Individual Choice from a Convex Lottery Set: Experimental Evidence

T. Neugebauer

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1 Introduction

This paper is concerned with a simple pen-and-paper experiment on individual choice under risk, in which subjects choose a lottery from a convex set. In the reported experiment subjects face a choice of two risky lotteries and a degenerated one, and any linear combination of the three lotteries.[1] The distinguishing features of the design are as follows: The two risky lotteries perfectly negatively correlate with each other, implying the existence of a riskless combination of these lotteries. Furthermore, as this riskless combination of the risky lotteries yields a greater payoff than the degenerated lottery, all lotteries in the interior of the convex set are strictly dominated. Finally, the efficient frontier of the convex set includes lotteries that involve a possible loss.

The experimental design including these features is useful for the following reasons. First, we can test whether subjects make a rational choice or whether they choose dominated lotteries in this setting. In theories on rational choice, dominance is a normatively essential requirement (Levy, 1998; Luce & Marley, 2005; Starmer, 2000 survey the literature).[2] Violations of dominance have been observed in binary choice experiments where dominance was not transparent (Tversky & Kahneman, 1986),[3] and in portfolio selection experiments.[4] However, in contrast to these studies the present one involves a riskless alternative. Since sure events are evaluated differently from risky events, a different choice behavior than in the reported studies can be conceivable. Second, a couple of experiments on portfolio

T. Neugebauer
University of Luxembourg, Luxembourg School of Finance,
4 rue Albert Borschette, 1246 Luxembourg, Luxembourg
e-mail: Tibor.Neugebauer@uni.lu

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selection choice show that participants do not respond to correlations between alternatives when they make their investment decisions (Clemen & Reilly, 1999; Kroll & Levy, 1992; Kroll et al., 1988a, b; Lipe, 1998; Oehler, 1995; Weber & Camerer, 1998). The available empirical evidence for portfolio selection is also compatible with the view that people ignore covariance risk, as negligence of covariance risk leads to under-diversification in financial markets.[5] However, no study involves perfect negative correlation which, again, enables the decision maker to eliminate all risk (Elton & Gruber, 1981). Finally, most experimental studies involve only gains, but the literature has provided convincing evidence that people treat possible losses differently from gains. Hence, the choices in our experiment may diverge from the existing evidence for several reasons.

Below I describe three classroom experiments in which highly motivated subjects, who possess complete information about risk and return involved in the decision task, are asked individually to choose a linear combination of one riskless asset and two risky assets. The two risky assets are perfectly negatively correlated, thus allow the construction of a riskless portfolio with a greater return than the riskless asset. Under these simplified conditions, I examine whether the actual choices from the convex set approach efficiency, and if theoretical or psychological principles underlie the observed behavior.

In the three experiments, each subject was asked to allocate a 100% share between three lotteries and provide a free-form rationale for the decision. The first (Original) and second (High Stakes) experiments are identical but the latter affects a considerably more highly paid group of subjects. These experiments involve one decision only; no repeated choice was considered (see the discussion on maximization of the geometric mean in Kroll et al. 1988a). The third (Transparency) experiment features repeated choice: the first stage is identical to the first experiment, but at a second stage subjects are exposed to a more transparent presentation of the task. The three experiments were designed to investigate four major issues: (1) the effects of the perfect negative correlation between the risky alternatives, and of the existence of the riskless but dominated lottery; (2) the possibility to choose from a convex set; (3) the effects of higher stakes; and (4) the effects of transparent presentation of dominance.

Section 2 describes the tasks employed in both experiments. The opportunity set and the theoretical optimal decisions are presented in Sect. 3. Section 4 describes and discusses the results of the Original and the High Stakes experiments; Sect. 5 does the same for the Transparency Experiment. Concluding remarks are stated briefly in Sect. 6.

2 Experimental Design

2.1 Instructions

Subjects had to write their choice on a decision sheet which included the following instructions: "There are three assets A, B, C; assets A and B are risky, C is riskless. The payoffs generated by these assets depend on two equiprobable states, X and Y.

Table 1 Payoffs in the experiment

Your division of your endowment	Asset	State X	State Y
a:	A	3	−1
b:	B	−3	6
1-a-b:	C	1	1
	Payoff	$(3a-3b+1-a-b)$	$(-a+6b+1-a-b)$

Your task is to make a decision about the allocation of your investment capital towards each of these assets. Please record the shares that you allocate to these assets in the first column of the following table. The sum of the shares must yield 100%, and each share must be non-negative.

After you have made your choice, you are asked to toss a coin to determine the state to occur. Before you toss, you decide whether heads represents state X or state Y. Given you choose X, state X occurs if the face on the upside of the coin shows heads; if the coin shows tails, state Y occurs. Given you choose Y, heads and tails imply state Y and X, respectively.

The resulting payoffs are recorded in the table. After you have allocated the shares that composed your portfolio, please compute your payoff for both states X and Y and record these numbers in the last row of the table. The corresponding amount will be paid to you in cash after you have tossed the coin. Note: if the outcome of the gamble is negative you will also have to pay your dues to the experimenter. In fact, you do not have to take any risk. Asset C is riskless and guarantees a sure payoff of 1 token."

All students first made their choice, and then they were asked to briefly state the rationale for their decision in words on the record sheet. In the last line of their sheet corresponding to the one in Table 1, subjects wrote the payoffs they were about to receive in the states X and Y. If the payoff in one state was negative, subjects were prompted to put the exact amount of money on the table to show that they were willing to execute their decision before the toss of the coin. Three students chose an allocation that involved a negative payoff in state X or Y. One student actually received a negative payoff and had to pay the corresponding amount to the experimenter. When all had finished their statement, each student tossed a coin to determine his/her own payoff according to the allocation of shares in the Table 1, and received immediate cash payment. The task took about three quarters of an hour to complete.

3 Theoretical Considerations

Before we discuss the experimental results we present the theoretical predictions. Due to perfect negative correlation, a riskless combination of A and B exists. We anticipate that most subjects choose a positive share of the degenerated lottery C.

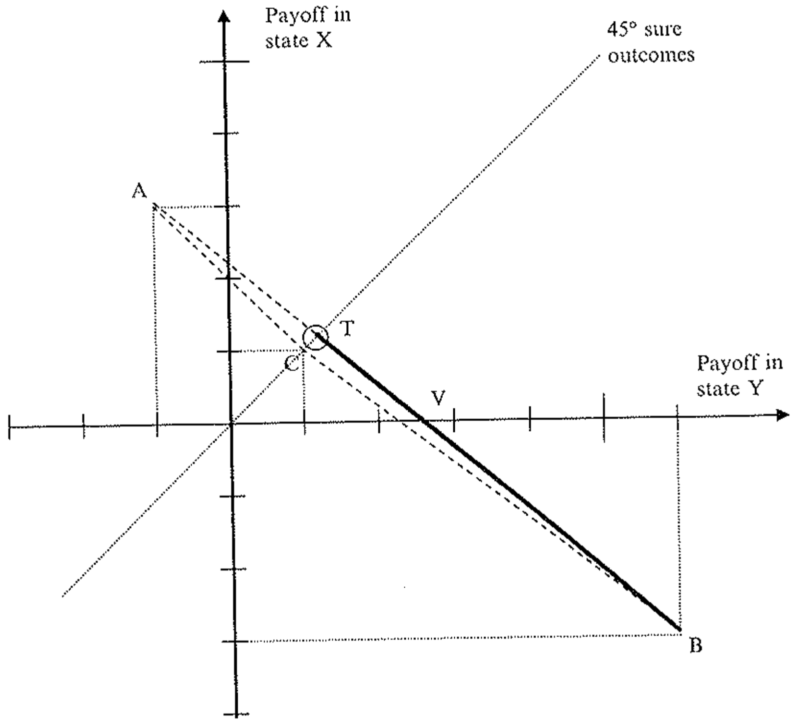

Fig. 1 Portfolio possibility set in the experiment

This decision is dominated, because the riskless portfolio constructed from the risky lotteries A and B at a ratio 9:4 induces a riskless return of $15/13 > 1$.[6] All allocations which involve a share greater than $a = 9/13$ towards the lottery A are dominated. The expected payoff of the three lotteries are $\{\mu_A; \mu_B; \mu_C\} = \{1; 1.5; 1\}$, the standard deviations of A and B are $\{\sigma_A; \sigma_B\} = \{2; 4.5\}$, the covariance ($\sigma_{AB} = -9$) and the correlation coefficient ($\rho_{AB} = -1$) between the risky lotteries. In Fig. 1, the plane included in the connecting lines of the coordinates A, B and C presents the convex set of lotteries one chooses from. The diagram represents the payoff space; the vertical axis measures the payoff in state X and the horizontal axis measures the payoff in state Y. The 45° line represents equal payoffs in both states, X and Y.

3.1 *Testable Hypothesis: Efficient Frontier*

The solid line in Fig. 1 represents all efficient choices. It connects lottery B with the riskless combination of A and B, corresponding to the coordinate (15/13; 15/13) denoted by T. The efficient choices involve all payoff maximizing combinations for a given amount of risk. Thus all indifference curves that maximize utility are tangent to this line. Note, the linear combinations that lie on the broken line which connects lottery A and T are dominated by the lotteries on the efficient line. Also, all choices in the interior of the set are dominated as they involve the strictly dominated lottery C. The choice of any combination on the efficient frontier is proposed in general by expected utility theory and in particular by mean-variance theory.[7]

3.2 *Testable Hypothesis: Lossless Combination of Risky Lotteries*

In prospect theory losses loom larger than gains. Hence, prospect theory as well as cumulative prospect theory would predict a choice on the efficient line between T and V for reasonable chosen loss aversion parameters. V represents the lottery involving the payoffs (2.5; 0) in states Y and X, i.e., V maximizes expected value in the domain of gains. In addition to these theories, other theories that weigh losses more than gains (for instance aspiration level theory with a positive aspiration level) would predict the positive segment of the efficient line.

3.3 *Testable Hypothesis: Riskless Combination of Risky Lotteries*

The riskless combination of risky lotteries, T, which generates a sure payoff of 15/13 is proposed by at least three theories: First, cumulative prospect theory involving the parameters estimated by Tversky and Kahneman (1992) would suggests this choice. Second, under the assumption of a perfect capital market, T would be the tangential portfolio suggested by the separation theorem and the CAPM. Third, safety first theory would also suggest this outcome, given that the safety first level is below 15/13.

4 Original and High Stake Experiment

4.1 *Original Experiment*

Fifteen students of the Behavioral Finance lecture in the summer term 2005 at the University of Hannover, Germany were asked to make their decision on a record sheet as displayed in Table 1. Subjects were no volunteers in the experiment, but completed the task as part of the lecture. One can assume that the students understood the task, since they all correctly calculated the payoffs for states X and Y on their record sheets. Most of them had seen the mean variance model in earlier courses. Despite the arguably small payoffs (one token equaled 1 €), students seemed highly motivated. Subjects were asked to imagine actually facing an honorable bet between millionaires.

Table 2 Individual choices (a, b and c in percentage) and stated rationale in the Original Experiment

ID	R(Y)	R(X)	a	b	c	Stated rationale explaining choice
1	0.90	1.20	30	10	60	A is less risky than B, I prefer the riskless asset
2	1.00	1.00	0	0	100	Assets A and B are very risky, I do not want to take any risk
3	1.05	1.10	35	15	50	B's variance is huge
4	1.33	1.00	67	33	0	perfect negative correlation, I try to estimate the optimal portfolio
5	1.75	0.50	25	25	50	Diversification
6	1.75	0.50	25	25	50	Payoffs are always positive
7	1.90	0.40	30	30	40	
8	2.00	0.33	33	33	33	
9	2.10	0.20	20	30	50	I always have a positive payoff
10	2.10	0.20	20	30	50	
11	2.20	0.20	40	40	20	My payoff is always positive
12	2.50	0	50	50	0	No loss, but relatively high gain possible
13	2.50	0	50	50	0	No loss, but relatively high gain possible
14	3.00	−0.50	25	50	25	Diversification with a tendency towards the more risky asset
15	6.00	−3.00	0	100	0	Take the risk, since little at stake. In case of higher stakes would decide differently.

Individual Choices in the Original Experiment

The individual choices of the original experiment are recorded in Table 2; percentages are rounded to the next integer and tokens are rounded to the next hundredth. The first column assigns an identification number to subjects; the second and third columns present the resulting returns in state X and Y, respectively. The third, fourth and fifth columns correspond to the allocation of shares to the lotteries A, B and C; reported numbers refer to percentages. For instance, individual #10 allocated a 30% share to A, 10% to B and 60% to C; the corresponding payoffs for the states X and Y were 1.20 and 0.90 tokens.

The expected payoffs among all subjects average at 1.17 tokens. This amount is only 0.02 tokens more than the payoff of the riskless combination T. The Wilcoxon (signed ranks) test indicates that the difference in payoff to the riskless choice is insignificant ($p > 0.5$). Only four subjects chose a lottery on the efficient frontier (#4, #12, #13, #15). Due to the students' choices of asset C, the average loss per subject is 0.06 tokens in expected terms; the 95% confidence interval extends from 0.03 to 0.08 tokens. The difference is significantly different from zero ($p < 0.002$, Wilcoxon test). The efficiency loss can be expressed in excess risk incurred by the students. On the efficient frontier, the risk to be incurred at an expected payoff of 1.17 tokens would be 0.26 tokens. In other words, the standard deviation which is 0.99 tokens is 0.73 tokens too large.

In fact, it would be good to know whether subjects have any reason for such non-rational choices. The last column of Table 2 records the stated rationale of the subject eventually abbreviated and translated to English. Subjects #7, #8, and #10 did not provide any statement. In fact, no salient rewards were connected to these statements. Subject #4 is the only one who states that perfectly negative correlation is involved, thus he presumably recognized the possibility of a riskless combination of assets A and B. All other subjects make no analogous statement, but rather refer to possible losses or to the wish to diversify. At least the statements of five subjects (#6, #9, #11, #12, #13) suggest that they do not want to incur any loss.

4.2 High Stake Experiment

Eighteen students of the course "Decision Making and Portfolio Choice" in the winter term 2006 at the University Hannover were asked to make their decision in the described experiment with tenfold payoff; i.e., each token equals 10 €. Kroll et al. (1988a) suggested that subjects may take the task more seriously and make different decisions if payoffs are multiplied by ten. The experiment was run at the end of the final lecture, 3 weeks ahead of students' final examination; expected utility and the mean-variance model were essential content in this course. All subjects were volunteers and no subject had previously participated in a comparable experiment.

Individual Choices in the High Stake Experiment

Corresponding to Tables 2 and 3 records subjects' choices, rationales and payoffs involved in the individual choices; the ID numbers are $\{\#16, \#17, \ldots, \#33\}$, thereby taking into account the assigned IDs of the Original Experiment. The expected payoffs among subjects in the High Stake Experiment average 1.16 tokens.[8] This amount is only 0.01 tokens more than the payoff of the riskless combination, T, and 0.01 tokens less than in the Original Experiment. According to the Wilcoxon test, the difference in expected payoff is insignificant from the ones in T. Furthermore, the differences in choices and the differences in payoffs as measured in tokens are insignificant between the Original Experiment and the High Stake Experiment as the Mann Whitney test suggests.[9] In the High Stake experiment, five subjects choose a lottery on the efficient frontier. All these subjects $\{\#29, \#30, \#31, \#32, \#33\}$ choose the lossless corner lottery V. In summary, the tenfold increase in payoffs has no statistically notable effect on subjects' decisions. However, 13 subjects (72%) state that they do not want to earn a negative payoff, $\{\#17, \#20, \#23, \#24, .., \#33\}$, and no subject chooses a lottery that involves a potentially negative payoff.

Table 3 Individual choices (a, b and c in percentage) and stated rationale in the High Stake Experiment

ID	r(Y)	r(X)	a	b	c	Stated rationale explaining choice
16	0.60	1.60	70	20	10	$r(Y) > r(X)$
17	0.70	1.40	40	10	50	No deposit payment. I am very risk averse
18	1.00	1.00	0	0	100	Don't invest in A, since $\mu = 10 = r(C)$. For B $\mu > 10$, but σ is too high
19	1.00	1.20	50	20	30	Risk relatively neutralized. In any case, I receive more than C
20	1.40	0.80	30	20	50	I am risk averse. I do not want to lose any, but I want a chance to earn some money
21	1.75	0.50	25	25	50	It is difficult to decide between A and B. I am risk neutral
22	1.80	0.40	10	20	70	
23	1.90	0.40	30	30	40	No Loss. Would C be greater, I would invest more in C
24	1.90	0.40	30	30	40	Because: C is riskless. B, A involve a possibility of loss or gain
25	2.00	0.33	33	33	33	No loss possible, asset A insures loss of B in X
26	2.10	0.20	20	30	50	No negative payoff, because budget = 0.50% chance of having a "high" payoff
27	2.40	0	30	40	30	All or nothing, but incur no losses
28	2.40	0	30	40	30	No risk of loss, but prospect of positive gain!
29	2.50	0	50	50	0	I do not feel like losing money
30	2.50	0	50	50	0	50% chance to receive something
31	2.50	0	50	50	0	Since one-shot gamble, I do not want to make a loss. If repeated I'd always choose B
32	2.50	0	50	50	0	In all states there is no loss
33	2.50	0	50	50	0	All or nothing

4.3 What Lottery Do Subjects Select from the Convex Set?

Since there are no significant differences between the data of the Original Experiment and the High Stake Experiment, the data are pooled in this section. The resulting 33 independent choices are displayed in Fig. 2 with respect to the shares a and b allocated to the risky lotteries A and B. In the figure, a small circle represents one observation, a double circle represents two choices, a triple circle three choices etc. Hence, seven subjects chose the 50:50 division of endowment toward the two risky lotteries inducing the payoffs 2.50 tokens or 0. As can be seen in the figure, most choices are on the 45 ° line or close to it; 14 choices involve a = b; 8 involve a > b; and 7 choices involve a < b; on average a = 1.03 b. The distribution around the 45 ° line is approximately symmetric.[10] In other words, the allocation to the risky lotteries is divided in equal shares among A and B. Although 34% of shares were assigned to C a glance at Fig. 2 makes it evident that it is not apt to say that the endowment is divided equally between all three lotteries. The general choice pattern suggested by the figure seems rather in line with the following heuristic: choose a share of the riskless lottery and allocate the remainder to the lottery that maximizes expected value among the lossless lotteries. In fact, this choice pattern is not rational

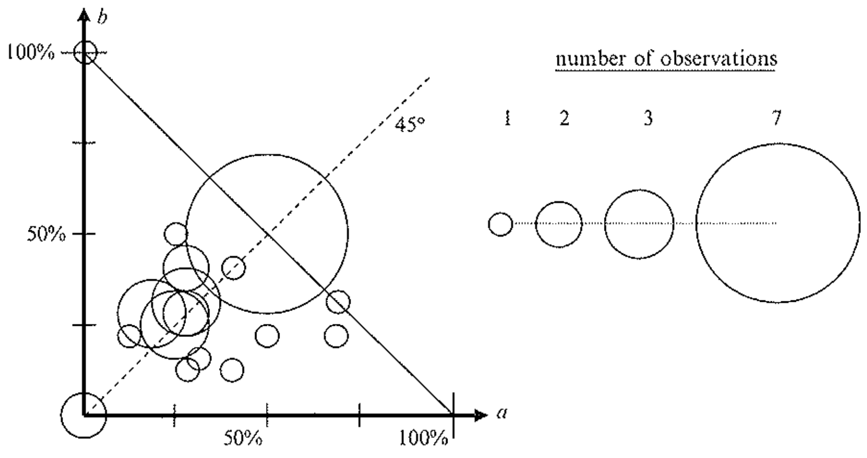

Fig. 2 Risky lottery share in the experiment

as it involves a dominated lottery, but the rationale agrees with aspiration level theory (Lopes, 1987) which forms the basis of behavioral portfolio theory (Shefrin & Statman, 2000).[11]

5 Transparency Experiment

5.1 The Experiment

Thirteen students of the Behavioral Finance lecture in the summer term 2006 at the University of Hannover voluntarily participated in the experiment. The experiment was run at the end of a lecture. Only some of the 64 students who attended the course had previous knowledge on portfolio choice and individual decision making. It is possible that some of the subjects had participated in one of the other above reported experiments. The participating subjects, in Table 4 identified by {#34, #35, ..., #46}, were first asked to make a choice according to Table 1; in accordance with the Original Experiment, one token equaled 1 € in the Transparency Experiment. When all subjects had made the first choice, they were asked to make a second choice on another record sheet. The second sheet presented 14 lotteries including lotteries C and V.[12] The other twelve lotteries corresponded to coordinates on the line that connects A and B in Fig. 1, dividing the line in 13 equal sized segments. Lotteries A and B were not included in the sheet and the states X and Y were interchanged to mask the decision problem; the two tasks in the experiment should not be easily identified as identical.[13] Hence, in the second decision task, the two riskless lotteries C and T were both exposed to the participants, such that dominance was transparent. Either the choice in the first task or the choice in the second task was played out for real; subjects tossed a coin to determine the relevant task.

Table 4 Individual choices in the Transparency Experiment

ID	r(X)	r(Y)		r(Y)	r(X)
34	1.60	0.40	→	1.15	1.15
35	1.00	1.00	→	1.15	1.15
36	1.00	1.00	→	1.15	1.15
37	1.00	1.00	→	1.15	1.15
38	1.00	1.00	→	1.88	0.58
39	0.60	1.80	→	2.23	0.23
40	0.30	2.00	→	2.23	0.23
41	−0.50	3.50	→	2.50	0
42	0	2.50	→	2.50	0
43	0	2.50	→	2.50	0
44	0	2.50	→	2.50	0
45	0	2.50	→	2.50	0
46	0	2.50	→	2.50	0

Individual Choices in the Transparency Experiment

Since independence of the data from the above experiments is not warranted and subjects did hardly state any rationale on their sheet at the end of the second task, this section focuses on the differences in choice between the first and the second task in the Transparency Experiment. Table 4 records on the left side the lotteries chosen in the first task, and the corresponding choices of the second task on the right. While in the first task the majority of decisions involved a dominated lottery, 0% of subjects chose a dominated lottery in the second task. This result confirms earlier experimental results of the non-dominated lottery choice where dominance was transparent (Birnbaum, 1998a; Tversky & Kahneman 1986).

It might be conceivable that subjects who have chosen a risky lottery in the first task may choose T when this lottery is transparently presented in the second task, because it is the efficient riskless payoff. However, the table of the individual choices in the Transparency Experiment reveals that subjects who chose lottery V in the first task did repeat their choice in the second task. Between tasks, subjects chose the same amount of risk; in the first task the average standard deviation between payoffs in state X and Y was 1.12 tokens, in the second task it was 1.10 tokens ($p > 0.5$, Mann Whitney test).

6 Summary

This paper has presented a simple individual choice experiment in a classroom setting, where subjects choose a portfolio from a convex set involving dominated lotteries and perfect negative correlation of payoffs. Most subjects had heard about expected utility theory and mean variance theory before, but the presentation of the task was different than the one from their textbooks. The correlation involved in the task allowed the construction of a riskless lottery, but hardly any subject identified the correlation. Hence, the present study shows that even under perfect negative correlation subjects neglect correlation. Moreover, most subjects choose a dominated lottery when dominance is not transparent. The fact that all subjects choose an efficient lottery when dominance is transparent seems to suggest that errors cause efficiency losses.[14]

The data on revealed preferences and the stated rationales of subjects suggest that subjects in the experiment choose a share risklessly and allocate the remainder of their endowment to the most risky lottery that involves only gains. The data thus support earlier experimental findings according to which subjects are loss averse rather than variance averse (Duxbury & Summers, 2004; Levy & Levy, 2001). This pattern seems to suggest that subjects want both, secure a non-negative payoff and achieve a high expected return. Though choices are only boundedly rational since resources are allocated to a dominated lottery, the behavior is in the spirit of aspiration level theory (Lopes, 1987).

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Notes

[1]The available combinations represent mixtures of consequences at a fixed probability of one half. This approach contrasts to the one presented in Sopher & Narramore (2000) where subjects could mix probabilities over fixed consequences.

[2]Systematic dominance violations refute a large class of descriptive models including rank-dependent utility theory (Diecidue & Wakker, 2001; Quiggin, 1985, 1993), rank and sign dependent utility theory (Luce & Fishburn, 1991, 1995), cumulative prospect theory (Gonzalez & Wu, 1999; Starmer & Sugden, 1989; Tversky & Kahneman, 1992; Tversky & Wakker, 1995; Wakker & Tversky, 1993; Wu & Gonzalez, 1996), lottery dependent utility theory (Becker & Sarin, 1987), aspiration level theory (Lopes, 1987; Lopes & Oden, 1999), mean-variance theory (Lintner, 1965; Markowitz, 1952; Mossin, 1966; Sharpe, 1964; Tobin, 1968), safety first theory (Kataoka, 1963; Roy, 1952; Telser, 1955), and generalized utility theory (Machina, 1982).

[3]Birnbaum and associates present recent evidence for systematic violations of first order stochastic dominance (Birnbaum, 1997, 1999a, b, 2004a, b; Birnbaum & Martin, 2003; Birnbaum & Navarette, 1998; Birnbaum et al. 1999). Diederich & Busemeyer (1999) report also violation of first order stochastic dominance in a repeated setting where dominance is not transparent.

[4]Kroll & Levy (1992) and Kroll et al. (1988a, b) find violations of second order stochastic dominance, and Baltussen and Post (2005) report violations of first order stochastic dominance.

[5]Empirical studies have documented that private investors under-diversify and frequently invest only in one to two securities or they split their wealth equally over all available assets or funds (Bernatzi, 2001; Bertaut, 1998; Blume & Friend, 1975; Blume et al., 1974; Cohn, Lewellen, & Lease, 1975; Guiso, Japelli, & Terlizze, 1996; Heaton & Lucas, 2000; Joos & Kilka, 1999; Kelly, 1994; Perraudin & Sorensen, 2000; Samuelson & Zeckhauser, 1988; Statman, 1987). The latter investment approach is known as the 1/n-heuristic or naïve diversification (Benartzi & Thaler, 2001), and even financial advisors support corresponding investment decisions (Canner, Mankiw, & Weil 1997; Elton & Gruber, 2000; Fisher & Statman, 1997a, b; Siebenmorgen, Weber, & Weber 2001). Siebenmorgen and Weber provide a remarkable fit between a behavioral model that assumes the negligence of covariance risk in the objective function and their own data as well as the one of Canner et al.

[6]To compute the riskless combination of lotteries A and B, equalize the payoffs in states X and Y: $3a - 3b + 1 - a - b = -a + 6b + 1 - a - b \Leftrightarrow a/b = 9/4$, where a and b denote the shares allocated to A and B.

[7]Other theories predict also choices on the efficient frontier (general form of cumulative prospect theory, prospect theory, rank-dependent utility theory, rank and sign dependent utility theory, lottery dependent utility theory, aspiration level theory and generalized utility theory).

[8]The average loss in payoff is 0.06 tokens, i.e., the same as in the Original Experiment. The difference is significantly different from zero ($p = 0.001$, Wilcoxon test). Efficiency is 95% in both experiments. The standard deviation for the expected payoff of 1.16 tokens on the efficient line would be 0.05 tokens, 0.76 tokens less than the observed standard deviation. The observed standard deviations of the chosen lotteries are statistically undistinguishable between Original and High Stake Experiment ($p = 0.957$, Mann Whitney test).

[9]With the Mann Whitney test I compared the allocations of shares to A, B and C (i.e., the shares a, b and c), the payoffs in states X, Y and the expected payoffs, both in tokens. Furthermore, I checked on the equality of the variances between the two experiments by means of the non-parametric test of Talwar & Gentle (1977). All probability values are greater than $p > 0.8$.

[10]The Wilcoxon signed ranks test for symmetry returns a probability value of $p = 0.513$.

[11]Aspiration level theory supports also both, the purchase of insurance and the purchase of lottery tickets.

[12]Although the task involved the choice of a linear combination from 14 lotteries, actually no subject chose a combination of more than two lotteries.

[13]The procedure tried to avoid that students made the same choice in both tasks just on grounds of consistency. Some subjects were debriefed after the experiment; these subjects had not noticed that the tasks were basically identical not regarding the risky lotteries A and B.

[14]A couple of models study the role of errors in individual decision making (Camerer & Ho, 1994; Harless & Camerer, 1994; Hey, 1995; Hey & Orme, 1994; Loomes & Sugden, 1995; Schmidt & Neugebauer, 2007).

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