls leaves the

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[11] Cettolin and Tausch (2015) found a similar tendency in *ex ante* risk sharing among subjects who chose relatively low risk exposure for themselves.

coefficients on *riskier*, *chosen-for* and their interaction unchanged in terms of sign and significance and, in the case of the latter two, larger in absolute magnitude. This LPM indicates, once again, that *chosen-for* players who were assigned the safer gamble by *chooser* co-players were significantly more likely to share payoffs compared to subjects who were randomly assigned the safer gamble under *RAND*. However, on average, there was no difference in sharing rates between the *chosen-for* players who were assigned the riskier gamble by their *chooser* co-players and subjects who were randomly assigned the riskier gamble under *RAND*.

To sum up, Predictions 1.1 and 1.2 are supported. *Choosers* are rewarded for choosing the safer gamble for their *chosen-for* co-players, especially under *IDSG*, and under *IDDG choosers* are punished for choosing the riskier gamble for their *chosen-for* co-players.

4.2 Is social responsibility in risk taking cost-dependent?

The results of the comparative t-test analysis of risk exposure presented in Table 5 are inconsistent with predictions 2.1 and 2.3. However, predictions 2.2 and 2.4, which focus on how the cross-treatment differences vary with the level of risk aversion, have yet to be tested. To test predictions 2.2 and 2.4 we estimate a Logit model using the RSG gamble choice decisions made by subjects under *CHOS* and *choosers* under either *IDSG* or *IDDG*. The dependent variable equals one if a subject chose the safer gamble for herself and zero otherwise. The explanatory variables are *IDSG-chooser* and *IDDG-chooser*, which equal one if the decision was made by a *chooser* player under *IDSG* or *IDDG* respectively and zero otherwise, the decision-maker's level of risk aversion, *RA*, and pairwise interactions between *RA* and the two treatment identifiers. Table 7, column (1) presents the resulting estimated average marginal effects of *RA* on the likelihood of a subject choosing the safer gamble for herself and the predicted likelihoods of a subject making such a choice given RA=0 and RA=1 under each

treatment. Figure 2, Panel A plots the predicted likelihoods of a subject making such a choice, and the alternative, given every level of risk aversion in the data under each treatment.

Column (1) of Table 7 and Panel A of Figure 2 indicate that the likelihood of a subject choosing the safer gamble for herself is increasing in her level of risk aversion, but that the relationship is significant only under *IDSG* ($p<0.01$). They also indicate that, in accordance with Predictions 2.2 and 2.4, the marginal effects of a subject's level of risk aversion on the likelihood of her choosing the safer gamble for herself is greater under *IDSG* and *IDDG* compared to *CHOS*. However, in neither instance is the difference statistically significant.

Column (2) of Table 7 presents the results of estimating a version of the Logit model that also includes the age, sex, education, and household income of the decision-making subject and village fixed effects. These controls are jointly highly significant ($p<0.01$) owing to the high joint significance of the village fixed effects ($p<0.01$). However, their inclusion has little impact on the effects of principle interest.

Table 7: The effect of risk aversion on choice of RSG gamble for self: Logit estimations

Dependent variable = 1 if i chose the safer gamble for herself, = 0 otherwise

	(1)	(2)
Under *CHOS*:		
Likelihood of choosing safer for self when $RA_i=0$	0.527	0.487
Likelihood of choosing safer for self when $RA_i=1$	0.680	0.682
Average marginal effect of RA_i	0.153	0.144
	(0.336)	(0.336)
Under *IDSG-chooser*:		
Likelihood of choosing safer for self when $RA_i=0$	0.208	0.185
Likelihood of choosing safer for self when $RA_i=1$	0.887	0.870
Average marginal effect of RA_i	0.679***	0.764***
	(0.216)	(0.186)
Under *IDDG-chooser*:		
Likelihood of choosing safer for self when $RA_i=0$	0.420	0.432
Likelihood of choosing safer for self when $RA_i=1$	0.894	0.886
Average marginal effect of RA_i	0.474	0.469
	(0.285)	(0.311)
Female$_i$	-	0.087
		(0.064)
Age$_i$	-	0.003
		(0.003)
Education$_i$	-	0.009
		(0.012)
Household income$_i$	-	1.77e^{-4}
		(1.25e^{-4})
Village fixed effects	No	Yes
Joint sig of village fes (p-value)		<0.001
Linear restriction tests of:		
H$_0$: effect of RA_i under *CHOS* and *IDSG* the same (p-value)	(0.196)	(0.103)
H$_0$: effect of RA_i under *CHOS* and *IDDG* the same (p-value)	(0.477)	(0.490)
Pseudo R-squared	0.023	0.100
Obs.	229	228

Notes: An observation is a RSG gamble choice; sample includes decisions by 229 subjects, 1 decision per subject; 1 observation lost in (2) owing to missing demographic data; predictions, average marginal effects and corresponding standard errors, adjust to account for clustering at the session level, presented; *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Finally, Table 7 and Panel A of Figure 2 yield some insights relating to predictions 2.1 and 2.3. In accordance with Prediction 2.1, risk averse *choosers* under *IDSG* were more likely (though not significantly so) to choose the safer gamble for themselves compared to risk averse subjects under *CHOS*. However, in conflict with Prediction 2.1, risk tolerant *choosers* under *IDSG* were less likely (though not significantly so) to choose the safer gamble for themselves compared to risk tolerant subjects under *CHOS*. Further, in accordance with Prediction 2.3, risk tolerant *choosers* under *IDDG* were less likely (though not significantly so) to choose the safer gamble for themselves compared to risk tolerant subjects under *CHOS*. However, in conflict with Prediction 2.3, risk averse *choosers* under *IDDG* were more likely (though not significantly so) to choose the safer gamble for themselves compared to subjects under *CHOS*.

To sum up, while there are regularities in the data that are consistent with Predictions 2.1 to 2.4 and, hence, with the conjecture that socially responsible risk taking is cost-dependent, the statistical evidence is patchy and weak. In part, the failure of the predictions appears to be owing to the *choosers* for whom socially responsible risk taking is most costly erring towards social irresponsibility, choosing the riskier gamble for their *chosen-for* co-players because, in so doing, they secure their preferred gamble for themselves.

One possible explanation as to why *choosers* for whom socially responsible risk taking is most costly might err towards socially irresponsible risk-taking is that they can share *ex post* instead. This brings us to our final research question.

4.3 Are social responsibility in risk taking and sharing substitutes?

To test prediction 3.1, we use the gamble choice and sharing decisions made by *choosers* under *IDSG* and *IDDG*. We generate a new variable that equals one if a *chooser* under *IDSG* chose

the safer gamble for herself and, hence, also for her *chosen-for* co-player, one if a *chooser* under *IDDG* chose the riskier gamble for herself and, hence, the safer gamble for her *chosen-for* co-player, and zero otherwise. This new variable is positively correlated with the decision to share and, according to a Chi-squared test, the correlation is significant ($p=0.017$). A simple bivariate regression indicates that the correlation remains significant once we account for clustering at the session-level and that choosing the safer gamble for a *chosen-for* co-player is associated with a 0.15 increase in the likelihood of sharing gamble payoffs equally with that co-player. Finally, once village-level variations in sharing are accounted for, choosing the safer gamble for a *chosen-for* co-player is associated with a 0.19 increase in the likelihood of sharing.

To gain some insights into what is driving this positive correlation, we return to the Logit models presented above and break the dependent variable down into the following four categories: choose safer for self and share; choose safer for self and leave; choose riskier for self and share; and choose riskier for self and leave. Then, instead of Logit estimations, we conduct multinomial Logit estimations. The upper panel of Table 8 presents a model without controls, Model 1. The lower panel presents a model with controls including village fixed effects, Model 2. Model 2 makes use of the sub-sample of decisions made in villages in which two out of the three relevant treatments, *CHOS*, *IDSG* and *IDDG*, were conducted.[12] Once again, the village fixed effects are jointly highly significant ($p<0.01$). Also, while all the coefficients on the subjects' characteristics are individually insignificant, they too are jointly highly significant ($p<0.01$). The size and significance of the effects of principle interest do vary between the models in the upper and lower panel. However, the signs of the effects remain the same and the set of effects that are significant at the 10 percent level or better is unchanged.

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[12] If we include decisions made in villages in which only one out of the three relevant treatments were conducted, the model with village fixed effects does not converge.

For this reason, because Model 2 is supported by an incomplete sample, and for consistency with Panel A, in Figure 2, Panel B we plot the predicted likelihoods of a subject making each of the possible combined gamble and share-or-leave choices derived from Model 1.

Consistent with the positive correlation reported above, Figure 2, Panel B, reveals that risk tolerant *choosers* under *IDSG* were considerably more likely to choose the riskier gamble for themselves and leave compared to risk tolerant subjects under *CHOS*. In contrast, but also consistent with the positive correlation, risk averse *choosers* under *IDSG* were considerably more likely to choose the safer gamble for themselves and share compared to risk averse subjects under *CHOS*.

To sum up, Prediction 3.1 is not supported. Socially responsible risk taking and sharing are positively correlated, indicating that they are not substitutes. The positive correlation is most pronounced under *IDSG*, where risk averse choosers tend to engage in both socially responsible risk taking and sharing and risk tolerant choosers tend to engage in neither.

Table 8: Risk taking and sharing, multinomial logit estimations

Dependent variable ∈{Safer for self and share, Safer for self and share,
Riskier for self and leave, Riskier for self and leave}

Basis for comparison = Safer for self and share

	Saferer for self and leave	Riskier for self and share	Riskier for self and leave
Model 1.			
IDSG-chooser	0.870	1.177	2.533 *
	(1.278)	(1.395)	(1.323)
IDDG-chooser	0.756	0.647	0.875
	(1.003)	(1.432)	(1.107)
RA_i	-0.073	-1.138	-0.132
	(1.046)	(2.045)	(1.092)
RA_i*IDSG-chooser	-2.782	-1.698	-5.600 ***
	(2.387)	(2.355)	(2.121)
RA_i*IDDG-chooser	-0.771	-1.025	-3.378 *
	(1.734)	(2.665)	(1.829)
Constant	-0.777	-0.082	-0.887
	(0.676)	(1.193)	(0.795)
Village fixed effect?		No	
Pseudo R-squared		0.036	
Obs.		462	
Model 2.			
IDSG-chooser	0.848	1.549	3.108 *
	(1.321)	(1.386)	(1.688)
IDDG-chooser	-0.024	2.520	2.485
	(0.842)	(1.915)	(1.605)
RA_i	-0.218	-0.709	-0.086
	(1.147)	(2.216)	(1.347)
RA_i*IDSG-chooser	-3.322	-1.941	-5.956 **
	(2.682)	(2.529)	(2.854)
RA_i*IDDG-chooser	0.113	-4.074	-8.070 **
	(1.280)	(3.890)	(3.502)
$Female_i$	-0.006	-0.655	-0.613
	(0.578)	(0.442)	(0.440)
Age_i	-0.023	-0.025	-0.024
	(0.019)	(0.019)	(0.019)
$Education_i$	-0.093	-0.103	-0.044
	(0.058)	(0.072)	(0.060)
$Household\ income_i$	$-3.72\ e^{-4}$	$2.44e^{-4}$	$-9.98\ e^{-4}$
	$(7.59\ e^{-4})$	$(7.74\ e^{-4})$	$(7.19\ e^{-4})$
Village fixed effect?		Yes	
Joint sig. of village fes (p-value)		<0.01	
Pseudo R-squared		0.1282	
Obs.		392	

Notes: Base for comparison is Safer for self + share; an observation is a subject facing a scenario; coefficients and standard errors presented; *** $p<0.01$; **$p<0.05$; * $p<0.10$.
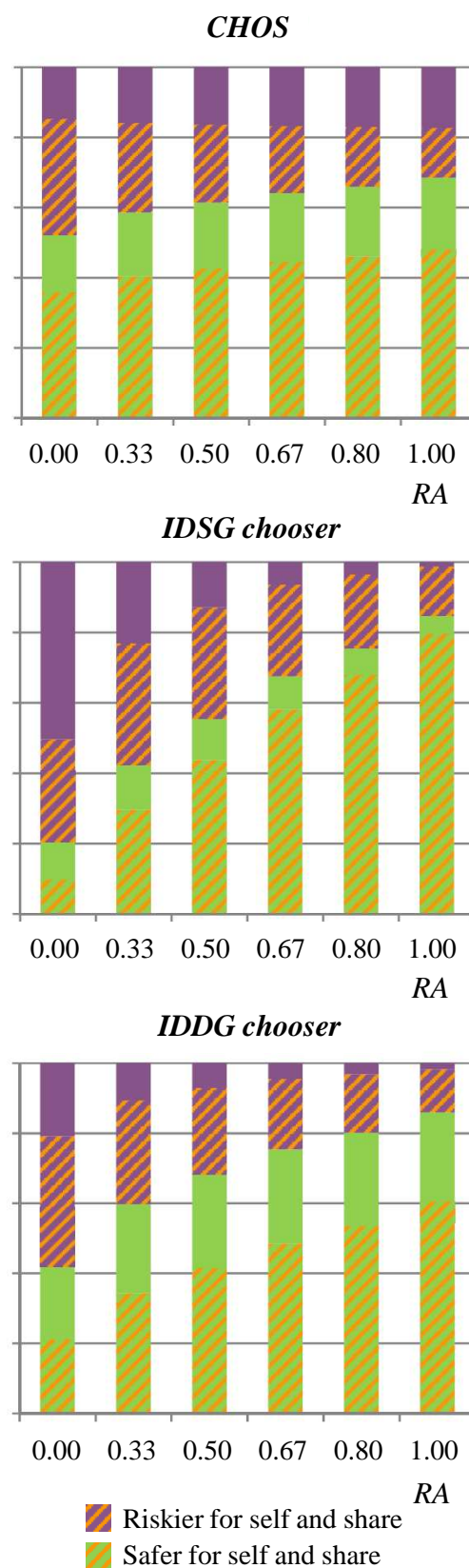
Figure 2: *Choosers'* **risk taking and sharing decisions**

Panel A . Risk taking
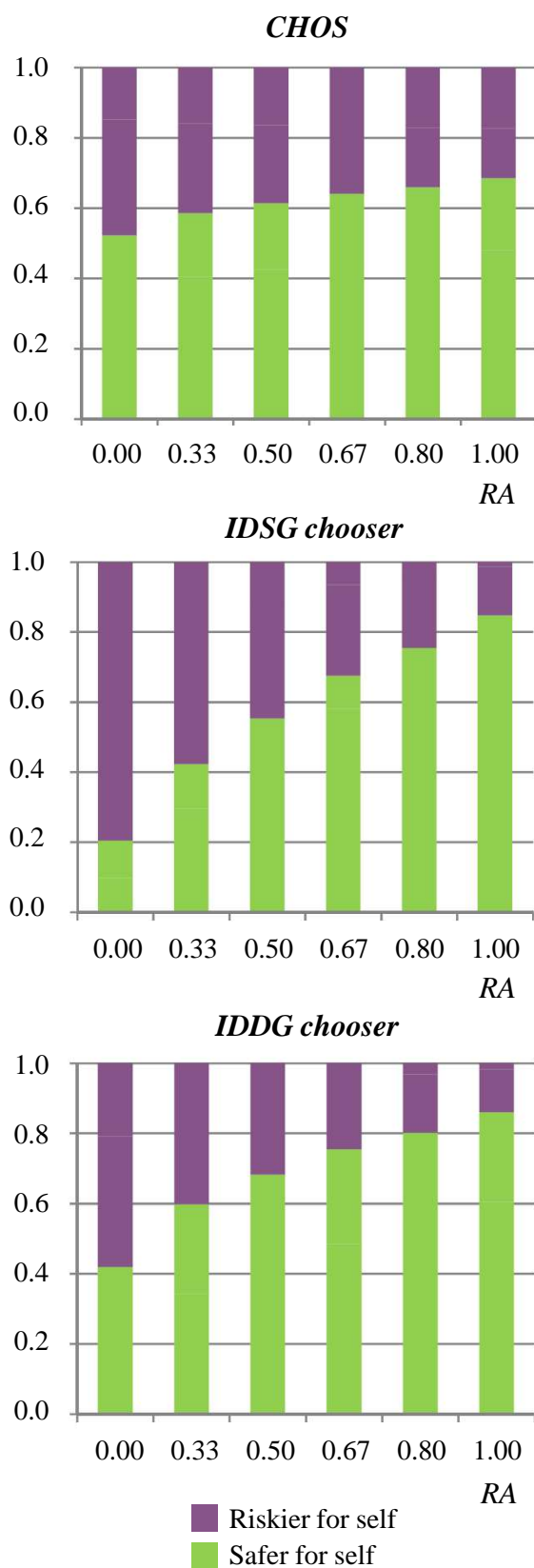
Panel B. Risk taking and sharing

Notes: Panel A derived from Logit estimation in column (1) of Table 7; Panel B derived from multinomial Logit estimation in upper panel of Table 8.

4.4 The meaning of socially responsible risk taking to Sri Lankan farmers

So, what do the findings presented above tell us about what socially responsible risk taking means to Sri Lankan farmers? Earlier we proposed that, within the context of the RSG, socially responsible risk taking could equate to either minimising the risk exposure of others or minimising the risk exposure of the pair. And we went on to argue that, under certain assumptions, if the second rather than the first of these meanings is apposite, we would find support for our predictions when focusing on *IDSG*, but not when focusing on *IDDG*.

The share-or-leave decisions of the *chosen-for* subjects under both *IDSG* and *IDDG* were consistent with socially responsible risk taking equating to minimising the risk exposure of others and being rewarded and/or not punished. So, the *chosen-for* Sri Lankan farmers were acting in accordance with the definition focused on what their co-players' risk taking decisions implied for them. However, while the RSG-gamble-choice decisions combined with the share-or-leave decisions of the *choosers* under *IDSG* systematically differed from those of subjects under *CHOS*, there was visually less and statistically no difference between *choosers* under *IDDG* and subjects under *CHOS*. So, the *chooser* Sri Lankan farmers may have been acting in accordance with the definition focussing on what their risk taking decisions implied for the pair.

5. Conclusion

Within the context of our experiment, we found that *choosers* were rewarded for choosing the safer gamble for their *chosen-for* co-players, especially when *choosers* and *chosen-for* players faced the same risk. Further and relatedly, *choosers* were punished for choosing the riskier gamble for their *chosen-for* co-players when, as a consequence, they (the *choosers*) faced the safer gamble. These findings indicate that socially responsible risk taking is rewarded and socially irresponsible risk taking punished.

With regard to the farmers' risk taking decisions, while there were regularities in the data that were consistent with the conjecture that socially responsible risk taking is cost-dependent, the statistical evidence was patchy and weak. In part, this was owing to the *choosers* for whom socially responsible risk taking was most costly erring towards social irresponsibility, that is choosing the riskier gamble for their *chosen-for* co-players because, in so doing, they secured their preferred gamble for themselves.

Finally, we found that socially responsible risk taking and sharing were positively correlated, indicating that they are not substitutes and that they may be codetermined.

Given that socially responsible risk taking is rewarded, socially irresponsible risk taking is punished and socially responsible risk taking and sharing are positively correlated within individuals, efforts to promote socially responsible risk taking may, at the same time, strengthen traditional forms of risk pooling. Further work is needed before firm conclusions can be drawn about how the cost of socially responsible risk taking to individuals in terms of the opportunities they may have to forgo or the risks they may have to endure impact on risk taking, but our findings suggest that risk taking will turn out to be predictable in this regard.

Finally, although not directly related to our research questions, it is worth noting that despite the one-shot anonymous nature of the decision-making context into which they were placed, the Sri Lankan farmers demonstrated a very high degree of solidarity, choosing to share in 70 percent of the scenarios described to them in which they turned out to be the richer player.

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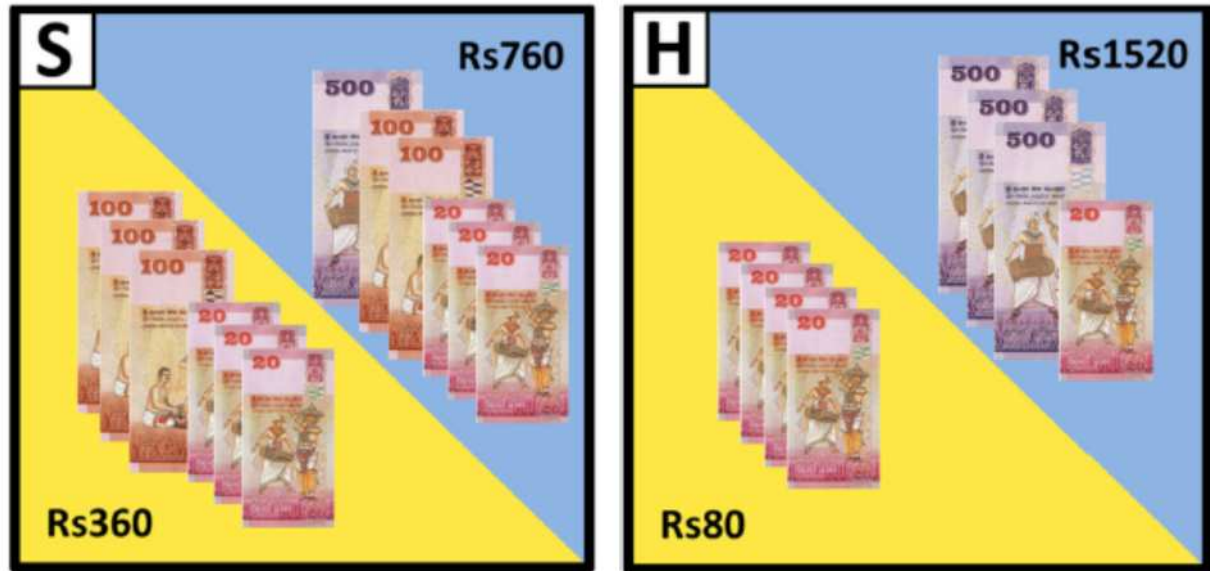
Appendix

Figure A1: Gamble Choice in the RSG

Figure A2: Gamble Choice Task Decision Card