REFLECTION EFFECT UNDER DIFFERENT RISK ATTITUDES

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Abstract

„Reflection effect" means, that people are risk averse if dealing with profits and risk seeking by challenging losses (Kahneman and Tversky, 1979). The aim of the paper is to find out whether the decisions of the experiment participants differ when dealing with positive and negative prospects by choosing a preferred lottery. Standardized scale (DOSPERT) evaluating the participant willingness to take risk in different domains of life is also considered. An econometric model for predictions of the paired lottery game results depending on the risk characteristics identified within DOSPERT is estimated in the paper.

Keywords: reflection effect, experiment, lottery, risk, DOSPERT (Domain-Specific Risk-Taking) scale
JEL classification: C91, D81, Z1

1. INTRODUCTION

Expected utility theory (EUT), formulated by von Neumann and Morgenstern [von Neumann, 1944], was an inventive extension of the neoclassical economic theory, relaxing deterministic character of the utility function arguments. EUT offers a simple axiomatic system allowing its further development. On the other hand, later criticism of the theory was based on the fact that "perfect rationalism" in behavior of people is just pure mathematical simplification [Simon, 1978], which was later confronted with the ambiguous experimental results. Kahneman and Tversky [Kahneman, 1972] showed systematic deviations of the real-data examples from the EUT and formulated the Prospect theory as a new alternative. Both authors re-formulated their theory into its axiomatic form known as the Cumulative prospect theory in 1992. Elsberg paradox [Elsberg, 1961] also showed weaknesses of EUT and violated its assumptions.

The Reflection effect was originally introduced by Kahneman and Tversky [Kahneman and Tversky, 1979]. They introduced a laboratory experiment, where despite of lower (expected) gain, most of the respondents - 80% preferred a sure strategy (winning $3000) to the lottery with non-negative gains $0 and $4000 provided with probabilities 0.2 and 0.8, respectively. The fact was explained as a demonstration of the risk averse behavior. In case of the same paired lotteries with the opposite sign payoffs (sure gain -$3000 and lottery with $0 and -$4000 gains) 92% of the participants preferred the lottery and just 8 % preferred the sure loss of $3000. This was noted as a demonstration of the risk seeking behavior. This behavior pattern is assumed to be valid in general and explains risk seeking in the loss domain and risk aversion in the gain domain.

Holt and Laury [Laury, 2002] introduced the paired lotteries choice experiment based on the gain domain from the Kahneman and Tversky experiment noted above. This experiment became the benchmark for other following experiments. Eckel and Wilson [Eckel, 2004] used the same experiment to quantify the risk attitudes of the experiment participants and to find some statistically significant relations between their trust behavior and risk attitudes. Among other six risk measures, Holt – Laury risk measure derived from the lottery game results was proved to be the only significant factor explaining the decision to reciprocate. On the other hand, this measure was not significant in the Probit regression explaining trust. Goeree, Holt and Palfrey [Goeree, 2002] showed the accordance between the risk aversion derived from both the bimatrix game experiments and the Holt and Laury paired lottery games. Baker, Laury and Williams [Baker, 2007] compared both the small groups and the behavior of individuals using the methodology based on the paired lottery game experiment including also payoffs of Holt and Laury [Holt, 2002]. Laury and Holt [Holt 2004] performed similar paired lottery experiment to show some specifics in the Reflection effect; however they did not use the payoffs from their earlier often cited experiment.

The main aim of the research is to analyze the risk attitudes in context of the Reflection effect using the standard paired lottery game originally formulated by Holt and Laury [Holt, 2002], but extending both Gain and Loss variants of the game.

The experiment design is described in the second part and the experimental results are presented in the third part. In the forth part we tried to explain the behavior of the partici-

pants using the DOSPERT scale data aimed at the perception of risk taking covering 5 domains of life.

2. EXPERIMENTAL DESIGN

The experiment was organized within the study group of the Faculty of Economics, Technical university of Košice in the autumn semester 2011. There were 36 students participating in the experiment, including 19 males and 17 females. The paired lotteries game in a gain and in a loss domain variants were played. Both variants included 10 paired lotteries, given in Table 1, as introduced by Holt and Laury [Holt, 2002].

2.1. Lottery pairs

The participants were divided into 2 subgroups. The first one started with the gain domain variant followed by the loss domain one and this order was altered by the second subgroup to exclude the impact of the prospective „order effect". Student were asked to mark A or B preferred option for each of the listed lotteries pairs.

Lotteries listed as the first ones in both variants (Lottery 1), assign high probability (90 %) to the low gains (1.6 and 0.1)/ losses (-1.6 and -0.1) and, on contrary, assign low probability (10 %) to the high gains (2 and 3.85) /losses (-2 and -3.85). That is, why risk averse students choose option A in case of the gain variant and option B in the loss variant. Then, the probabilities were stepwise altered by 10 % in the next listed lotteries to decrease the probability of the low gains/losses and, on contrary, increase probability of the high gains/losses. Then, the crossover point, when a participant is changing his options is a measure of his risk attitude. According to Holt and Laury (2002, p. 10), the students were categorized as risk averse (more then 4 chosen options A), risk neutral (4 chosen options A) and risk seeking (less than 4 options A). In the loss variant, the categories are given as follows: Risk aversion (less than 4 options B), risk neutrality (4 options B) and risk seeking (more than 4 options B). As increasing number of the A chosen options in the Gain variant means increasing of the risk averse attitudes and increasing number of B chosen options in the Loss variant means increasing the risk seeking attitudes, there is some „antisymmetry" between chosen respective options in both variants.

As Holt and Laury showed the decreasing attitudes toward risk in experiment using hypothetical money payoffs, we decided to motivate the students by real money payoffs. On the other hand, we used the Laury [Lauty, 2005] experience of no significant difference in experiment results when paying for all or for one randomly chosen round at the low payoff level. In our experiment, the 10 sided cube was thrown to choose the lottery, which was really paid off to the students. In the end of the experiment, the students were asked to fulfill the DOSPERT scale.

Table no. 1 Experiment lotteries variants

	GAIN VARIANT				**LOSS VARIANT**			
	Probability	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**
Lottery 1	0,1	2	0,1	3,85	0,1	-2	0,1	-3,85
	0,9	1,6	0,9	0,1	0,9	-1,6	0,9	-0,1

	GAIN VARIANT				LOSS VARIANT			
	Probability	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**
Lottery 2	0,2	2	0,2	3,85	0,2	-2	0,2	-3,85
	0,8	1,6	0,8	0,1	0,8	-1,6	0,8	-0,1
Lottery 3	0,3	2	0,3	3,85	0,3	-2	0,3	-3,85
	0,7	1,6	0,7	0,1	0,7	-1,6	0,7	-0,1
Lottery 4	0,4	2	0,4	3,85	0,4	-2	0,4	-3,85
	0,6	1,6	0,6	0,1	0,6	-1,6	0,6	-0,1
Lottery 5	0,5	2	0,5	3,85	0,5	-2	0,5	-3,85
	0,5	1,6	0,5	0,1	0,5	-1,6	0,5	-0,1
	GAIN VARIANT				**LOSS VARIANT**			
	Probability	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**	**Probability**	**Payoff**
Lottery 6	0,6	2	0,6	3,85	0,6	-2	0,6	-3,85
	0,4	1,6	0,4	0,1	0,4	-1,6	0,4	-0,1
Lottery 7	0,7	2	0,7	3,85	0,7	-2	0,7	-3,85
	0,3	1,6	0,3	0,1	0,3	-1,6	0,3	-0,1
Lottery 8	0,8	2	0,8	3,85	0,8	-2	0,8	-3,85
	0,2	1,6	0,2	0,1	0,2	-1,6	0,2	-0,1
Lottery 9	0,9	2	0,9	3,85	0,9	-2	0,9	-3,85
	0,1	1,6	0,1	0,1	0,1	-1,6	0,1	-0,1
Lottery 10	1	2	1	3,85	1	-2	1	-3,85
	0	1,6	0	0,1	0	-1,6	0	-0,1

2.2. DOSPERT scale

DOSPERT (Domain-Specific Risk-Taking) scale was introduced by Weber et al. [Weber et al., 2002] and Blais and Weber [Weber, 2006]. As far, the scale has been used in several multidisciplinary research problems. DOSPERT contains three separate response scales: Risk-Taking, Risk-Perceptions and Expected Benefits. For the purpose of our research, we only used the Risk-Taking scale. The scale assesses risk taking in 30 questions in five content domains: *financial decisions, health/safety, recreation, ethics* and *social decisions*. Respondents rate the likelihood that they would engage in the domain-specific risky activities on the ordinal answer scale ranging from 1 (very unlikely) to 7 (very likely). Here, higher values represent higher level of the risk attitude. Subsequently, the score of each contain domain (subscale) counts. Then, the theoretical max (min) scoring of each subscale is 42 (6). The scoring of each subscale reflects the extent of the likelihood of respondent risk taking in the corresponding area.

3. RESULTS AND DISCUSSION

In order to avoid the order bias and learning effects, we compared relative frequencies of the respective options (A options in the gain variant and B options in the loss variant separately) between both participants subgroups playing both variants in different order. According to the Kolmogorov – Smirnov tests, there was no statistical significant difference neither in the gain variant (D statistics = 0,381, p-value=0.1577) nor in the loss variant (D statistics = 0.1238, p-value=0.9993. We rejected the order bias hypothesis.

3.1. Lottery results

Playing the Gain variant, some participants switched more times between A and B options (see Table 2). That is, why a clear determination of the crosspoint is ambiguous. In this case Holt and Laury (2002, p. 9) proposed to consider just the number of playing respective strategies A. In our experiment, 30 students chose more than 4 options A, which is considered to be risk averse kind of behaviour. Just 4 students behaved risk neutral (chose 4 options A) and 2 students chose less than 4 options A – they are considered to be risk seeking. The average number of chosen options A was 5.7 that is in line with the general idea of the risk averse behaviour of the people.

In case of the Loss variant of the game, distribution of the risk type players was completely different. As mentioned before, counting of all the options B selected by the participant in all 10 paired lotteries is considered to be the risk measure. In this variant of the game, 17 students (of 36) demonstrated risk seeking behaviour (playing more than 4 options B), 15 students chose exactly 4 options B (were risk neutral) and 4 students chose risk averse strategies (took less than 4 options B). The average number of taken options B was 4.8 that signaled behaviour of the respondents somewhere between risk neutral and risk seeking norm. On the other hand, the experiment results of both variants do not contradict the hypothesis on the Reflection effect.

3.2. Gain / Loss variants comparison

The frequencies of the respective choices in both variants are given in Figure 1. Risk neutral strategy seems to be an anchor which offers a possibility to be compared to. Then, the raised question is, whether there is a systematic tendency to deviate from the neutral strategy in each of the variants in consideration. As data seem not to be normally distributed (Kolmogorov-Smirnov D =0.998, p-value = 0.000 in the Gain variant and D= 0.9772, p-value = 0.000 in the Loss variant), we decided to use the Wilcoxon signed-rank test of the alternative hypothesis that median value of the chosen respective options (A/B) is greater than 4. Here, despite the lower power of the non-parametric tests, the differences proved to be significant in both variants (W=1296, p-value=0.000 in the Gain variant and W=1278, p-value=0.000 in the Loss variant). The second question to be answered is, whether there is some correlation of the respective choices (A vs. B) between both variants. As data are not normal, we estimated the Spearman correlation (rho=0.079, p-value = 0.648) is signaling no statistically significant correlation between respective choices in both variants. That is, why both risk measures seem to be case dependent in either one game variant and no kind of „antisymmetry“ seems to be present.

Table no. 2 Lottery game results for individual participants

No	GAIN VARIANT			LOSS VARIANT		
	Options	Count of A	Risk Type	Options	Count of B	Risk Type
1	AAAAAAABBB	7	averse	BBBAAAAAAA	3	averse
2	AAAAAAABBB	7	averse	BBBBBAAAAA	5	r. seeking
3	AAAAAABBBB	6	averse	BBBBBAAAAA	5	r. seeking
4	AAAAAABBBB	6	averse	BBBBBBAAAA	6	r. seeking
5	AAAAAAABBB	7	averse	BBBBBBAAAA	6	r. seeking
6	AAAAABBBBB	5	averse	BBBBAAAAAA	4	neutral
7	AAAAABBBBB	5	averse	BBBBAAAAAA	4	neutral
8	AAAAAAAABB	8	averse	BBAAAAAAAA	2	averse
9	AAAAABBBBB	5	averse	BBBBBBAAAA	6	r. seeking
No	**GAIN VARIANT**			**LOSS VARIANT**		
	Options	**Count of A**	**Risk Type**	**Options**	**Count of B**	**Risk Type**
10	AAAABBBBBB	4	neutral	BBBBAAAAAA	4	neutral
11	AAAABBBBBB	4	neutral	BBBBAAAAAA	4	neutral
12	AAAABBBBBB	4	neutral	BBBBAAAAAA	4	neutral
13	AAAAAABBBB	6	averse	BBBBBAAAAA	5	r. seeking
14	AAAAAAABBB	7	averse	BBBBBAAAAA	5	r. seeking
15	AAAAAAAAAB	9	averse	BBBBBBBBBA	9	r. seeking
16	AAAABBABBB	5	averse	BBBBABAAAA	5	r. seeking
17	AAABBAABBB	5	averse	BBBBBBBAAA	7	r. seeking
18	AAAABBAAAB	7	averse	BBBBBAAAAA	5	r. seeking
19	AAAABAAAAB	8	averse	BBBBAAAAAA	4	neutral
20	AAAAABABBB	6	averse	BBBABAAAAA	4	neutral
21	ABBBAABABA	5	averse	AABABABAAA	3	averse
22	AAAAAABBBB	6	averse	BBBBAAAAAA	4	neutral
23	AAAAABBBBB	5	averse	BBBBAAAAAA	4	neutral
24	AAAAABBBBB	5	averse	BBBBAAAAAA	4	neutral
25	AAAAABBBBB	5	averse	BBBBAAAAAA	4	neutral
26	AAABBBBBBB	3	r. seeking	BBBBBAAAAA	5	r. seeking
27	AAAAABBBBB	5	averse	BBBBBAAAAA	5	r. seeking
28	AAAAAABBBB	6	averse	BBBBBBBAAA	7	r. seeking
29	AAAAAABBBB	6	averse	BBBBBBBAAA	7	r. seeking
30	AAAAAABBBB	6	averse	BBBAAAAAAA	3	averse
31	AAAABBBBBB	4	neutral	BBBBBAAAAA	5	r. seeking
32	AAAAAABBBB	6	averse	BBBBAAAAAA	4	neutral

No	GAIN VARIANT			LOSS VARIANT		
	Options	Count of A	Risk Type	Options	Count of B	Risk Type
33	AABAAAABBB	6	averse	BBBAAABAAA	4	neutral
34	AAAAAABBBB	6	averse	BBBAAABAAA	4	neutral
35	AAABBBBBBB	3	r. seeking	BBAABBAAAA	4	neutral
36	AAAABABBBB	5	averse	BBBBBBABAA	7	r. seeking

As we can see in Figure no. 1, in the Gain variant, most participants selected more than 4 A options and seem to be risk averse. In the Loss variant, most participants selected exactly 4 options B and seem to be risk neutral, or selected more than 4 options B and seem to be Risk seeking.

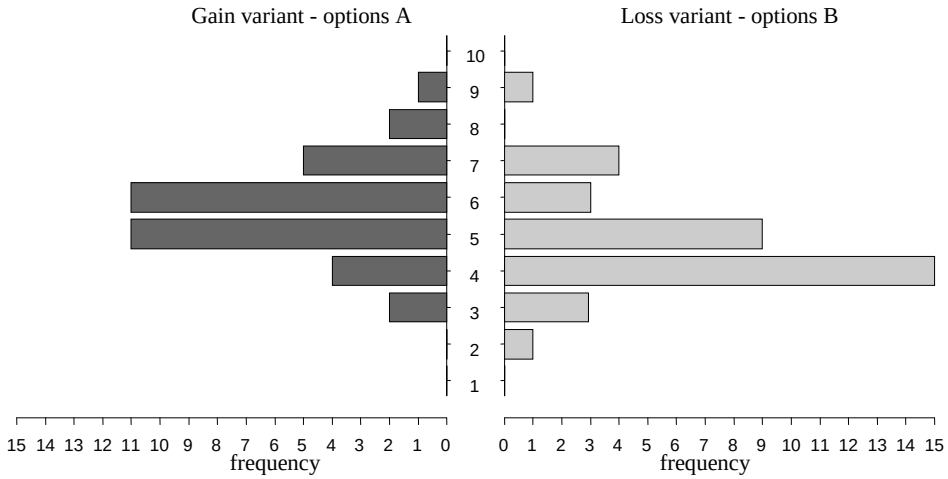


Figure no. 1 Pyramid graph of the A/B options chosen by the participants in both variants

Table no. 3 DOSPERT scale specific domain subscales – descriptive statistics

	Ethics	Financial decisions	Health/ Safety	Recreational	Social decisions
min	6.00	12.00	6.00	9.00	18.00
max	25.00	38.00	38.00	40.00	36.00
range	19.00	26.00	32.00	31.00	18.00
sum	494.00	796.00	784.00	884.00	1023.00
median	13.00	21.00	21.50	23.00	29.00
mean	14.11	22.11	21.78	24.56	28.42
var	22.34	38.44	49.49	68.20	20.76
std.dev	4.73	6.20	7.04	8.26	4.56

Table no. 4 DOSPERT scale scores for individual participants

No	Ethics	Financial decisions	Health/Safety	Recreational	Social decisions
1	20	25	24	25	29
2	18	29	23	30	31
3	20	22	26	38	34
4	11	15	6	16	30
5	8	20	15	16	30
6	7	14	17	24	31
7	25	18	22	33	34
8	10	16	27	9	18
9	18	23	18	17	33
10	11	22	28	19	29
11	21	32	30	18	27
12	11	30	18	21	29
13	12	26	14	20	22
14	13	19	13	14	26
15	13	15	18	19	32
16	19	20	13	25	29
17	12	26	24	37	30
18	10	16	22	24	24
19	17	15	30	21	23
20	9	24	32	40	24
21	19	31	25	26	31
22	19	21	21	35	28
23	15	26	14	17	24
24	11	20	19	16	18
25	9	16	20	19	24
26	6	32	16	31	36
27	18	23	26	12	29
28	12	38	32	35	29
29	15	20	29	22	29
30	19	12	25	22	25
31	11	20	18	35	36
32	14	19	11	30	34
33	7	16	17	30	22
34	34	33	38	37	33
35	18	21	32	32	29
36	16	21	21	19	31

4. DOSPERT SCALE ANALYSIS

4.1. Descriptive statistics

The DOSPERT scale was filled out by all 36 participants. As participant No. 34 demonstrated extreme risk attitude (in the Ethics domain), his records were excluded from the further DOSPERT scale analysis.

Eyeballing analysis of the DOSPERT scale statistics presented in Table 3 and 4 leads us to the following weak conclusions: 1. The respondents are the most sensitive to the *ethics* domain when deciding to take risks, where even low levels of risk are not acceptable. 2. Large response differences were in the *recreation* and *health/safety* domains. 3. The evaluations of the particular domains are not significantly correlated (see Table 5) in any of investigated cases, except in the case of Social decisions and Recreational pair. We consider this case to be a realization of the Type I. error, and we do not investigate this further.

Table no. 5 Spearman correlations of DOSPERT subscales

		Ethics	**Financial decisions**	**Health / Safety**	**Recreational**	**Social decisions**
Ethics	cor	1	0.2040	0.2923	0.1291	0.19
	p-value		0.2397	0.0885	0.4597	0.2743
Financial decisions	cor	0.2040	1	0.2924	0.2911	0.1942
	p-value	0.2397		0.0836	0.0850	0.2565
Health / Safety	cor	0.2923	0.2924	1	0.3121	-0.1192
	p-value	0.0885	0.0836		0.0639	0.4888
Recreation	cor	0.1291	0.2911	0.3121	1	0.3774
	p-value	0.4597	0.0850	0.0639		0.0233
Social decisions	cor	0.19	0.1942	-0.1192	0.3774	1
	p-value	0.2743	0.2565	0.4888	0.0233	

4.2. Econometric model

In previous parts, we have not identified any statistical dependencies between the risk measures in the Gain and in the Loss variants of the game. No kind of antisymmetry between them, as intuited in the introduction of the research, was evidenced. Now, we estimate the econometric models for both the risky measures defined according to the Gain/Loss variant of the game. Here, we used the scores from the DOSPERT domain specific subscales as explanatory variables to estimate the overparametrized model, with the number of selected options A in the case of the Gain variant and the number of selected options B in the case of the Loss variant being the dependent variables. Then, consequently minimizing the Akaike information criterion, we excluded the insignificant variables to obtain the parsimonial models given in Table 6.

In the Gain variant regression in parsimonial form, the dominant explanatory variable seems to be variable *Social Decision*. The negative sign of the estimated regression coeffi-

cient means the negative impact of the risky attitude identified in the *Social decision* domain of DOSPER on the risk aversion of the participant. Here about 10 points increase of the *Social decision* subscale scoring increases the number of chosen options A by 1. The similar results with approximately half the impact demonstrates scoring of the *Financial decisions* subscale. The positive sign of the *Ethics* regression coefficient is rather questionable. In the overall DOSPERT analysis introduced above, we identified small average scoring of the Ethics subscale, which can be explained by sensitive rejection of the ethical norm violation in the group of the experiment participants. On the other hand, rejection of ethical norms violations can be influenced by other motives not directly regarding risk attitudes.

Table no. 6 Econometric model estimated for the Gain and Loss variants using the DOSPERT scale scores

Variable	Gain variant		Loss variant	
	Overparametrized model	**Parsimonial model**	**Overparametrized model**	**Parsimonial model**
Intercept	8.659***	8.906***	1.951	1.964
Ethics	0.045	0.054*	-0.061	-0.062*
Financial decisions	-0.061*	-0.052*	0.030	0.027
Health/safety	0.014		0.000	
Recreation	0.015		-0.011	
Social decisions	-0.107**	-0.103**	0.113*	0.106**
R^2	0.312	0.292	0.212	0.208
R^2 adj.	0.189	0.221	0.072	0.129
F stat.	2.539*	1.124**	1.512	2.630*
Jarque-Berra (JB)				
Breusch-Pagan (BP)		1.626		1.197
		3.325		2.470
RESET		0.835		1.539
VIF(Ethics)		1.136		1.136
VIF(Finance)		1.140		1.140
VIF(Social)		1.166		1.166

(Level of significance: *** - 0.001, ** - 0.01, * - 0.05)

Analyzing the Loss variant regression in parsimonial form, the results are quite interesting. Despite of lack of statistical evidence of the „anti-symmetric“pattern of both risk measures (no correlation between measures as stated before), some kind of symmetry was discovered in the regression. In the parsimonial model, the estimated regression coefficients of the *Ethics*, *Financial decisions* and *Social decisions* variables demonstrated the opposite signs if compared to the parsimonial model of the Gain Variant regression, but the absolute values of these coefficients are approximately the same (*Ethics* 0,054 vs. -0,062, *Financial decisions* -0,052 vs. 0,027, *Social decisions* -0,103 vs. 0,106). The opposite signs of the coefficients are obvious as the dependent variable means the risk seeking measure if compared to the Gain variant regression, where the dependent variable was presented by the risk averse measure. The approximately equal absolute values of the regression coefficients can be interpreted as a demonstration of the antisymmety, supposed to be present in the introduction of the research. It is important to note however, that in the case of both variants the

R^2 adjusted is rather low, therefore the regression results, although statistically significant, have to be treated carefully.

As there is an evident difference between participant behavior in both variants observed in Figure 1 (participants being risk averse in the Gain variant and Risk neutral/seeking in the Loss variant), and this difference seems to be independent on the DOSPERT scale scores for the statistically significant variables (as with any change in the scores the number of selected options A/B in the appropriate variants change equally), we can conclude that the Reflection effect does exist, and that the risk measure defined by Holt and Laury (1992) in the Gain/Loss variants is case dependent. Furthermore there seems to be a clear antisymetry effect between both variants, preserving the Reflection effect with changes in the DOSPERT scale scores for the statistically significant variables.

5. CONCLUSION

In the article we presented an experiment based on the benchmark experiment proposed by Holt and Laury (1992) expanded by using the Gain and Loss variants of lottery proposed by Kahneman and Tversky (1972). The experiment results confirmed the presence of difference in risk measures in the Gain and Loss variants, but no direct relation between these measures was found. Using the scores from the DOSPERT scale we performed a regression analysis for both variants and identified the *Ethics*, *Financial decisions* and *Social decisions* to be the statistically significant subscales. For all these subscales, the absolute values of their estimated coefficients were equal for both variants, however the signs were opposite. This fact indicated that the difference in risk measures for the two variants is case dependant, further confirming the presence of the Reflection effect. This also indicated an antisymetry of the two risk measures in the Gain and Loss variants.

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References

[1] Baker, R.J., Laury, S., Williams, A.W., Comparing Small-Group and Individual Behavior in Lottery-Choice Experiments, *CAEPR Working Paper*, No. 2007-018. Available at SSRN: http://ssrn.com/abstract=1015833.

[2] Blais, A.R., Weber, E.U., A Domain-Specific Risk-Taking (DOSPERT) scale for adult populations, *Judgment and Decision Making*, Publisher: SSRN, Vol. 1, , No. 1, pp. 33-47, 2006, ISSN**:** 19302975.

[3] Ellsberg, D., Risk, Ambiguity, and the Savage Axioms, *Quarterly Journal of Economics*, Vol. 75, No. 4., pp. 643-669, 1961.

[4] Eckel, C., Wilson, R., Social learning in coordination games: does status matter?, *Experimental Economics*, Springer, Vol. 10/No. 3, pages 317-329, 2007

[5] Goeree, J.K., Holt, C.A., Palfrey, T.R., Risk Averse Behavior in Generalized Matching Pennies Games", *Games and Economic Behavior*, Vol. 45/No. 1., pp. 97-113, 2002.

[6] Holt, C.A., Laury, S.K., Risk Aversion and Incentive Effects, *American Economic Review*, Vol. 92/No. 5, pp. 1644-1655, 2002.

[7] Kahneman, D., Tversky, A., Subjective Probability: A Judgment of Representativeness, *Cognitive Psychology*, Vol. 3/No. 3., pp. 430-454, 1972.

[8] Kahneman, D., Tversky, A., Prospect Theory: An Analysis of Decision under Risk, *Econometrica*, Vol. 47/No. 2., pp. 263-291, 1979.
[9] Laury, S., Holt, C.A., Further Reflections on Prospect Theory, *Andrew Young School of Policy Studies Research Paper Series*, No. 06-11, 2005, Available at SSRN: http://ssrn.com/abstract=893614.
[10] Laury, S., Pay One or Pay All: Random Selection of One Choice for Payment, *Andrew Young School of Policy Studies Research Paper Series*, No. 06-13, 2005, Available at SSRN: http://ssrn.com/abstract=894271.
[11] Simon, H.A., Rational Decision-Making in Business Organizations, *Nobel Lectures, Economics,* 1978, available at: Nobelprize.org: http://www.nobelprize.org/nobel_prizes/economics/laureates/1978/simon-lecture.html.
[12] Von Neumann, J, Morgenstern, O., *Theory of Games and Economic Behavior*, Princeton University Press, 1944.
[13] Weber, E.U., Blais, A.R., Betz, N., A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors, *Journal of Behavioral Decision Making*, Vol. 15, pp. 263-290, 2002.