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This note presents an experimental study of the random lottery incentive mechanism. In the baseline treatment we observe risk behavior in a given choice problem. We show that by integrating a second, asymmetrically dominated choice problem in a random incentive mechanism risk behavior can be manipulated systematically. This implies that the isolation hypothesis is violated the random incentive mechanism does not elicit true preferences.

Keywords: random incentive mechanism, isolation, asymmetrically dominated alternatives

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Asymmetrically Dominated Alternatives and Random Incentive Mechanisms

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Abstract

This note presents an experimental study of the random lottery incentive mechanism. In the baseline treatment we observe risk behavior in a given choice problem. We show that by integrating a second, asymmetrically dominated choice problem in a random incentive mechanism risk behavior can be manipulated systematically. This implies that the isolation hypothesis is violated the random incentive mechanism does not elicit true preferences.

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1 Introduction

In many experimental studies the reward of subjects relies on a random incentive mechanism (RIM). Under this mechanism subjects usually respond to numerous tasks (e.g. different binary choice questions, bidding for an object in several rounds, etc.) and at the end of the experiment one of the tasks is randomly selected and played out for real. RIM has several advantages: (i) it gives incentives for truthfully answering several questions while only paying one of them and, thus, keeps costs of the experiment at a reasonable level, (ii) it avoids wealth or house money effects which would result from paying each task after its completion, and (iii) it also avoids possible portfolio effects arising from paying all tasks at the end of the experiment. However, RIM is not necessarily incentive-compatible. This was pointed out by Holt (1986) for binary choice between lotteries. In case that the reduction of compound lottery axiom holds, RIM only provides incentives for truthfully reporting preferences if the independence axiom is satisfied. Since there exists abundant evidence that the independence axiom is often violated, the argument of Holt challenges RIM seriously. This motivated several experimental studies aiming to test whether RIM does elicit true preferences (Camerer, 1989; Starmer and Sugden, 1991; Beattie and Loomes, 1997; Cubitt, Starmer, and Sugden, 1998; Hey and Lee, 2005a, b; Laury, 2006; Anderson et al., 2007; Lee, 2008; Baltussen et al., 2008). These studies did not observe serious distortions induced by the use of RIM. A convincing reason for this result is the isolation hypothesis from prospect theory (Kahneman and Tversky, 1979) which implies that subjects evaluate each task in a RIM independently of the other tasks.

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This note presents a simple experiment which tests incentive compatibility of RIM in the presence of asymmetrically dominated alternatives. The literature of context-dependent choice has shown that adding asymmetrically dominated alternatives (ADAs) in the set of options can systematically influence choice behavior (see e.g. Huber et al., 1982; Simonson and Tversky, 1992; Hsee and Lecrerc, 1998; Bhargava et al., 2000). In contrast to these studies, in the present experiment ADAs are not included in the set of options in a given task but as options in a different, independent task. Given that isolation holds, choice behavior under RIS in one task should not be influenced by the presence of ADAs in a different task even if preferences are menu-dependent. Consequently, the present study does not employ ADAs in order to investigate context-dependence; instead they are used to test the isolation hypothesis and the validity of RIS.

2 Experimental Design

Two experiments were run at the University of Kiel with altogether 581 subjects. In both experiments subjects were randomly assigned to one of five groups, referred to as Groups 1, 2.1, 2.2, 3.1, and 3.2 in the sequel. For Experiment 1 the stimuli received by the groups (in each case printed on a single sheet of paper) are presented in Table 1.

	Group 1	Group 2	Group 3
First Choice	Option A: 4 € with 100% Option B: 10 € with 50% 0 € with 50%	Option C: 3 € with 100% Option D: 12 € with 50% 0 € with 50%	Option E: 5 € with 100% Option F: 8 € with 50% 0 € with 50%
Second Choice		Option A: 4 € with 100% Option B: 10 € with 50% 0 € with 50%	Option A: 4 € with 100% Option B: 10 € with 50% 0 € with 50%

Table 1: Design of Experiment 1

In Group 1 subjects had just to choose between Options A and B. Subject were told that everybody will receive the payoff of the chosen option in cash directly after the experiment and that the payoff of Option B will be determined by a coin flip. In Groups 2.1 and 3.1 there were two choices (presented in the order of Table 1) and a RIS was employed, i.e. there was a first coin flip which determined whether the first or the second choice was played out for real and a second coin flip which determined the payoff if one of the risky options (D, F or B) was chosen. Group 2.2 (3.2) differed from Group 2.1 (3.1) only by the order in which the choices were presented, i.e. the choice between Options A and B was presented first in Groups 2.2

and 3.2. In all groups the left-right positioning of options was randomized. The design of Experiment 2 was identical to that of Experiment 1 with the only exception that the payoff of all safe options (i.e. Options A, C, and E) was increased by one Euro.

The aim of Group 1 is to elicit true preferences of subjects between Options A and B as a design with one choice played out for real offers perfect incentives to state true preferences (see Cubitt et al., 2001). Also in Groups 2 and 3 we elicit preferences between Options A and B which could however be biased as the design here involves an additional choice. If the isolation hypothesis holds, the fraction of subjects choosing A should be identical in Groups 1, 2, and 3. If isolation is violated, the additional choice in Groups 2 and 3 may influence the choice between A and B. In Group 2 Option A dominates Option C whereas B is dominated by D. Analogous to the evidence of asymmetrically dominated alternatives in the context-dependent choice experiments this could make Option A look more and Option B less attractive, leading to a higher fraction of A choices compared to Group 1. The opposite could be expected for Group 3 as here A is dominated by E whereas B dominates F.

3 Results

The results of both experiments are presented in Table 2 which states for all groups and both choices the fraction of subjects choosing the risky lottery. First, we can see that in Group 2 indeed by far most subjects choose D. These subjects may be reluctant to choose B leading to a higher fraction of observed A choices as compared to Group 1. Also in Group 3, most subjects chose as expected option E and for those A could look less attractive..

Group	1	2.1	2.2	3.1	3.2
			Experiment 1		
N	58	54	54	62	56
% Choice of B	82.8	51.9**	59.3**	80.6	78.6
% Choice of D (F)		88.9	96.3	12.9	3.6*
			Experiment 2		
N	61	62	59	57	58
% Choice of B	31.1	29.0	33.9	52.6**	43.1
% Choice of D (F)		87.1	93.2	7.0	5.2

Table 2: Results

Let us first have a look at Experiment 1. While 82.8% of subjects chose B in Group 1, this fraction reduces to 51.9% and 59.3% in Groups 2.2 and 2.2 respectively. In both cases, the difference is significant at the 1%-level (1-sided test according to the statistic of Conlisk,

1989). As expected, A turns out to be more attractive in Group 2 leading to a significant violation of isolation and, therefore, to a failure of RIS. In Group 3 we have expected the opposite effect as in Group 2 but the fraction of B choices is not higher than in Group 1. Since this may be due to large fraction of subjects preferring B anyhow, Experiment 2 was performed where the outcome of safe options was increased by one Euro which should lead to a higher fraction of A choices. Table 2 shows that in Experiment 2 the fraction of risky choices is indeed reduced to 31.1% in Group 1. Contrary to Experiment 1, there are no substantial differences between Group 1 and Groups 2. However, consistent with our hypothesis, the fraction of risky choices in Groups 3 is substantially higher than in Group 1. In Group 3.1 this difference is significant at the 1%-level, in Group 3.2 it is only marginally significant at the 10%-level.

There are substantial ordering effects between Groups 2.1 and 2.2 as well as between Groups 3.1 and 3.2 which are all in the expected direction. However, only one of these effects (the difference between choice of F in Groups 3.1 and 3.2) is significant at the 5-level. The relatively small ordering effects can be explained by the fact that in the instructions to Groups 2 and 3 all alternatives were presented prior to the response of subjects.

4 Conclusions

This note has shown with a very simple experimental design that integrating asymmetrically dominated alternatives in a random incentive mechanism can manipulate choice behavior systematically. In our study isolation is violated significantly and the random incentive mechanism does not elicit true preferences. Consequently, the presented results seriously challenge the common methodology at least in risky choice experiments.

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