REEVALUATING EVIDENCE ON MYOPIC LOSS AVERSION: AGGREGATE PATTERNS VERSUS INDIVIDUAL CHOICES*

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Pavlo R. Blavatskyy† and Ganna Pogrebna‡

Abstract

Investors who are more willing to accept risks when evaluating their investments less frequently are said to exhibit myopic loss aversion (MLA). Several recent experimental studies found that, on average, subjects bet significantly higher amounts on a risky lottery when they observe only a cumulative outcome of several realizations of the lottery (long evaluation period). In this paper we reexamine these empirical findings by analyzing individual rather than aggregate choice patterns. The behavior of the majority of subjects is inconsistent with the hypothesis of MLA: they bet an intermediate fraction of their initial endowment and these bets, on average, are not significantly different across two treatments with short and long evaluation period. We discuss several alternative explanations of this finding, including the Fechner model of random errors and the financial asset pricing model.

Key words: myopic loss aversion, evaluation period, prospect theory, random error

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† Institute for Empirical Research in Economics, University of Zurich, Winterthurerstrasse 30, CH-8006 Zurich, Switzerland, tel.: +41(0)446343586, fax: +41(0)446344978, e-mail: pavlo.blavatskyy@iew.unizh.ch

‡ Corresponding author, Columbia University, Institute for Social and Economic Research and Policy, Center for Decision Sciences, 419 Schermerhorn Hall, New York, NY 10027 USA, tel.: +1 212 854 8384, e-mail: gp2240@columbia.edu

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1. INTRODUCTION

The equity premium puzzle stems from the observation that individuals who hold low return government bonds when high return equity stocks are available should exhibit an implausibly high risk aversion (Mehra and Prescott, 1985). Benartzi and Thaler (1995) propose myopic loss aversion (MLA) as an explanation for this puzzle. MLA is a twofold behavioral concept (e.g., Thaler et al., 1997) which combines greater sensitivity to losses than to gains (loss aversion) and a tendency to evaluate outcomes frequently (mental accounting). Since the frequency of evaluation is an important component of MLA, it is also related to the way in which individuals set their time horizons in choice under risk and uncertainty (e.g., Bhushan et al., 1997; Kelly, 1997).

A testable implication of MLA is that for lotteries with a positive expected value and the possibility of a loss, a high frequency evaluation should lead to a greater dissatisfaction (Haigh and List, 2005). When the performance of such lotteries is frequently assessed, losses are more likely to be detected. Since the aggravation from losses exceeds the pleasure from equal-sized gains, this leads to a greater dissatisfaction compared to a situation when the same lotteries are evaluated infrequently.

Empirical evidence on MLA is mixed. On the one hand, Durand et al. (2004) show that the analysis of Benartzi and Thaler (1995) is not robust. Fielding and Stracca (2006) find that MLA can explain historical equity premium puzzle only if investors have highly short-sighted evaluation period. On the other hand, Thaler et al. (1997), Gneezy and Potters (1997), Gneezy et al. (2003), Langer and Weber (2005), Haigh and List (2005) and Bellemare et al. (2005) provide experimental evidence in support of MLA. In

these experimental studies, subjects appear to invest significantly higher amounts in a risky lottery when its performance is assessed over a relatively long time period.

This paper reevaluates the experimental data documenting the presence of MLA. In particular, we take a closer look at the experimental results of Gneezy and Potters (1997), Haigh and List (2005) and Langer and Weber (2005). We show that while aggregate choice patterns in these experiments appear to support MLA, the majority of individual choices are inconsistent with the MLA hypothesis.

The remainder of this paper is organized as follows. Section 2 describes the experiment conducted by Gneezy and Potters (1997) as well as summarizes design extensions introduced by Haigh and List (2005), Langer and Weber (2005) and Bellemare et al. (2005). Section 3 provides the reexamination of experimental results and shows that the majority of individual choices are inconsistent with MLA. Section 4 discusses several alternative explanations of the experimental data. Section 5 concludes.

2. EXPERIMENTAL DESIGN

In the experiment of Gneezy and Potters (1997), subjects receive a task to bet any part x of their initial endowment on a risky lottery. This lottery yields $-x$ with probability 2/3 and $2.5x$ with probability 1/3. Experimental task is iterated for 9 rounds.

Subjects are randomly assigned to one of the two experimental treatments. In treatment H, the lottery is evaluated with high frequency. Subjects make investment decisions at the beginning of each of the 9 rounds. At the beginning of round $t \in \{2, \dots, 9\}$ they observe the outcome of the lottery realized in the previous round. In treatment L, the lottery is evaluated with low frequency. Subjects make investment decisions only in round $t \in \{1,4,7\}$. The level of investment chosen in round t remains

constant in rounds t, $t+1$ and $t+2$. In rounds 4 and 7 subjects observe the cumulative outcome of the lottery realized in the previous three rounds. In both treatments subjects receive a new initial endowment at the beginning of every round. This endowment does not depend on the cumulative earnings in the previous rounds.

Haigh and List (2005), Langer and Weber (2005), and Bellemare et al. (2005) extend Gneezy and Potters (1997) approach by introducing several modifications to the experimental design. Particularly, Haigh and List (2005) conduct an experiment with conventional student subject pool as well as a field experiment with professional traders from the Chicago Board of Trade. Langer and Weber (2005) increase the number of rounds from 9 to 18. They also use two other risky lotteries which return aggregate choice patterns inconsistent with MLA. Bellemare et al. (2005) introduce an additional treatment identical to treatment L except that subjects are able to observe the realization of the risky lottery in every round. They find that betting behavior in this treatment is not significantly different from that in treatment H.

3. REEXAMINATION OF EXPERIMENTAL RESULTS

Gneezy and Potters (1997), Haigh and List (2005), and Langer and Weber (2005) show that, at the aggregate level, students as well as professional traders are prone to MLA. Table 1 provides a summary of results reported in these experimental studies. On average, subjects appear to invest statistically significantly higher proportions of their initial endowments in treatment L compared with treatment H.

[INSERT Table 1 HERE]

In order to explore whether individual behavior can be explained by the MLA hypothesis, we use individual choices to partition subjects into three clusters: (i) subjects

who consistently invest 100% of their endowment in a risky lottery; (ii) subjects who consistently invest 1-99% of their initial endowment (henceforth an "intermediate amount") and (iii) subjects who consistently invest 0% of their endowment. Table 2 and Table 3 show that the majority of subjects in the data set exhibit the same individual choice patterns in both treatments of the experiment. In the majority of rounds they invest an intermediate fraction of their initial endowment into the risky lottery. According to Table 2 and Table 3, only a handful of subjects abstain from betting on the risky lottery and 12%-22% (15%-37%) of subjects consistently bet 100% of their endowment on the risky lottery in treatment H (L).

[INSERT Table 2 and Table 3 HERE]

Since the majority of subjects consistently bet an intermediate fraction of their endowment, we take a closer look at choices of these subjects. Table 4 shows that intermediate bets are not significantly different across two treatments in all experiments with an exception of the field experiment of Haigh and List (2005) with professional traders. This exception is discussed in detail in Section 4.2.

Our analysis shows that the majority of subjects invest an intermediate fraction of their endowment in the risky lottery in both treatments. Furthermore, these intermediate investments are not significantly different across two treatments. We now demonstrate that such behavior is inconsistent with the hypothesis of MLA.

[INSERT Table 4 HERE]

The MLA prediction originates in a deterministic cumulative prospect theory (CPT) developed by Tversky and Kahneman (1992). According to CPT, an individual derives utility from changes in wealth rather than from absolute wealth levels, which is

captured by the value function $v(x) = x^{\alpha}$ if $x \geq 0$ and $v(x) = -\lambda(-x)^{\beta}$ if $x < 0$. Coefficient $\lambda > 0$ refers to the index of loss aversion (e.g., Köbberling and Wakker 2005). Coefficients α and β are estimated to be both equal to 0.88. They capture diminishing sensitivity to gains and losses

An individual who invests nothing into the risky lottery obtains zero utility in both treatments. An individual who bets amount x on the lottery in treatment H receives utility

(1) $$U_H(x) = (2.5x)^{\alpha} w_+(1/3) - \lambda x^{\beta} w_-(2/3)$$

where $w_+(p) = p^{\gamma}/(p^{\gamma} + (1-p)^{\gamma})^{1/\gamma}$ and $w_-(p) = p^{\delta}/\left(p^{\delta} + (1-p)^{\delta}\right)^{1/\delta}$ are the probability weighing functions for gains and losses respectively ($p \in [0,1]$ and coefficients $\gamma > 0$ and $\delta > 0$ are estimated to be 0.61 and 0.69 correspondingly).

An individual who bets amount x on the risky lottery in treatment L obtains utility

(2) $$U_L(x) = (0.5x)^{\alpha} w_+(19/27) + \left(4^{\alpha} - 0.5^{\alpha}\right)x^{\alpha} w_+(7/27) + \left(7.5^{\alpha} - 4^{\alpha}\right)x^{\alpha} w_+(1/27) - \lambda(3x)^{\beta} w_-(8/27)$$

Let $\underline{\lambda} = \dfrac{2.5^{\alpha} w_+(1/3)}{w_-(2/3)}$ and $\overline{\lambda} = \dfrac{0.5^{\alpha} w_+(19/27) + \left(4^{\alpha} - 0.5^{\alpha}\right)w_+(7/27) + \left(7.5^{\alpha} - 4^{\alpha}\right)w_+(1/27)}{3^{\beta} w_-(8/27)}$.

Notice that when $\alpha = \beta$, an individual bets nothing on the risky lottery in treatment H if her index of loss aversion λ is greater than $\underline{\lambda}$ (in this case $U_H(x) < 0$). An individual bets all her initial endowment on the risky lottery if $\lambda < \underline{\lambda}$ ($U_H(x) > 0$). Finally, an individual is exactly indifferent between betting and not betting (i.e. she can invest any fraction of her endowment in the risky lottery) if $\lambda = \underline{\lambda}$ ($U_H(x) = 0$). Similar prediction holds for treatment L with the threshold for index of loss aversion being $\overline{\lambda}$ instead of $\underline{\lambda}$.

For conventional parameterizations of cumulative prospect theory ratio $\bar{\lambda}$ is larger than ratio $\underline{\lambda}$. For example, $\bar{\lambda} \approx 1.66$ and $\underline{\lambda} \approx 1.33$ for parameters estimated by Tversky and Kahneman (1992).[1] Taking into account different possible levels of loss aversion, Table 5 presents a theoretical prediction for individual behavior in treatments H and L according to the MLA hypothesis.

[INSERT Table 5 HERE]

Table 5 has the following testable implications in the between-subject design of Gneezy and Potters (1997):

A. Percentage of subjects, who bet all their endowment on the risky lottery, is higher in treatment L than in treatment H;
B. Percentage of subjects, who abstain from betting, is higher in treatment H than in L;
C. Percentage of subjects, who bet all their endowment in treatment L, is higher than the percentage of subjects, who bet an intermediate fraction of endowment in treatment H;
D. Percentage of subjects, who bet nothing in treatment H, is higher than the percentage of subjects, who bet an intermediate fraction of their endowment in treatment L.

According to Table 2 and Table 3, implications A and B of MLA are confirmed for all experiments. However, implications C and D are clearly violated. In all experiments the majority of subjects bet an intermediate fraction of their endowment on the risky lottery. Fractions of subjects who consistently bet an intermediate amount of their endowment are almost equal across treatments (ranging between 65% and 85% in different experiments). Moreover, except for traders (Haigh and List, 2005) intermediate

[1] Gneezy and Potters (1997), Gneezy et al. (2003) and Haigh and List (2005) considered a simplified version of cumulative prospect theory. This version assumes a piecewise linear value function ($\alpha = \beta = 1$) without non-linear probability weighting ($\gamma = \delta = 1$). In this case $\underline{\lambda} = 1.25$ and $\bar{\lambda} \approx 1.56$.

bets of other subjects are not statistically significantly different between treatment H and treatment L.

This finding can be consistent with the MLA hypothesis only if ratios $\underline{\lambda}$ and $\overline{\lambda}$ are equal for the majority of subjects in both treatments. However, in order for the equality $\underline{\lambda} = \overline{\lambda}$ to hold, it is necessary to assume an unconventional parameterization of cumulative prospect theory (particularly, $\delta < \gamma$) which contradicts to the existing experimental evidence (e.g., Tversky and Kahneman, 1992; Abdellaoui, 2000). Furthermore if the equality $\underline{\lambda} = \overline{\lambda}$ is true, MLA becomes inconsistent with implications A and B which apparently precipitate statistically significant difference between aggregate choice patterns in treatments H and L.

4. DISCUSSION

As it is demonstrated in the previous section, MLA cannot explain individual choices observed in several experiments on risk taking with varying evaluation period. This section discusses two tentative explanations of these experimental findings.

4.1. FECHNER MODEL OF RANDOM ERRORS

In every experimental round subjects face identical decision problem. According to deterministic decision theories, subjects should bet the same amount in every round. However, experimental data suggest that observed bets of the same individual are rather stochastic across different rounds. Moreover, Table 6 shows that the spread between a maximum and a minimum bet of the same individual is, on average, larger than the magnitude of a cross-treatment effect. This result is consistent with findings of Hey (2001) that the variability of the subjects' responses in repeated choice under risk is

generally higher than the difference in the predictive error of various deterministic decision theories.

[INSERT Table 6 HERE]

Consider an individual who places bets in both treatments according to a simple algorithm. Starting from the status quo, she compares betting zero versus betting a fraction Δ of her endowment.[2] If the latter yields higher utility, she compares betting Δ and betting 2Δ and so forth until either further increase of her bet does not pay off in terms of utility or a maximum bet (100% of endowment) is reached.[3] For simplicity, let us assume that risky lotteries are evaluated by expected value but this evaluation is distorted by noise.[4] According to the Fechner model of random errors originally proposed by Fechner (1860) and recently axiomatized by Blavatskyy (2008), an individual prefers to abstain from betting rather than to bet Δ in treatment H if

$$0-\left(2.5\Delta\cdot 1/3-\Delta\cdot 2/3\right)+\varepsilon>0 \tag{3}$$

and in treatment L — if

$$0-\left(7.5\Delta\cdot 1/27+4\Delta\cdot 6/27+0.5\Delta\cdot 12/27-3\Delta\cdot 8/27\right)+\varepsilon>0, \tag{4}$$

where ε is a stochastic error term symmetrically distributed around zero.

Let $\Phi(.)$ denote cumulative distribution function of stochastic error ε. Equations (3) and (4) then imply that the chance of observing zero bet is $prob\left(\varepsilon>\Delta/6\right)=1-\Phi\left(\Delta/6\right)$ in treatment H and $prob\left(\varepsilon>\Delta/2\right)=1-\Phi\left(\Delta/2\right)$ in treatment L. Since $\Phi\left(\Delta/2\right)\geq\Phi\left(\Delta/6\right)$

[2] Experimental data seem to suggest that for the majority of subjects the step size Δ is a quarter of initial endowment. For example, investment of 0%, 25%, 50%, 75% or 100% of endowment constitutes 81.3% of all bets in treatment H and 85.7% of all bets in treatment L in the experiment of Gneezy and Potters (1997).

[3] Blavatskyy and Köhler (2009) provide experimental evidence that people decompose complex decision problems into a series of simple binary choice problems.

[4] Random errors may occur for a variety of reasons. To name a few, subjects can misunderstand experimental instructions, lack sufficient monetary incentives, or pencil in a wrong number by accident.

for any positive Δ, the likelihood that an individual abstains from betting is higher in treatment H than in treatment L.

The intuition behind this result is simple. According to deterministic preferences (maximization of expected value) an individual always prefers to bet a higher amount on the risky lottery. However, an occasional random error can reverse this preference. Since in treatment L the stakes are three times higher than in treatment H, a larger error is required in treatment L than in H for reversing deterministic preferences. Hence, the likelihood that an individual abstains from investment is lower in treatment L.

A simple calculation also suggests that the probability that an individual bets 100% of her initial endowment on the risky lottery is $\Phi(\Delta/6)^{1/\Delta}$ in treatment H and $\Phi(\Delta/2)^{1/\Delta}$ in treatment L. Thus, according to Fechner model, an individual is more likely to invest all her initial endowment in treatment L rather than in Treatment H. Intuitively, if observed behavior is a result of noise, an individual should bet all her endowment on the risky lottery in both treatments. In the presence of random errors, this deterministic preference does not always translate into observed behavior. However, not all errors that reverse deterministic preference in treatment H are sufficient for reversing this preference in treatment L (where returns to investment are tripled). Therefore, the likelihood that an individual bets all her endowment on the risky lottery is higher in treatment L.

Probability that an individual bets an intermediate fraction of her endowment is $\Phi(\Delta/6)[1-\Phi(\Delta/6)]+...+\Phi(\Delta/6)^{1/\Delta-1}[1-\Phi(\Delta/6)]=\Phi(\Delta/6)-\Phi(\Delta/6)^{1/\Delta}$ in treatment H and $\Phi(\Delta/2)-\Phi(\Delta/2)^{1/\Delta}$ in treatment L. Which one of these two probabilities is larger depends on the additional assumptions about the step size Δ and the function $\Phi(.)$. Clearly, chances of observing an intermediate bet can be of a similar magnitude in both

treatments. Thus, a simple model of expected value maximization with Fechner-type random errors can explain the qualitative properties of experimental data that are reexamined in this paper.

4.2. FINANCIAL ASSET PRICING MODEL

Recall from Section 3 that in contrast to that of students, individual choices of professional traders in the experiment of Haigh and List (2005) appear to be consistent with the hypothesis of MLA. In order to explain this finding we consider a financial asset pricing model as a tentative explanation of traders' behavior.

In a standard asset pricing model, investment opportunities are represented as points in a two-dimensional risk-return space (e.g. Figure 1). Notably, risk embedded in an investment project is conventionally measured as a standard deviation of possible returns. Betting on the risky lottery in treatment L yields a three times higher expected return, compared to treatment H, but the standard deviation of possible returns is only $\sqrt{3}$ times higher. Figure 1 shows that for every investment portfolio in treatment H (located on the line OH) there is a corresponding portfolio in treatment L (located on the line OL) that either yields a higher expected return for the same level of risk, or yields the same expected return with a lower risk. Thus, betting on the risky lottery appears to be at least as rewarding in treatment L as in treatment H.

This argument can explain observed behavior in the field experiment of Haigh and List (2005) with professional traders. Professional traders are likely to frame the experiment in terms of the asset pricing model. They are accustomed to this model due to the nature of their profession and their training. Thus, our finding that intermediate bets of traders (in contrast to those of undergraduate students) are significantly different across two treatments (e.g., Table 4) can be explained by the fact that traders perceive

field experiment as a portfolio allocation problem in which they face relatively less risky option in treatment L than in treatment H.

[INSERT Figure 1 HERE]

5. CONCLUSION

This paper uses the experimental data on risk taking and evaluation periods reported in Gneezy and Potters (1997), Haigh and List (2005) and Langer and Weber (2005) to explore whether and to what extent MLA can explain and predict behavior of experimental subjects. A close reexamination of the data suggests that while at the aggregate level observed choice patterns can be reconciled with the MLA hypothesis, the majority of individual choices are inconsistent with MLA. Experimental subjects invest intermediate fractions of their initial endowment in the risky lottery. Moreover, these intermediate bets do not appear to vary significantly with the length of the evaluation period.

We find that while the experimental results cannot be fully rationalized by MLA, several alternative explanations are possible. Particularly, the Fechner model of random errors (Fechner, 1860) can be evoked to capture the qualitative properties of the experimental data. The Fechner model suggests that an individual evaluates risky lotteries according to a deterministic decision theory, but this evaluation is affected by random errors. The smaller the difference between two lotteries in terms of utility, the more likely are random errors to reverse deterministic preferences.

We show that a simple model of expected value maximization combined with a standard Fechner model of random errors explains the experimental data. In the long evaluation period lotteries are more distinct in terms of utility than in the short evaluation

period. Hence, an individual preference for betting on the risky lottery is less vulnerable to errors when lotteries are evaluated infrequently.

The behavior of professional traders in the field experiment of Haigh and List (2005) could be rationalized using a standard financial asset pricing model. We show that while traders seem to exhibit behavioral patterns consistent with MLA, it is also possible and likely that, due to their training and experience, they apply standard asset pricing toolbox in experimental situations resembling conventional portfolio allocation problems.

Our findings suggest that experiments on risk taking and evaluation periods seem to provide evidence of phenomena other than MLA. Several experimental studies (e.g., Plott and Zeiler 2005 and 2006) reevaluate asymmetries in exchange behavior initially interpreted as evidence of endowment effect predicted by loss aversion. They find that these asymmetries might result from subjects' misconceptions about the experimental procedure. We show that a similar critique of experimental evidence can be applied to research cited in support of myopic loss aversion.

Our results also indicate that there is much work to be done in developing a model capable of explaining the data on risk taking and evaluation periods. It is also necessary to design an experimental procedure which will give an opportunity to compare expected utility theory (EUT) approach with the MLA hypothesis in the laboratory. Even though much progress has been made in the direction of developing an appropriate procedure, to date, existing experimental algorithms, by in large, fail to discriminate between the EUT and the MLA hypotheses.

Finally, one of the interesting endeavors for future research is to conduct studies testing MLA as well as other tentative explanations of individual behavior in choice under risk with different evaluation periods. For example, one experiment that allows us

to discriminate between different models proposed in this paper (i.e. the Fechner model of random errors and the financial asset pricing model) can be the following. In treatment H, a subject who invests x from the initial endowment receives $-x$ with probability 2/3 and $2.5x$ with probability 1/3 at the end of the period. In treatment L, a subject who invests x from the initial endowment receives $-x/3$ with probability 2/3 and $5x/6$ with probability 1/3 at the end of the period. As usual, in this treatment the subject does not observe individual earnings at the end of the period. She observes only the cumulative earnings at the end of three consecutive periods. In this proposed future experiment, a simple model of expected value maximization combined with the Fechner model of random errors predicts that there is no significant difference in individual choice patterns across two treatments. In contrast, the financial asset pricing model predicts that individuals invest more in treatment L. This laboratory experiment can distinguish between two models.

More importantly, it is worthwhile to explore whether individual behavior of traders outside the laboratory can be predicted by MLA, the Fechner model of random errors and the financial asset pricing model. Traders may have very short time horizons due to the fact that they evaluate their earnings on a daily basis. Such a high frequency of evaluation should result in traders being implausibly highly risk averse (e.g., Mehra and Prescott, 1985). Yet, non-experimental studies in finance suggest that traders tend to suffer from various behavioral biases which are likely to affect their behavior. For example, Coval and Shumway (2005) show that traders tend to exhibit high levels of loss aversion expecting above average afternoon risk to recover from morning losses. As a result, such traders engage in risk-seeking trading: they buy contracts at higher prices and sell contract at lower prices than those that prevailed previously. Odean (1998) argues

that traders are also prone to overconfidence. Incorporating such behavioral biases into theoretical predictions and testing the fit of these predictions using laboratory and non-experimental data will give an opportunity to differentiate among various theoretical explanations, to determine a new agenda for the research on risk taking and evaluation periods as well as to deepen our understanding of professional behavior exhibited by professional traders.

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TABLES AND FIGURES

	Rounds	Average percentage of endowment bet (standard deviation)		Mann-Whitney statistic (*p*-value)
		Treatment H	Treatment L	
Students	**Gneezy and Potters (1997)**			
	Rounds 1-3	52.0 (30.2)	66.7 (29.5)	-2.08 (0.018)
	Rounds 4-6	44.8 (30.0)	63.7 (30.3)	-2.78 (0.003)
	Rounds 7-9	54.7 (28.9)	71.9 (29.4)	-2.51 (0.006)
	Rounds 1-9	50.5 (26.7)	67.4 (27.3)	-2.86 (0.002)
	Haigh and List (2005)			
	Rounds 1-3	42.77 (31.16)	56.50 (25.75)	-2.35 (0.019)
	Rounds 4-6	51.77 (30.64)	62.72 (26.69)	-1.48 (0.138)
	Rounds 7-9	58.13 (28.52)	68.28 (26.88)	-1.45 (0.146)
	Rounds 1-9	50.89 (30.48)	62.50 (26.56)	-1.82 (0.069)
	Langer and Weber (2005)			
	Rounds 1-18	44.6 -	59.9 -	- (<0.05)
Traders	**Haigh and List (2005)**			
	Rounds 1-3	48.85 (30.88)	66.22 (27.50)	-2.19 (0.029)
	Rounds 4-6	39.10 (33.11)	75.56 (24.58)	-3.90 (0.000)
	Rounds 7-9	48.83 (34.24)	81.41 (22.74)	-3.55 (0.000)
	Rounds 1-9	45.59 (32.69)	74.29 (25.49)	-3.48 (0.000)

Table 1 Average percentage of initial endowment invested in the risky lottery in treatments H and L by all subjects as reported in Gneezy and Potters (1997), Haigh and List (2005) and Langer and Weber (2005)

Clusters of individual choices	Number (percentage) of subjects			
	Students			Traders
	Gneezy and Potters (1997)	Haigh and List (2005)	Langer and Weber (2005)	Haigh and List (2005)
Invest 100% of endowment in the majority of rounds[1]	7 (17.1 %)	5 (15.7 %)	2 (12.5%)	6 (22.2 %)
Invest 1%-99% of endowment in the majority of rounds	27 (65.8 %)	25 (78.1 %)	13 (81.2%)	17 (63.0 %)
Invest 0% of endowment in the majority of rounds	4 (9.8 %)	1 (3.1 %)	1 (6.3%)	2 (7.4 %)
Other	3 (7.3 %)	1 (3.1 %)	0 (0.0%)	2 (7.4 %)

Table 2 Individual choices observed in Treatment H

Clusters of individual choices	Number (percentage) of subjects			
	Students			Traders
	Gneezy and Potters (1997)	Haigh and List (2005)	Langer and Weber (2005)	Haigh and List (2005)
Invest 100% of endowment in the majority of rounds	15 (35.7 %)	6 (18.8 %)	3 (15.0%)	10 (37.0 %)
Invest 1%-99% of endowment in the majority of rounds	27 (64.3 %)	26 (81.2 %)	17 (85.0%)	17 (63.0 %)
Invest 0% of endowment in the majority of rounds	0 (0.0 %)	0 (0.0 %)	0 (0.0%)	0 (0.0 %)

Table 3 Individual choices observed in Treatment L

[1] Majority is defined as 5 rounds for experiments of Gneezy and Potters (1997) and Haigh and List (2005) and 10 rounds for the experiment of Langer and Weber (2005).

	Rounds	Average percentage of endowment bet (standard deviation)		Mann-Whitney statistic (*p*-value)
		Treatment H	Treatment L	
Students	**Gneezy and Potters (1997)**			
	Rounds 1-3	43.71 (15.74)	50.00 (21.68)	-0.8118 (0.4169)
	Rounds 4-6	37.69 (19.74)	43.52 (16.34)	-1.2893 (0.1973)
	Rounds 7-9	45.40 (19.25)	56.24 (25.55)	-1.3390 (0.1806)
	Rounds 1-9	42.27 (15.58)	49.92 (16.54)	-1.7436 (0.0812)
	Haigh and List (2005)			
	Rounds 1-3	34.88 (20.49)	49.72 (21.59)	-2.5758 (0.0100)
	Rounds 4-6	46.13 (22.63)	52.28 (20.04)	-0.9641 (0.3350)
	Rounds 7-9	55.07 (25.02)	59.40 (23.61)	-0.6804 (0.4962)
	Rounds 1-9	45.36 (19.23)	53.80 (19.64)	-1.5922 (0.1113)
	Langer and Weber (2005)			
	Rounds 1-6	39.87 (24.29)	49.56 (16.49)	-1.5293 (0.1262)
	Rounds 7-12	39.87 (23.51)	52.94 (22.56)	-1.3404 (0.1801)
	Rounds 13-18	41.54 (26.38)	56.18 (25.71)	-1.3404 (0.1801)
	Rounds 1-18	40.43 (22.65)	52.89 (19.56)	-1.6744 (0.0940)
Traders	**Haigh and List (2005)**			
	Rounds 1-3	33.18 (23.69)	51.94 (21.90)	-2.3850 (0.0171)
	Rounds 4-6	27.98 (17.41)	60.69 (19.46)	-3.8802 (0.0001)
	Rounds 7-9	38.39 (26.28)	70.47 (22.31)	-3.2629 (0.0011)
	Rounds 1-9	33.18 (19.19)	61.03 (19.25)	-3.5493 (0.0004)

Table 4 Average percentage of initial endowment invested in the risky lottery in treatments H and L by subjects who bet intermediate fraction of their endowment in the majority of experimental rounds

Index of loss aversion λ	$\lambda < \underline{\lambda}$	$\lambda = \underline{\lambda}$	$\underline{\lambda} < \lambda < \overline{\lambda}$	$\lambda = \overline{\lambda}$	$\lambda > \overline{\lambda}$
Betting on the risky lottery in treatment H	everything	anything	nothing	nothing	nothing
Betting on the risky lottery in treatment L	everything	everything	everything	anything	nothing

Table 5 MLA prediction for individual behavior in treatments H and L

Indicators (in percent of initial endowment)	Experiment			
	Students			Traders
	Gneezy and Potters (1997)	Haigh and List (2005)	Langer and Weber (2005)	Haigh and List (2005)
Average spread between maximum and minimum bet of the same subject in treatment H	44.7	46.1	58.8	55.6
Median spread between maximum and minimum bet of the same subject in treatment H	45.0	40.0	70.0	67.0
Average spread between maximum and minimum bet of the same subject in treatment L	17.4	20.0	28.3	18.1
Median spread between maximum and minimum bet of the same subject in treatment L	0.0	20.0	27.5	20.0
Difference between average bets in treatments H and L (between subject)	16.9	11.6	14.9	28.7
Difference between median bets in treatments H and L (between subject)	0.0	10.0	30.0	40.0

Table 6 Within-subject volatility versus cross-treatment effect

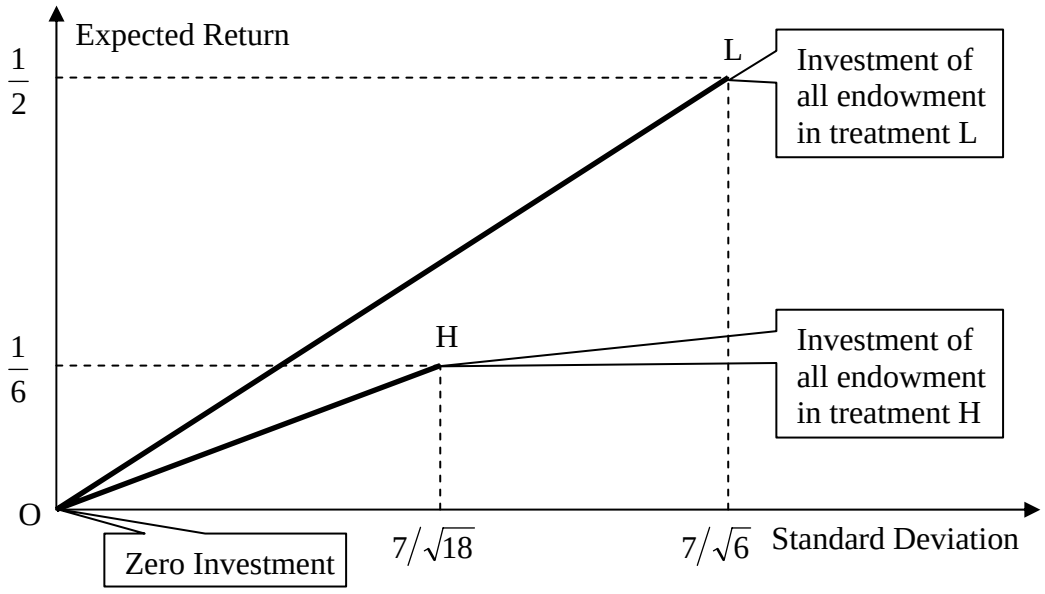

Figure 1 Investment portfolios available in treatments H and L