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Myopic loss aversion revisited ☆

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ABSTRACT

In this paper we reexamine several experimental papers on myopic loss aversion by analyzing individual rather than aggregate choice patterns. We find that the behavior of the majority of subjects is inconsistent with the hypothesis of myopic loss aversion.

1. Introduction

Myopic loss aversion (MLA) refers to a combination of greater sensitivity to losses than to gains (loss aversion) and a tendency to evaluate outcomes frequently (mental accounting) e.g. Thaler et al. (1997). Benartzi and Thaler (1995) proposed MLA as an explanation for the equity premium puzzle (Mehra and Prescott, 1985). However, Durand et al. (2004) showed that the analysis of Benartzi and Thaler (1995) is not robust. In a similar vein, Fielding and Stracca (2006) find that MLA can explain historical equity premium only if investors have highly short-sighted evaluation period.

Given these recent findings that macroeconomic simulations of equity premium puzzle do not appear to be consistent with MLA hypothesis, this papers takes a closer look at the experimental evidence in support of MLA. 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) all find that, on average, subjects bet significantly higher amounts on a risky lottery when its performance is assessed over a relatively long time period. Thus, *aggregate* choice patterns observed in these experiments apparently support MLA hypothesis. However, this paper shows that the majority of *individual* choice patterns are actually inconsistent with MLA hypothesis in several of these experiments.[2] Only a field experiment of Haigh and List (2005) documents MLA at the individual level.

The remainder of this paper is organized as follows. Section 2 presents the experimental design of Gneezy and Potters (1997), which was subsequently replicated (with additional treatments) by Langer and Weber (2005), Haigh and List (2005) and Bellemare et al. (2005). Section 3 reexamines the experimental results and shows that the majority of subjects exhibit behavior inconsistent with MLA. Section 4 concludes.

2. Experimental design

Gneezy and Potters (1997) ask subjects to bet any part x of their initial endowment on a risky lottery that yields $-x$ with probability 2/3 and 2.5x with probability 1/3. Subjects are randomly

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[2] In a similar spirit, Hershey and Schoemaker (1980) argued that the reflection hypothesis of the original prospect theory should be tested on the individual level rather than on the aggregate level.

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Table 1
Individual choice patterns observed in treatment H.

Individual choice pattern in the majority of rounds	Number (percentage) of subjects			
	Gneezy and Potters (1997)	Langer and Weber (2005)	Haigh and List (2005), students	Haigh and List (2005), traders
Invest 100% of endowment	7 (17.1%)	2 (12.5%)	5 (15.7%)	6 (22.2%)
Invest 1%–99% of endowment	27 (65.8%)	13 (81.2%)	25 (78.1%)	17 (63.0%)
Invest 0% of endowment	4 (9.8%)	1 (6.3%)	1 (3.1%)	2 (7.4%)
Other	3 (7.3%)	0 (0.0%)	1 (3.1%)	2 (7.4%)

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).

Table 2
Individual choice patterns observed in treatment L.

Individual choice pattern in the majority of rounds	Number (percentage) of subjects			
	Gneezy and Potters (1997)	Langer and Weber (2005)	Haigh and List (2005), students	Haigh and List (2005), traders
Invest 100% of endowment	15 (35.7%)	3 (15.0%)	6 (18.8%)	10 (37.0%)
Invest 1%–99% of endowment	27 (64.3%)	17 (85.0%)	26 (81.2%)	17 (63.0%)
Invest 0% of endowment	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

assigned to one of the two experimental treatments. In treatment H, subjects make investment decisions in 9 rounds. In rounds 2–9 subjects observe the outcome of the lottery realized in the previous round. In treatment L, 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 cumulative outcome of the lottery from previous three rounds. In both treatments subjects receive a new initial endowment at the beginning of every period (irrespective of past earnings).

Langer and Weber (2005), Haigh and List (2005) and Bellemare et al. (2005) replicated the experiment of Gneezy and Potters (1997) and made several modifications to their design. Langer and Weber (2005) increased the number of rounds from 9 to 18 and used two other risky lotteries for which they did not find evidence of MLA. Haigh and List (2005) conducted a field experiment with professional traders from the Chicago Board of Trade. Bellemare et al. (2005) used an additional treatment identical to treatment L except that subjects observed the realization of the risky lottery in every period (betting behavior in this treatment was not significantly different from that in treatment H).

Table 3
Average percentage of initial endowment invested in the risky lottery in treatments H and L by subjects who bet only intermediate fraction of their endowment in the majority of experimental rounds.

Rounds	Average percentage of endowment bet (standard deviation)		Mann–Whitney statistic (p-value)
	Treatment H	Treatment L	
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)
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)
Haigh and List (2005), students			
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)
Haigh and List (2005), professional traders			
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)

3. Reexamination of experimental results

Tables 1 and 2 show that the majority of subjects in the experiments of Gneezy and Potters (1997), Langer and Weber (2005) and Haigh and List (2005) exhibit the same individual choice patterns, both in treatment H and treatment L. In the majority of experimental rounds they invest an intermediate fraction of their initial endowment. Only a handful of subjects abstain from betting on the risky lottery and 12%–22% (15%–37%) of subjects consistently bet all their endowment on the risky lottery in treatment H (L).

Let us now focus on subjects who consistently bet an intermediate fraction of their endowment on the risky lottery. Table 3 shows that their intermediate bets are not significantly different across two treatments in all experiments with an exception of field experiment of Haigh and List (2005) with professional traders. We will now demonstrate that such behavior is inconsistent with the hypothesis of MLA.

The prediction of MLA is based on a deterministic decision theory proposed by Tversky and Kahneman (1992). According to their cumulative prospect theory, an individual derives utility from changes in wealth, 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 $\lambda>0$ is the index of loss aversion (e.g. Köbberling and Wakker, 2005) and coefficients α and β, that capture diminishing sensitivity to gains and losses, are estimated to be both equal to 0.88.

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

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

where $w_{+}(p)=p^{\gamma}/(p^{\gamma}+(1-p)^{\gamma})^{1/\gamma}$ and $w_{-}(p)=p^{\delta}/(p^{\delta}+(1-p)^{\delta})^{1/\delta}$ 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 betting amount x on the risky lottery in treatment L obtains utility

$$U_{\mathrm{L}}(x) = (0.5x)^{\alpha} w_{+}(19/27) + (4^{\alpha} - 0.5^{\alpha}) x^{\alpha} w_{+}(7/27) + (7.5^{\alpha} - 4^{\alpha}) x^{\alpha} w_{+}(1/27) - \lambda (3x)^{\beta} w_{-}(8/27). \qquad (2)$$

Let $\underline{\lambda} = \frac{2.5^{\alpha} w_{+}(1/3)}{w_{-}(2/3)}$ and $\overline{\lambda} = \frac{0.5^{\alpha} w_{+}(19/27) + (4^{\alpha} - 0.5^{\alpha}) w_{+}(7/27) + (7.5^{\alpha} - 4^{\alpha}) w_{+}(1/27)}{3^{\beta} w_{-}(8/27)}$. Notice that when $\alpha=\beta$, an individual bets nothing on the risky lottery in

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Table 4
Predicted behavior in treatments H and L according to MLA.

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

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 $\underline{\lambda}$ is smaller than ratio $\overline{\lambda}$. For example, $\underline{\lambda}\approx 1.33$ and $\overline{\lambda}\approx 1.66$ for parameters estimated by Tversky and Kahneman (1992).[3] Therefore, individual betting behavior in treatments H and L, which is consistent with the hypothesis of MLA, can be organized in the following Table 4 (depending on the unobservable index of loss aversion).

In terms of the between-subject design of Gneezy and Potters (1997), Table 4 has the following testable implications:

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.

Tables 1 and 2 show that while implications A and B of MLA are confirmed for all experiments, implications C and D of MLA are clearly violated. In all experiments the majority of subjects decide to bet an intermediate fraction of their endowment on the risky lottery. The fraction of subjects who consistently bet an intermediate fraction of their endowment is nearly identical across two treatments (ranging between 65% and 85% across different experiments) and their intermediate bets are not significantly different across two treatments (except for the field experiment of Haigh and List, 2005).

MLA can explain this finding only if ratios $\underline{\lambda}$ and $\overline{\lambda}$ happen to be equal for the majority of subjects in both treatments. However, for the equality $\underline{\lambda}=\overline{\lambda}$ to hold, we need to assume unconventional parameterizations of cumulative prospect theory (in particular, $\delta<\gamma$), which contradicts to the existing experimental evidence (e.g. Tversky and Kahneman (1992), Abdellaoui (2000)). Moreover, if $\underline{\lambda}=\overline{\lambda}$, then MLA cannot explain implications A and B that apparently lead to statistically significant difference between *aggregate* choice patterns in treatments H and L.

4. Conclusion

In this paper we reexamine the experimental evidence on risk taking and evaluation periods, provided by Gneezy and Potters (1997), Langer and Weber (2005) and Haigh and List (2005). A close look at the data suggests that behavioral patterns of the majority of subjects contradict to the MLA explanation. Subjects not only invest intermediate fractions of their endowment, but also these intermediate bets do not appear to vary greatly across treatments with different length of evaluation period (except for a field experiment of Haigh and List, 2005).

Our results suggest two important messages. First, experiments on risk taking and evaluation periods may reflect other phenomena than MLA. Some experimental evidence in support of the assumption of loss aversion of prospect theory has already been called into question by Plott and Zeiler (2005, 2007) and List (2003, 2004).

The second message is that the question of comparing expected utility theory and MLA approaches in the laboratory remains unanswered. While many attempts have been made to create an appropriate procedure, current experimental algorithms fail to discriminate between the two alternatives. It is left to further research to design an experiment, which would test expected utility theory versus MLA.

References

Abdellaoui, M., 2000. Parameter-free elicitation of utility and probability weighting functions. Management Science XLVI, 1497–1512.
Bellemare, Ch., Krause, M., Kröger, S., Zhang, C.h., 2005. Myopic loss aversion: information feedback vs. investment flexibility. Economics Letters 87, 319–324.
Benartzi, S., Thaler, R., 1995. Myopic loss aversion and the equity premium puzzle. Quarterly Journal of Economics CX, 73–95.
Durand, R., Lloyd, P., Wee Tee, H., 2004. Myopic loss aversion and the equity premium puzzle reconsidered. Finance Research Letters 1, 171–177.
Fielding, D., Stracca, L., 2006. Myopic loss aversion, disappointment aversion and the equity premium puzzle. Journal of Economic Behavior and Organization 64 (2), 250–268.
Gneezy, U., Potters, J., 1997. An experiment on risk taking and evaluation periods. Quarterly Journal of Economics CXII, 631–645.
Gneezy, U., Kapteyn, A., Potters, J., 2003. Evaluation periods and asset prices in a market experiment. Journal of Finance LXIII, 821–838.
Haigh, M., List, J., 2005. Do professional traders exhibit myopic loss aversion? an experimental analysis. The Journal of Finance LX, 523–534.
Hershey, J., Schoemaker, P., 1980. "Prospect theory's reflection hypothesis: a critical examination,". Organizational Behavior and Human Decision Processes 25 (3), 395–418.
Köbberling, V., Wakker, P., 2005. An index of loss aversion. Journal of Economic Theory CXXII, 119–131.
Langer, Th., Weber, M., 2005. Myopic prospect theory vs. myopic loss aversion: how general is the phenomenon? Journal of Economic Behavior and Organization LVI, 25–38.
List, John A., 2003. Does market experience eliminate market anomalies? Quarterly Journal of Economics 118 (1), 41–71.
List, John A., 2004. Neoclassical theory versus prospect theory: evidence from the marketplace. Econometrica 72 (2), 615–625.
Mehra, R., Prescott, E., 1985. The equity premium: a puzzle. Journal of Monetary Economics XV, 341–350.
Plott, Ch., Zeiler, K., 2005. The willingness to pay—willingness to accept gap, the "endowment effect, subject misconceptions, and experimental procedures for eliciting valuations,". American Economic Review 95 (3), 530–545.
Plott, Ch., Zeiler, K., 2007. Asymmetries in exchange behavior incorrectly interpreted as evidence of prospect theory. American Economic Review 97 (4), 1449–1466.
Thaler, R., Tversky, A., Kahneman, D., Schwartz, A., 1997. The effect of myopia and loss aversion on risk taking: an experimental test. Quarterly Journal of Economics CXII, 647–661.
Tversky, A., Kahneman, D., 1992. Advances in prospect theory: cumulative representation of uncertainty. Journal of Risk and Uncertainty V, 297–323.

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

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