Individual and Group Preferences Over Risk: An Experiment

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Abstract

The recent literature on individual and group choices over risk has led to different results. In some studies under unanimity, groups were found to be less risk averse than individuals, while those under majority did not highlight significant differences. However, both the types of studies impose the decision rule to the group. In the present work we elicited groups' preference under risk using a consensus rule, i.e. groups are free to solve disagreement endogenously, just as in the real life. Results from our pairwise choices experiment shows that when group members are free to use any rule they want in order to reach unanimity, there is no statistical difference between individuals' and groups' risk aversion.

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1. Introduction

What have in common a company managed by a board of directors, an important purchase planned by the whole family, and political parties' deliberations? They are all decisions taken by groups. Indeed, in the real life groups – rather than individuals – make most choices. However, for a long time economists have been studying only individual decision-making process. Nevertheless, in-group interaction may have an impact on the final outcome. Is the final result just a sum of individual preferences or group interaction affects it? And if so, in which direction the outcome changes?

In the last 15 years many scholars, by means of laboratory experiments, have studied groups behavior towards risk (Ambrus et al., 2013; Baker et al., 2008; Charness et al., 2006; Harrison et al., 2012; Holt and Laury, 2002; Masclet et al., 2009; Shupp and Williams, 2008; Rockenbach et al., 2001). On one hand two recent studies – Zhang and Casari (2012), and Brunette et al. (2015) – analyzed group decision under risk when group choices are taken under unanimity rule. The former elicits risk preferences of groups of three-members, where group's decision is taken with a strong form of unanimity, i.e. they associated a zero payoff to disagreement; the latter elicits risk preferences of three-members group using a weak form of unanimity. On the other hand, Harrison et al. (2012) studied group's decision when disagreement in the group is solved by majority.

If disagreements are solved by both weak and strong form of unanimity, groups tend to be more prone to the risk neutrality than individuals (Zhang and Casari, 2012; Brunette et al., 2015). If disagreements are solved by majority rule there is no statistical differences between individual and group risk attitudes (Harrison et al., 2012).

In this paper, when we elicited groups' choices under consensus[3], i.e. we left group's members free to resolve disagreements endogenously.

The remainder of this work is organized as follows. In the next section, we discuss the features of previously implemented disagreements-breaking rules (i.e. strong unanimity, weak unanimity and majority). In the third section, we present our experimental design. Finally, we report our results and conclusions.

[3] Hare (1989) argued "Given groups of equal size and abilities, equal experience with the discussion methods, and adequate time to find solutions, one would expect the consensus method to result in better quality solutions, with higher overall satisfaction among the members and more commitment to the decisions reached."

2. Disagreements-breaking rules

In the literature, some studies investigated group decisions under unanimity (Masclet et al., 2009; Shupp and Williams, 2007; Zhang and Casari, 2012). However, in case of persistent disagreement, a default rule may be applied: choosing a random decision (Masclet et al., 2009) or calculating the mean of individual choices (Shupp and Williams, 2007). Specifically, in Zhang and Casari (2012) the default rule is particularly strong: in case of disagreement, group members had three trials in order to come to a unanimous decision, otherwise earnings would have been zero for everyone. This setting triggers a strong incentive to find an agreement before the last trial. That is, just as in the "chicken game", the more risk adverse is more likely to switch his/her decision in order to avoid the worst scenario of "zero earnings". That is the reason of calling this kind of unanimity a "strong unanimity".

Instead, a clear example of "weak unanimity" is in Brunette et al. (2015). They studied the impact of group decision rule on group choice. They found a significant risk shift effect when group make choices with respect to individuals. In their experiment, Brunette et al. (2015) presented individuals and three-member groups with ten binary choices. The group composition randomly changed at every choice. Members cannot interact to each other. In the treatment with unanimity rule, members had a maximum of five trials for each choice in order to come to a decision. If unanimity was not reached after the fifth trial, the computer did not randomly select a choice and the disagreement persisted. This feature is what makes the unanimity used in this study a "weak unanimity".

Finally, in Harrison et al. (2012) individual choices are aggregated ex post by the majority aggregation rule. Hence, the choice of majority becomes the choice of groups.

3. Experimental Design and Procedure

The experiment was conducted at the Universitat Jaume I. We ran 10 sessions, each session, of the experiment, had two parts involved 30 participants. Overall 300 students participated in the experiment. No person took part in the experiment more than once. The whole session (part 1 and part 2) took on average 40 minutes. In part 1, we measured subjects' risk attitude with 10 pairwise choices questions, reported in table 1. In part 2, subjects were randomly divided into groups of three persons and faced the same task as in part 1. In part 2, we called for a group decision for each lottery. Group

members could communicate face-to-face[4] with no time limits. They were free to choose any method to solve disagreement. Once they agreed they passed to the next decisional problems.

TABLE 1 – Binary lotteries

Lottery A		**Lottery B**	
50 ECU	**40 ECU**	**96,25 ECU**	**2.50 ECU**
10%	90%	10%	90%
20%	80%	20%	80%
30%	70%	30%	70%
40%	60%	40%	60%
50%	50%	50%	50%
60%	40%	60%	40%
70%	30%	70%	30%
80%	20%	80%	20%
90%	10%	90%	10%
100%	0%	100%	0%

The lotteries were presented as in Figure 1. The overall incentive structure was similar to that in Holt and Laury (2002). At the end of the experiment a pairwise choice was randomly selected (from the 20 played in part 1 and part 2) independently for each subject, and played for real.

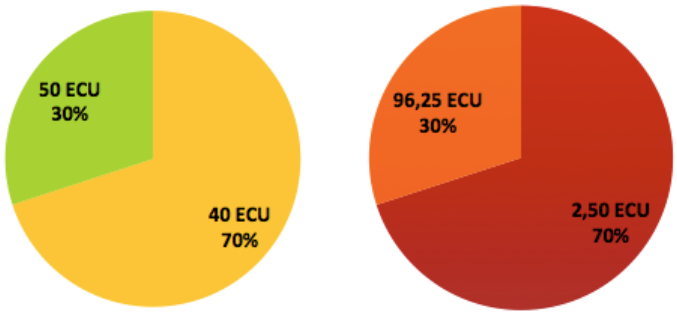

FIGURE 1 - Example of Lotteries Presented

4. Analysis and Results

In figure 2 we report the percentage of choices for A (the safe option). It compares individual choices (circle line) with group choices (square line). A perfect risk-neutral

[4] O'Neill et al. (forthcoming) showed that "Face-to-face teams were more effective on all decision".

subject (cross line) should switch from A to B at the 5th decision problem. A switch in later decisions reveals risk aversion, while a switch in earlier decisions reveals risk-seeking behavior.

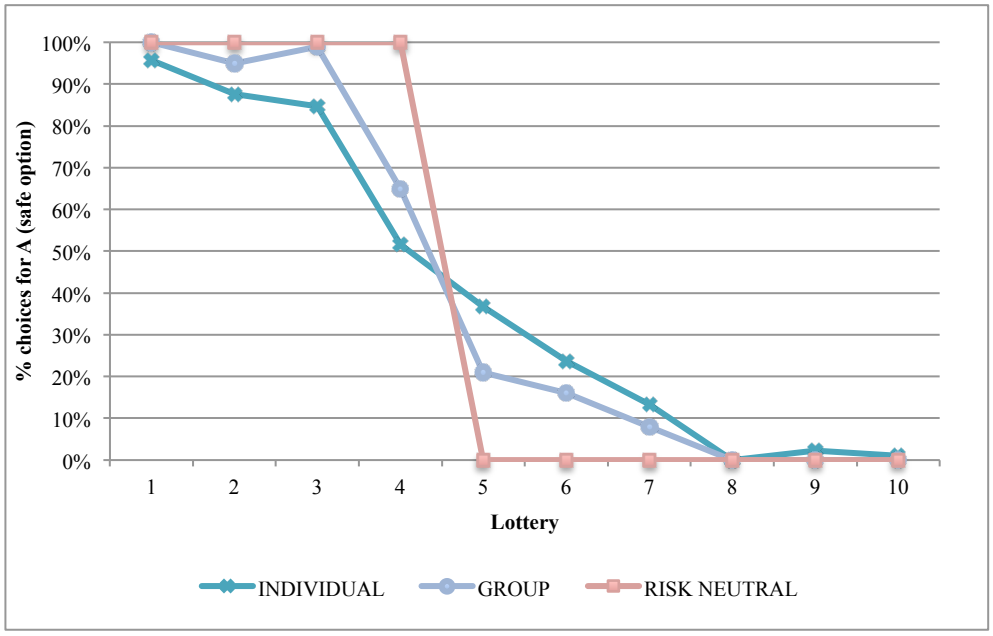

FIGURE 2 - Fraction of individuals and groups who chose the safe option A

As we can notice from the graph above, individuals are less risk averse than groups till the 5th decision problem. Note that, as the probability of obtaining the highest payoff increases, they appeared a little bit more risk averse. The switching point occurs at lottery 3. Indeed, the number of individuals' safer choices dramatically decreases from the 3rd to the 4th question: percentage of people who chose A passes from 84.7% in the former problem to 55% in the latter. This percentage gradually lowers between the 4th and the 8th decisional problems, while it is almost zero in the last two. Also for the groups, the switching point occurs at lottery number 3.

In order to infer risk aversion of subjects and groups, we calculated midpoints of CRRA coefficient for each lottery. It is useful to clarify that a rational subject with monotonic preferences should switch from the safer to the riskier option just once and never switch back. Instead, some subjects (and groups) switched from A to B and *vice versa* more than once, showing such a kind of inconsistency or indifference over a certain range. This behavior can be due to a couple of reasons: either subjects (or groups) are genuinely indifferent or they are irrational (do not respect monotonicity) or it is just a mistake. For our purpose, we consider this behavior a "mistake" when only

one switchback occurred. In these cases, we fixed the error and included that subject (or group) into the computation, since the real intention was clear. On the contrary, we labeled as "irrational" those participants who showed multiple switches and we did not considered them in the calculation, because their intentions were not so clear[5].

The average CRRA coefficient confirmed the results of the analysis. For the subjects, we found an average CRRA coefficient of −0.37, while it amounts to −0.40 for groups[6]. These values highlight that all the choices are quite less risk averse than a risk neutral subject, but they are all close to each other. Indeed, individual and group risk aversion is not statistically different. The two-sample Kolmogorov-Smirnov test on the individuals' and groups' distributions of switching points retains the null hypothesis of equality[7].

5. Conclusions

In this paper, we studied experimentally if subjects' attitude toward risk is different when decisions are taken individually or in a group. On one hand, Zhang and Casari (2012), and Brunette et al. (2015) show that, if disagreement is solved on the basis of a (weak or strong) unanimity rule, subjects in the group condition tend to be less risk averse than when they are not part of a group. On the other hand Harrison et al. (2012), report no significant differences between individuals and group risk aversion, if disagreement is solved on the basis of a majority rule. In our paper we did not imposed an exogenous disagreement-breaking rule, but we left each group free to resolve the disagreement, the only restriction we imposed is that subjects have to come to a group decision. Our experimental findings are in line with Harrison et al. (2012): no significant differences occur between individuals and group risk aversion. All in all, we can conclude that group's behavior is sensitive to the rule used to resolve disagreement.

[5] On this procedure, Jacobson and Petrie, 2009
[6] For this evaluation, we took into account 276 individuals, and 95 groups.
[7] Individual distribution is not statistically different from groups (n=300, m=100, p>.05).

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